UNIT: 01
BASIC INGREDIENTS

STRUCTURE

1.1 INTRODUCTION

Bakery ingredients have been used since ancient times and are of utmost importance these days as perhaps nothing can be baked without them. They are available in wide varieties and their preferences may vary according to the regional demands. Easy access of global information and exposure of various bakery products has increased the demand for bakery ingredients. Baking ingredients offer several advantages such as reduced costs, volume enhancement, better texture, colour, and flavour enhancement. For example, ingredients such enzymes improve protein solubility and reduce bitterness in end products, making enzymes one of the most preferred ingredients in the baking industry.

Every ingredient in a recipe has a specific purpose. It's also important to know how to mix or combine the ingredients properly, which is why baking is sometimes referred to as a science. There are reactions in baking that are critical to a recipe turning out correctly. Even some small amount of variation can dramatically change the result. Whether its breads or cake, each ingredient plays a part.

Food Ingredients– The different ingredients used in baking are flour, refined flour or maida, sugar, shortenings, leavening agents, eggs, water, salt, milk and milk derivatives. The bakery ingredients can be classified depending upon their functions in bakery.
Structure builders: Provide the structure and texture to the bakery products e.g. flour, eggs and milk.

Tenderizers: Provide softness and shortness in the product e.g. fat, sugar and baking powder.

Moisteners: Provide moisture and keeping quality e.g. milk, water, egg, syrup.

Driers: Absorb and retain moisture and provide the body of the product e.g. milk solids and starches.

Flavors: Provide natural flavour e.g. cocoa, chocolate, butter, egg, vanilla and other natural flavoring ingredients.

1.2 OBJECTIVE

While reading this unit the learners will able to

- Understand the characteristics and functions of sugars.
- Understand the characteristics and functions of wheat flours, and identify their main types by sight and feel.
- Understand the characteristics and functions of other flours, meals, and starches.
- Understand the characteristics and functions of fats.
- Understand the characteristics and functions of milk and milk products.
- Understand the characteristics and functions of eggs.
- Understand the characteristics and functions of leavening agents.
- Understand the characteristics and functions of chocolate and cocoa.
- Understand the characteristics and functions of salt, spices, and flavorings

1.3 SUGARS

Sugar or as it is chemically called Sucrose is a building blocks of carbohydrates and it is naturally found in many food such as fruit, milk, vegetables and grain, another kind of sugar is added sugar which can be founded in flavored yogurt, sweetened beverages, baked goods and cereals, and it is used widely in industry. Sugar is one of the major ingredients in the bakery industry and plays an important role. Sugars vary in their sweetening quality and are the soul of all desserts. Sugar is natural and non –toxic, sweet testing, water soluble concentrated form or crystalline carbohydrate.

A molecule of sugar is composed of 12 atoms of carbon, 22 atoms of hydrogen, and 11 atoms of oxygen ($C_{12}H_{22}O_{11}$). There are two basic groups of sugars – simple sugars or

monosaccharides, which means "single sugars" like glucose and fructose, and complex sugars or disaccharides, meaning "double sugars" like maltose (malt sugar} and lactose (found in animal milk).

Origin: It is found naturally and in higher quantity in the leaves, stems, roots or fruits of plants. Sugar may be obtained from varied plants like from maple tree – Canada, date palm – Africa, sugarcane – tropical region like India, beetroots from temperate region like Russia and from sorghum, grapes, potatoes, honey etc. The primary sugar, glucose, is a product of photosynthesis and occurs in all green plants. In most plants, the sugars occur as a mixture that cannot readily be separated into the components. In the sap of some plants, the sugar mixtures are condensed into syrup. Juices of sugarcane *(Saccharumofficinarum)* and sugar beet *(Beta vulgaris)* are rich in pure sucrose, although beet sugar is generally much less sweet than cane sugar. These two sugar crops are the main sources of commercial sucrose.

Classification of Sugar : Sugars are classified under one or in the combination of following –

1. The source (sugarcane or sugar beet)
2. The country of origin
3. The method of processing, which in turn determine the type of sugar produced, e.g. cube sugar, icing sugar.
4. Catering use – specific type of sugar should purchase for particular use.
   Chemical group –sugar may be classified in two chemical groups, mono and disaccharides.

Manufacture of sugar : The first step in sugar production is to crush the cane or beet to extract the juice. This juice contains tannins, pigments, proteins and other undesirable components that must be removed through refinement with the help of chemicals (milk of lime or carbon dioxide). Refinement begins by dissolving the juice in water, then boiling it in large steam evaporators. The solution is then crystallized in heated vacuum pans. The un –crystallized liquid by –product, known as *molasses*, is separated out in a centrifuge (used mainly as cattle fodder). The remaining crystallized product, known as raw sugar, contains many impurities. This is then washed with steam to remove some of the impurities. This yields a product known as *turbinado sugar*. Refining continues as the turbinado is heated, liquefied, centrifuged and filtered. Chemicals may be used to bleach and purify the liquid sugar. Finally, the clear liquid sugar is recrystallized in vacuum pans and further refined through bone ash to get pure opaque granulated sugar. Pure sucrose is sold in granulated and powdered forms and is available in several grades.

Forms of Sugar:

1. **Granulated/ white sugar/sandy sugar** –This is the regular white sugar which in used in homes. Usage of this sugar will find its place in any preparation which has sufficient liquid to dissolve it. For example, whipping eggs, making sugar syrups, cooking sabayon over double boilers, etc. It contains 99.7% sucrose.

2. **Icing sugar –** Granulated sugar is crushed into fine powder and has a small percentage of corn starch added to keep it smooth and free flowing. Icing sugar is used for creaming methods where it would be used as icing for cakes and pastries. Icing sugar can also be sifted on top of dry baked sweet products as a garnish.

3. **Castor sugar** – This is superfine sugar (A Grade) and is also called breakfast sugar –made by crushing and sieving fine granulated sugar. It dissolves quickly and easily in liquids and can be creamed easily. Used in making pastries, cakes, desserts, ices etc. as it produce tender and light cakes.

4. **Pearl sugar** – is a type of decorating sugar made by polishing large crystals until they resemble pearls.

5. **Sugar cubes** – are formed by pressing moistened granulated sugar into molds and allowing it to dry. Most cubes are used for beverage service.

6. **Powder Sugar or confectioners' sugar** – It is obtained from granulated sugar by pulverization (refining of granulated sugar to get more fine form). It is available in various degree of fineness, use for different purposes in confectionary.

7. **Brown Sugar** – It is simple refined sugar with some molasses returned to it or it is the residual sugar obtained during the process of refining sugar. It is brown in color and has distinctive color and flavor. As it contains moisture, it forms lump. Used in the preparation of certain puddings, cakes, etc.The more darker coarse granulated and caramel flavor sugar is called Turbinado sugar in USA and Demirara sugar in Great Britain. It is used in beverages and certain baked products.

8. **Vergeoise sugar or Sucre vergeoise (French)** – solid residue from refining beet giving a product of soft consistency, golden or brown with pronounced color.v Sucre vergeoise is available in *blonde* (light) or *brune* (dark).

9. **Muscovado sugar** – is an unrefined or partially refined cane sugar with a strong molasses flavor and high moisture content. It has a slightly coarse texture and feels sticky to the touch. It is popularly used in chocolate sweets and other baked goods. It is also called Barbados sugar, molasses sugar, kandasari, khand, and moist sugar.

10. **Glucose** – It is present in body and in fruits in natural form. Commercially it is sold as Dextrose. It is less sweet than sucrose, but it is use because of its waster holding capacity. It has ability to control the size of the crystals in candies and as a food for yeast, during the fermentation.

11. **Liquid glucose** – Liquid glucose is obtained by treating the corn slurry by acid – a process known as hydrolysis. This is chemically made and results in a thick viscous liquid that is used to produce candies by not allowing the sugar to crystallize and also acts as a preservative. Liquid glucose contains the dextrin gum which retards

the crystallization of sugar. When added to products, it makes them pliable and hence very commonly used to prepare garnishes and decoration pieces with sugar.

12. **Fondant** – sugar syrup beaten with cream of tartar to form thick white paste. Used for decorating pastry or confectionary.

13. **Date sugar** – It is obtained from drying and pulverizing dates. It is very sweet and although it does not dissolve very well it is used in many baked products.

14. **Liquid caramel** – liquid sugar in which caramel colour is added to give it dark brown colour. It is a thick free –flowing liquid and may be used in preparation of puddings and some types of confectionary.

15. **Treacle/Molasses** – are products of refined sugar. When the sugarcane juice undergoes refining, it undergoes many stages. In the first stage the white sugar or the raw sugar is removed. The remaining sugar syrup is used to make treacle which is stronger than golden syrup but less than molasses. Used in the preparation of certain beverages and sauces.

16. **Maltose –** It is use as a flavoring and coloring agent in the brewing of beer.

17. **Lactose**– It is commercially extracted solution of whey formed by crystallization. It is usually added to bakery products because its presence adds to the brewing of food products.

18. **Isomalt** – It is a natural sugar substitute and in reality it is sugar alcohol. It is available in crystalline forms and is used for preparing sugar garnishes as it is more stable than sugar and does not caramelize thereby giving an appearance of thin glass sheets.

19. **Golden Syrups** – It is thick amber coloured liquid obtained from sugar during the refining process. It is treated with acid to cut down on the sharp taste. It looks similar to honey and is used in making confectionery products and to add flavour to the food products.

20. **Honey** –It is natural sugar consisting of glucose and fructose. It is a natural sugar obtained from bee hives. The colour and flavor of honey will vary with its source. Some commercial honey farms allow bees to suck the nectar from only one particular flower to produce the honey of that flavor. One can use honey in most of the baked products but care has to be taken as honey can caramelize even at lower temperatures. It is used as leavening agents and in sherbets.

21. **Maple syrup** – It is natural sweetener and is a sap of maple tree. It is boiled down to thick syrup. Pure maple syrup is very expensive, as to obtain 1 liter of maple one has to boil down at least 10 liters of maple sap. For easy processing, commercial maple syrup added to them. It could be added in the range of 2 –6 percent. The

percentage of the maple is always mentioned on the bottle and this decides the price of the product.

22. **Palm sugar** – Palm sugar is traditionally made from the sap of Palmyra palm or the date palm. It is extensively used in Asian cooking.

23. **Agave syrup** is produced from starches extracted from. It has a neutral flavor about 25% sweeter than sugar, and a consistency that is thinner than honey. It may be used in baking and cooking, as well as for sweetening beverages.

24. **Corn Syrup** – It is very sweet and contains high amount of fructose and glucose or dextrose. It is chemically refined clear syrup made from corn kernels and is prepared by converting corn starch into simple sugar compound by the use of enzymes. Coloured corn syrup is artificially coloured. Used in icing, candy masking and beverages.

25. **Invert sugar** –When a sucrose solution is heated with an acid, some of the sucrose breaks down into equal parts of two simple sugars, dextrose and levulose. A mixture of equal parts of dextrose and levulose is called. It is about 30% sweeter than regular sucrose. Invert sugar has two properties that make it interesting to the baker. First, it holds moisture especially well and, therefore, helps keep cakes fresh and moist. Second, it resists crystallization. Thus, it promotes smoothness in candies, icings, and syrups. This is why an acid such as cream of tartar is often added to sugar syrups. The acid inverts some of the sugar when it is boiled, thus preventing graininess in the candy or icing. Invert sugar is produced commercially. It is also present in honey.The use of invert sugar has declined since glucose syrup is cheaper and, for some uses, has superior properties. Some bakers and confectioners take the view that invert syrup improves the flavour of some products.*"Artificial honey"* – Technically the same as inverted sugar syrup, the product is sometimes nicknamed artificial honey thanks to its honey –like flavor.

Artificial sugar: These are nonnutritive sweeteners, or non –caloric sweeteners, are sweeteners that contain virtually no calories and no carbohydrate. These sweeteners are chemicals or plant –based substances that are hundreds of times sweeter than regular sugar (sucrose) and that have little or no effect on blood sugar levels. Sugar substitutes are very popular among people who have diabetes, as well as the general population. Some artificial sweeteners are –

- **Saccharine** – 300 –500 times sweeter than sugar. It can replace some of the sugar, but will leave a metallic aftertaste and may result in lumpy texture.

- **Aspartame** – 200 times sweeter than sugar. Not for baking as it loses sweetness in high heat. May work in custards and puddings.

- **Sucralose** – 600 times sweeter than sugar and is heat stable. Good for baking under restricted baking formulation, which has low –calorie fillers

added for bulk. Sucralose is a distant cousin of sugar as it is made from sugar.

- **Acesulfame** potassium, or Ace –K –200 times sweeter than sugar and is heat stable. Can be used in baking, but will yield a slight bitter aftertaste.

- **Erythritol** –150 times sweeter than sugar. Good for baking with no aftertaste; has fewer calories than sugar, but is not zero –calorie like many other artificial sweeteners.

- **Stevia** –200 to 300 times sweeter than sugar.Heat stable so can be used in baking; however, these sugars do not caramelize or crystallize so you will not get the browning effect desired in certain baked goods. Not appropriate for use in meringues.

- **Neotame** –8,000 times sweeter than sugar. Developed to be used in baking as the sweetness holds up to high heat with no metallic or bitter aftertaste.

Uses of Sugar –

- Adds sweetness and flavour to the products.
- To colour the cooked products by the process of Caramelization.
- They give crust color. And help get even texture.
- Makes the texture firm and tender by weakening the gluten strands.
- To retain moisture and prevent in particularly baked goods such as cakes from drying out.
- Act as preservative.
- To help as an activator, sugar helps yeast to grow faster by providing it with a readily available source of nourishment.
- As anti –coagulant.
- They act as creaming agents with fats and as foaming agents with eggs.
- As a main ingredient for cake decorating, e.g. different types of icing (topping the cake).

Cooking of Sugar –

1. One should take the following precautions while cooking sugar –
2. Use thick bottom bowl.
3. Equipment should be clean and free from oil grease.
4. Use quality sugar
5. Add sufficient water so that it will dissolve well.
6. Add lemon juice before the solution reaches boiling point
7. Lemon juice helps remove dust from sugar syrup
8. Use slow fire and do not stir the syrup when boiling.
9. Remove the scum with the help of a thick wet cloth.

10. During boiling, small specks of sugar crystals will be sprayed on ti. It must be removed.
11. Stop the boiling when the required stage has been reached.
12. If the sugar has gone over the required stage, adjust by adding warm water.
13. Maintain the correct temperature.
14. Follow the methods carefully.
15. If colour or essence is added, ensure that they are free from oil.

SUGAR COOKING STAGES

Temperature	Stages And Hand Testing	Uses
105^0 C (220^0F)	Short thread – Dip the dry finger on the sugar syrup and rub the mixture between thumb and finger and draw apart. A thread will be formed. At this stage, the thread will break if stretched.	Thin syrup used as syrups
110 ^{0}C (230^0F)	Longthread – Do the same as above. At this stage the thread will stretch as far as the span of the finger without breaking.	Thick syrup used as syrups
115 ^{0}C (240^0F)	Soft ball – The sugar can be shaped into a ball but will just hold its shape and be soft and pliable.	Fondant, marzipan, fudge
125 ^{0}C (220^0F)	Hard ball – At this stage the sugar can be very easy to make a ball and the ball will be very firm when pressed with the finger.	Hard fudge, nought
130^0 C (270^0F)	Soft crack – When placed in water the sugar will form a film on the finger. It will snap but has a tendency to be pliable.	Hard toffee, nought
135^0C (280^0F)	Hard crack – Do the same soft crack test. When biting the sugar should snap but not stick to the teeth.	Pulled sugar, spun sugar, moulding sugar
160 ^{0}C (325^0F)	Caramel – The sugar will begin to colour gradually to darker shades of brown.	Colouring agent
170 ^{0}C and above	Black Jack – At this stage the sugar will turn black.	Colouring agent

Making Sugar Syrups: Simple or stock syrups are solutions of sugar and water. They are used in the bakeshop to moisten cakes and to make sauces, fruit sorbets, butter creams and candied fruits. The syrups density or concentration is dictated by its intended purpose. Cold water will dissolves up to double its weight in sugar, heating the solution forms denser, more concentrated syrups. A hydrometer, which measures specific gravity and shows degrees off concentration on Baume scale is the most accurate guide to density.
Simple syrups can be prepared without the aid of a hydrometer, however. To make simple sugar syrups, specific amounts of water and sugar combined in a saucepan and brought to a

boil. Once the solution boils, it the important no to stir, as this may cause recrystallization or lumping. For making successful simple sugar syrups like –

- **Light syrups** – boil 2 parts water which 1 part sugar for one minute. This concentration would measure – 17 –20c on the Baume scale. Light syrups can be used for making sorbet or moistening sponge cake.

- **Medium syrup** – boil 1 part sugar with 1 – ½ part water for 1 minute. This concentration would measure 21 –24c on the Baume scale. Medium syrups can be used for candying citrus peel.

- **Heavy syrups** – boil equal part of water and sugar for 1 minute. This concentration would measure 28 –30c on the Baume scale, and the solution should be at 220f (104c) heavy syrups are a basic, all – purpose syrup kept on hand in many bakeshops.

Functional Properties of Sugar in food –

In addition to the main role of sugars in providing sweet taste, there many other functions of sugars in food.

- **Sweetness** – The most apparent sensory property of sugars such as glucose, fructose, and sucrose is their sweetness, Lactose (milk sugar) is the least sweet, whereas fructose is the sweetest sugar. Sugars areused assweeteners in many kindsof food products.

- **Preservation** – By absorbing free water and increasing osmotic pressure, sugar reduces water activity in a food system (e.g. jam), resulting in reduced microbial and mold growth as well as extending the storage life of food. Also sugar can preserve fruits, either in syrup with fruit such as apples, pears….. or in crystallized form where the preserved material is cooked in sugar to the point of crystallization and the resultant product is then stored dry. This method can be used for the skins of citrus fruit (candied peel), angelica and ginger. A modification of this process produces glace fruit such as glace cherries where the fruit is preserved in sugar but is then extracted from the syrup and sold, the sugar content of the fruit and the superficial coating of syrup maintain the preservation. Using of sugar is often combined with alcohol for preservation of luxury products such as fruit in brandy or other spirits.

- **Flavor** – Sugar plays an important and single role in contributing to the flavor of food by interacting with othercomponents to enhance or lessen certain flavors. By adding a small amount of sugar to cooked vegetables and meat enhance the food's natural flavors, without making them taste sweet. In sour applications such as beverages, jams and marmalades which all mixes of sweet and sour components, it is important to create a good balance between sourness and sweetness, which is often achieved by adding

a mix of sugar and citric acid. In bitter applications, sugar is often used to moderate or disguise the bitterness (chocolate and coffee).

- **Antioxidant Function** – The hygroscopic nature of sugar produces a weakantioxidant effect by decreasing the availability of water that is otherwise required to potential oxidants. The antioxidanteffect of sugar reduces rancidity; discoloration and deterioration of certain food products (e.g. canned fruits and baked goods). Also many early stage products of the *Maillard reaction* (in which sugar is involved) have been shown to work synergistically with other natural antioxidants (e.g. vitamin E) to prevent oxidation of lipids and proteins, extending the shelf life of food.

- **Color** – Sugar can give color to the food product by Millard reaction and*Caramelization*. The Maillard reaction occurs between sugar and amino acids and gives rise to browning and flavoring in products such as bread, coffee, heated desserts and cakes. The end products of Maillard reaction include pigmentation, which causes coloration and aroma. Caramelization occurs when carbohydrates are exposed to high temperatures. The difference from Maillard reactions is no amino groups are involved. This reaction often occurs during the preparation of traditional sucrose syrups and caramels, which are extensively used in soft drinks, beer, confectionery and pastry products.

- **Texture** – The ability to interact with water and exist in amorphous and crystalline states gave the sugar functional properties to achieve desired texture in many food products. The molecules can reform either in a crystalline (from several micrometers to several millimeters) or an amorphous state (glassy, rubbery, gooey texture) depending on the processing of melted sugar. When the sugar added in enough amount to a solution, and bind water molecules, it will provide mouthfeel by increasing viscosity, and will decrease water activity, increase boiling temperature and decrease freezing temperature, so the behavior of proteins, starches, and hydrocolloids will change. Cotton candy is an example glass state of sucrose, taffies and caramels candies are examplefor "rubbery" plasticized form. In these candies, sucrose canbe replaced or partially substituted with other sugars or polyols.

- **Fermentation** – The sugar fermentation occurs by yeasts in anaerobic conditions, and produce carbon dioxide. This process is very important for bread making, beer and wine. In bread making, sugar plays important roles (in addition to taste), by leavening agent through the formation of carbon dioxide which causes bread dough to rise before and during baking, also the sugar has high affinity to bind to gluten so when dough is kneaded, a gluten structure of high elasticity forms, enabling the dough to stretch under the expansion of gases without collapsing.

CHECK YOUR PROGRESS-I

1. What are different forms of sugar?

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2. What are the functional properties of sugar in food?

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1.4 SHORTENINGS

The term "shortening" technically refers to any type of fat that is solid at room temperature. This includes butter, margarine and lard. Shortening can be made from either animal fat or vegetable oil, but shortening made from partially or fully hydrogenated vegetable oil like soybean, cottonseed or refined palm oil, which are naturally flavoured liquid at room temperature and are more common nowadays. This makes it useful for applications where strong fat flavors are not desired. The chemical structure of the oil is changed through a process called hydrogenation (An extra hydrogen atom is added to vegetable oils which creates a solid fat). This causes the oils to become more solid, creating a thick texture that makes shortening good to use for specific types of cooking and baking.Although butter is solid at room temperature and is frequently used in making pastry, the term "shortening" seldom refers to butter, but is more closely related to margarine.

Shortening seems to get its name from the fact that it shortens gluten strands in wheat by adding fat. In other words it is used to prevent the formation of a gluten matrix by interfering with gluten formation in a dough's and batters to impart crisp, flaky and crumbly texture to baked products such as pie crusts and to increase the plasticity, or workability of dough's. However, some vegetable shortenings have artificial butter flavor added and are used as an inexpensive replacement for butter. Gluten creates a gummy or chewy end product, which is desired in elastic "long" doughs, such as that used for pizza crust. For flaky or crumbly "short" dough, the fat is worked into dry flour and creates a barrier between gluten molecules, thus preventing them from cross –linking once a liquid is added. Unlike butter, which separates into oil and milk solids when melted, shortening remains intact and reverts back to its soft, semi –solid state upon cooling. For this reason,

cookies and other baked goods made with shortening tend to be soft, while those made with butter have a crispier texture.

Characteristics of shortening:

- They are 100 percent fat with a relatively high melting and smoking point.
- They are flavorless and odorless and create softness in the baking product.
- Oils they contain no animal products and so they are cholesterol –free and high in calories.
- They blend thoroughly throughout a mixture to form emulsion. It therefore coats more of the proteins, and the gluten strands produced are much shorter, a desirable result in short, crumbly, flaky and fine –textured products such as cookies, patties, muffins or chiffon cakes.
- They have higher degree of plasticity and therefore they can be easily shaped or molded.
- Helps in gaining the desired volume of the product.
- They are cheaper than other fats.
- They show higher resistance to oxidation and rancidity and therefore have a longer shelf life and can be stored at room temperature.
- Most of the shortenings are colorless, so a baker has ample opportunity to add any color according to his need.
- They easily distribute themselves in the entire product, so uniformity is attained.
- They can be melted or softened and creamed into a dough or batter.
- Shortening is used for creaming due to its ability to incorporate large volumes of air bubbles. This creates a fine, delicate structure in the end product.
- In cake making, it is used to tenderize the product by incorporating air in the finished cake batter as well as lubricating the other ingredients allowing the cake to rise more freely.
- Shortening imparts 'richness' to the eating quality of the cake.

CLASSIFICATION OF SHORTENINGS: Shortenings may be conveniently and briefly classified in three groups– Animal, vegetable, and compound shortenings.

A. ANIMAL SHORTENINGS

Lard – is produced from selected fat of the hog through a process known as 'rendering'. It is a solid white product of almost 100 percent pure fat; it contains only a small amount of water. Lard yields flaky, flavorful pastries, such as pie crusts, but it is highly prone to rancidity. Since the development of modern shortenings, however, it is not often used in the bakeshop.

Butter – is the fat of milk, separated from milk or cream by churning and contains also a small amount of other milk constituents. Fresh butter consists of about 80% fat, about 15% water, and about 5% milk solids. There are different types of butter available :

- **Unsalted butter** – It is more perishable, but it has a fresher, sweeter taste and is thus preferred in baking.

- **Salted butter** – It is butter with up to 2.5 percent salt added, which not only changes the butter's flavor, it also extends its keeping qualities. When salted butter is used, the salt content must be considered in the total recipe.

- **Europea**n –style butter or cultured butter – contains more milk fat than regular butter, usually from 82 to 86 percent with very little or no salt. It is often churned from cultured cream, giving it a more intense, buttery flavor.

- **Whipped butter** – It is made by incorporating air into the butter. This increases its volume and spreadability but also increases the speed with which the butter will become rancid. Because of the change in density, whipped butter should not be substituted in recipes calling for regular butter.

- **Clarified butter** – It is butter in which water and milk solids have been removed by a process called clarification. It is although rarely used in bakery only when sometimes a more stable and consistent product is required to be achieved by using clarified butter.

On the other hand, butter has two major advantages –

1. **Flavor** – Shortenings are intentionally flavorless, but butter has a highly desirable flavor.
2. **Melting qualities** – Butter melts in the mouth. Shortenings do not. After eating pastries or icings made with shortening, one can be left with an unpleasant film of shortening coating the mouth.

B. VEGETABLE SHORTENINGS

It is made by hydrogenating (adding hydrogen to) vegetable oil, such as soybean or cottonseed oil. Vegetable shortenings are solid or semi –solid at room temperature and through the process of hydrogenation any desired degree of hardiness may be secured. They resemble the texture of butter but with virtually no flavor or odor. A high degree of perfection has been reached in the manufacture of hydrogenated shortenings which are very popular for cake work, and which possess excellent qualities. Example –Vanaspati ghee.

Oils – Oils are liquid fats. They are not often used as shortenings in baking because they spread through a batter or dough too thoroughly and shorten too much. Some breads and a few cakes and quick breads use oil as a shortening. Beyond this, the usefulness of oil in the bakeshop is limited primarily to greasing pans, deep –frying doughnuts, and serving as a wash for some kinds of rolls.

C. COMPOUND SHORTENINGS

Compounds, as the name signifies, represent that group of shortenings made by compounding of blending a vegetable oil with a hard fat in proper proportions so as to give a resulting product of desirable consistency similar to that of lard. *Margarine,* sometimes called 'artificial butter', is a mixture of animal or vegetable fats, usually refined oleo oil churned in with some butter, neutral lard, and milk. Sometimes, vegetable oils, such as cottonseed oil, are also used. Coconut oil is often used in the preparation of various kinds of so –called 'nut butter' or 'nut margarine'. Flavorings, colorings, emulsifiers, preservatives and vitamins are added, and the mixture is firmed or solidified by exposure to hydrogen gas at very high temperatures, a process known as hydrogenation. Generally, the firmer the margarine, the greater the degree of hydrogenation and the longer its shelf life. Like butter, margarine is approximately 80 to 85% fat, 10 to 15% moisture, and about 5% salt, milk solids, and other components. But even the finest margarine cannot match the flavor of butter. Margarine melts at a slightly higher temperature than butter, making it useful for some rolled –in doughs such as puff pastry or Danish. Because they require higher temperatures to melt, margarine and other vegetable –based shortenings can leave a greasy taste on the tongue.

Storage of Shortenings:–

- Shortenings are always kept at a moist –free dark room at room temperatures. In very hot, humid storage environments, shortening may be refrigerated if desired, but it should be returned back to room temperature before using to ensure best results.

- Unopened airtight packed shortenings may last for 2 years.

- To maximize the shelf life of opened shortening, keep can tightly closed. An opened can of shortening will generally stay at best quality for about 1 year at room temperature.

- The best way is to smell and look at the shortening– if shortening develops an off odor, flavor or appearance it should be discarded.

CHECK YOUR PROGRESS-II

1. What are the characteristics of Shortenings?

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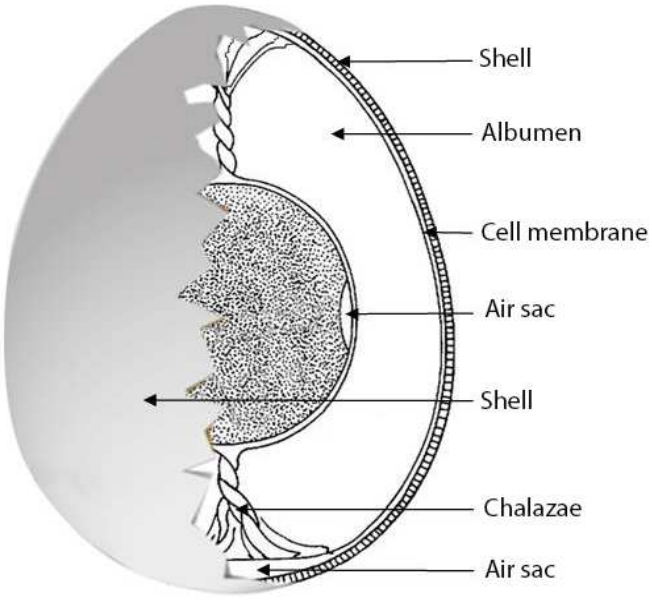
2. Write a note on Storage of Shortenings.

1.5 EGGS

The egg is a biological structure intended by nature for reproduction. It protects and provides a complete diet for the developing embryo, and serves as the principal source of food for the first few days of the chick's life. The egg is also one of the most nutritious and versatile of human foods.

The term egg not only applies to those of the hen, but also to the edible eggs of other birds such as turkey, geese, ducks, plover and gulls. But in hotel industry we are more concerned with hen's egg.

Composition: A whole egg consists primarily of 04 parts i.e the outer shell, cell membrane, the white and the yolk.



The shell – The shell, composed of calcium carbonateis not only fragile but also porous, is the outermost covering of the egg. It prevents microbes from entering and moisture from escaping, and also protects the egg during handling and transport. The breed of the hen determines shell color; for chickens, it can range from bright white to brown. Shell color has no effect on quality, flavor or nutrition.

Cell membrane – It is found in the inner lining of the shell. It forms an air cell at the large end, and two white strands called chalazae on the either side hold the yolk at the center of the white.

Chalazae – These thick, twisted strands of egg white anchor the yolk in place. They are neither imperfections nor embryos. The more prominent the chalazae, the fresher the egg. Chalazae do not interfere with cooking or with whipping egg whites.

Egg white – It consists 2/3rd portion of the egg and is called Albumen. It is clear translucent liquid and contains sulfur and more than half of the albumin protein and riboflavin. The protein, which is clear and soluble when raw but coagulates and becomes firm and opaque at temperatures between 144°F and 149°F (62°C and 65°C) when coagulated.

The Yolk – It is the yellow portion of the egg. It constitutes just over one –third of the egg and contains three –fourths of the calories, most of the minerals and vitamins and all the fat. The yolk also contains lecithin, the compound responsible for emulsification in products such as hollandaise sauce and mayonnaise. Egg yolk solidifies (coagulates) at temperatures between 149°F and 158°F (65°C and 70°C). Although the color of a yolk may vary depending on the hen's feed, color does not affect quality or nutritional content.

Hens egg are graded into four sizes

- Peewee 15oz 425 gms
- Small 18oz 510 gms
- Medium 21 oz 595 gms
- Standard 24oz 680 gms
- Large 27oz 765 gms
- Jumbo 30oz 850 gms

Bakes man prefer to use standard grade of eggs with plus or minus 3 oz (85 gms) as this fit the standard recipe. The size of an egg does not affect the quality but does affect the price. Good eggs are available throughout the year but the best during the winter season.

Function of eggs in Bakery: Eggs perform the following functions in baking –

- **Structure** – Like gluten protein, egg protein coagulates to give structure to baked products. This is especially important in high –ratio cakes, in which the high content of sugar and fat weakens the gluten. The dish must maintain that structure throughout the baking process. Some foods, like soufflés, will deflate soon after cooking as the air in them escapes, but other dishes, such as cakes, remain light and tall long after you remove them from the oven. Egg whites can be whipped to create egg white foam. This foam is filled with tons of air which helps to lighten and leaven baked goods.

- **Emulsifying** – Egg yolks contain natural emulsifiers like lecithin in the yolk and albumin in the whites that help produce smooth batters. Lecithin covers oil particles to keep them from gathering together once in the water – based mixture. By preventing the oil from clumping back together, the emulsifier prevents the finished product from separating. This action contributes to volume and to texture. Typical examples of emulsified mixtures are mayonnaise, salad dressing, baked goods, and ice creams.

- **Leavening** – Beaten eggs incorporate air in tiny cells, or bubbles. In a batter, this trapped air expands when heated and aids in leavening. For instance, the airy texture of an angel food cake would be impossible without the leavening of the beaten whites. For maximum leavening power, use room temperature egg whites, pristine bowls and beaters without any grease, and a small amount of acid to stabilize the whites.

- **Tenderizing** – Gluten is a protein in the flour of baked goods. The long strands of gluten contribute to chewiness in finished products. Flours with higher gluten percentages have chewier textures, such as bread flour, whereas those with low protein content, such as cake flour, produce more tender products.

- **Shortening action** – The fat in egg yolks acts as a shortening. This is an important function in products that are low in other fats. When added to baked goods, the fat from yolks shortens the recipe's gluten strands, yielding a more delicate, toothsome result.

- **Moisture** – Eggs are mostly water. Moisture in baked goods prevents the products from going stale while improving the flavor and texture. Fats act as moisturizers in food, which the yolks contain. The proteins found in both the yolks and whites also contribute to holding moisture from the yolks in the finished goods. This moisture must be calculated as part of the total liquid in a formula. If yolks are substituted for whole eggs, for example, or if dried eggs are used, adjust the liquid in the formula to allow for the different moisture content of these products.Yolks also helpin binding ingredients together.

- **Thickening** – Eggs are valuable thickeners in the cooking of chiffon pie fillings and custard.

- **Wash** – Many types of bread use a wash to create a protein –rich coating that repels excess moisture while giving the loaf a shiny finish. Some foods that have toppings will use a wash of egg whites and water to hold the seeds, nuts, or grains in place during baking.

- **Flavor** – Without the richness of yolks, the tastes naturally in baked foods would not stand out as much. Eggs contribute flavor to baked foods.

- **Color** – Yolks impart a yellow color to doughs and batters.The carotenoid xanthophylls gives the yolks their distinctively bright color. Additionally, eggs also facilitate the Maillard reaction that occurs when proteins cook and brown. This browning occurs both in foods as well as on the surfaces of baked goods forming brown crusts.

- **Nutritional value** – they also enhance the healthfulness of foods with extra protein and fats and traces of essential minerals. Eggs do not include harmful trans-fatty acids but healthier monounsaturated and polyunsaturated fats.

- **Customer appeal**– Eggs enhance the appearance of products through their colour and flavour, and they improve texture and grain.

- **Shelf life** – The shelf life of eggs is extended through the fat content of the yolk.

Coagulation of eggs depends on:

- Intensity of heat more heat leads to faster coagulation.
- Heating time – more heating time leads to more coagulation.
- Presence of sugar and salt in the liquid salt aids in coagulation by lowering the coagulation temperature, whereas sugar increases coagulation temperature and helps in forming a firmer gel.

Foams: Whipped egg whites are used to give lightness and rising power to soufflés, puffy omelets, cakes, some pancakes and waffles, and other products. The following guidelines will help you handle beaten egg whites properly.

- **Fat inhibits foaming** – When separating eggs, be careful not to get any yolk in the whites. Yolks contain fats. Use very clean equipment when beating whites.

- **Mild acids help foaming** – A small amount of lemon juice or cream of tartar gives more volume and stability to beaten egg whites. Use about 2 tsps cream of tartar per pound of egg whites (20 ml per kg).

- **Egg whites foam better at room temperature** – Remove them from the cooler 1 hour before beating.

- **Do not overbeat** – Beaten egg whites should look moist and shiny. Overbeaten eggs look dry and curdled and have lost much of their ability to raise soufflés and cakes.

- **Sugar makes foams more stable** – When making sweet puffed omelets and dessert soufflés, add some of the sugar to the partially beaten whites and continue to beat to proper stiffness. (This will take longer than when no sugar is added.) The soufflé will be more stable before and after baking.

MARKET FORMS

1. **Fresh eggs or shell eggs** – These are most often used for breakfast cookery and are the main subject of this section.

2. **Frozen eggs** – These are usually made from high –quality fresh eggs and are excellent for use in scrambled eggs, omelets, French toast, and in baking. They are pasteurized and are usually purchased in 30 –pound (13.6 –kg) cans. These take at least two days to thaw at refrigerator temperatures.
    - Whole eggs
    - Whites
    - Yolks
    - Whole eggs with extra yolks

3. **Dried eggs** – Dried eggs are used primarily for baking. They are not suggested for use in breakfast cookery. Unlike most dehydrated products, dried eggs are not shelf –stable and must be kept refrigerated or frozen, tightly sealed.
    - Whole eggs
    - Yolks
    - Whites

Purchasing quality of good eggs –

1. **Colour** – could be either brown or white but does not affect the quality of eggs.

2. **Size and weight** – Average weight of an egg is about 52 –55 gm and the weight of each egg is proportional to its size.

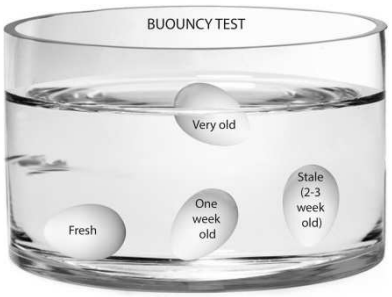
3. **Egg Yolk Upstanding, well** –rounded and of a good even color indicates freshness. The red spot on the yolk indicates that the egg is fertilized and it is prominent only when it is hatching.

4. **Shell –** Any cracks on the shell indicates deterioration of quality of eggs. The shell should be clean, well –shaped, strong and slightly rough.

5. Purchase only the amount needed for 1 2 weeks.

6. Buy farm fresh or refrigerated eggs.

7. Inspect carefully and discard any chipped ones.



Test for freshness –

1. **Buouncy method** – dip an egg in a glass of water, If it floats on top, it is fresh and if it sinks in the bottom, it is stale. In any stale egg, thick white gradually changes into thin white and the water passes from the white into the yolk. The yolk looses strength and begins to flatten resulting in evaporation of water and replacement of airinside. This causes the egg to float on the water.

2. **Candling** – When fresh eggs are held to the strong light, they have a uniform rosy tint and the yolk is firmly suspended in the center. The look more transparent on top. Stale eggs look cloudy and opaque and the yolk settles against the shell. Eggs having dark spots on the shell are definitely bad.

Preservation and storage of eggs: The storage of shell eggs during the main laying season, in order to conserve them for consumption when they are scarce, has been practiced for many centuries. For the successful storage of eggs, the following conditions must be met.

- The eggs placed in storage must be clean; they must not be washed or wet.
- Packaging material used should be new, clean and odourless.
- Loss of water due to evaporation should be reduced to a minimum.
- The storage room must be free from tainting products and materials and should be cleaned regularly with odourless detergent sanitizers.
- The storage room must be kept at a constant temperature and humidity must be checked.
- There should be air circulation in the storage room.
- Eggs should be stored so that they are allowed to breathe.
- As far as possible, interior quality should be monitored; there should be a good proportion of thick white, the yolk should stand up well, and the flavour of white and yolk should be good.
- Recommended storage times –
    1. Raw whole eggs – use by 'Best Before' date
    2. Raw yolks or whites – use within 2 –4 days
    3. Prepared egg dishes – use within 3 –4 days
    4. Hard –cooked whole eggs – use within 1 week
    5. Pickled eggs – use within 1 month
    6. Frozen whole eggs (blended) – use within 4 months
- In cold storage –eggs are kept a little above freezing point under controlled humidity and flow of air. They can be kept upto 9 months.
- Frozen eggs – eggs broken in sterilized containers, pasteurized, packed and rapid frozen.
- Dried eggs – eggs broken, mixed well and then spray dried at 71^0C.
- Greased eggs – thoroughly cleaned and sanitized eggs are lapped with pure liquid grease dried and can be kept for 3 months. The grease seals the pores in the shell and prevents the eggs from deteriorating.

CHECK YOUR PROGRESS-III

1. What are the functions of egg in baking?

2. Write a note on Storage and preservation of egg.

1.6 WHEAT AND FLOURS

Wheat is a cereal grain belongs to the genus triticum with 30,000 families. The kernel is 1/8 –¼ inches long, ovoid in shape, rounded in both ends. Along one side of the grain there is a crease, a folding of the aleurone and all covering layers. Wheat is consumed mostly in form of flour and small quantity s used in breakfast foods such as wheat flakes and puffed wheat. Other cereal grains include corn (maize), oats, rice, and rye. Widespread consumption of cereal grains began in the Middle East about10, 000 years ago, when agriculture first began. It was then that wheat was first planted and cultivated. Today, thousands of varieties of wheat are grown throughout the world, most requiring fertile soil and a temperate climate. Several locations in North America have ideal conditions for growing high –quality wheat, including the Midwestern United States and the southern prairie region of Canada. Other major wheat growing countries include China, India, France, and Russia. Wheat is more popular than any other cereal grain for use in baked goods. Its popularity stems from the gluten that forms when flour is mixed with water. Without gluten, raised bread is hard to imagine. Wheat is also preferred because of its

mild, nutty flavor. Both factors, no doubt, account for wheat being the most widely grown cereal grain in the world.

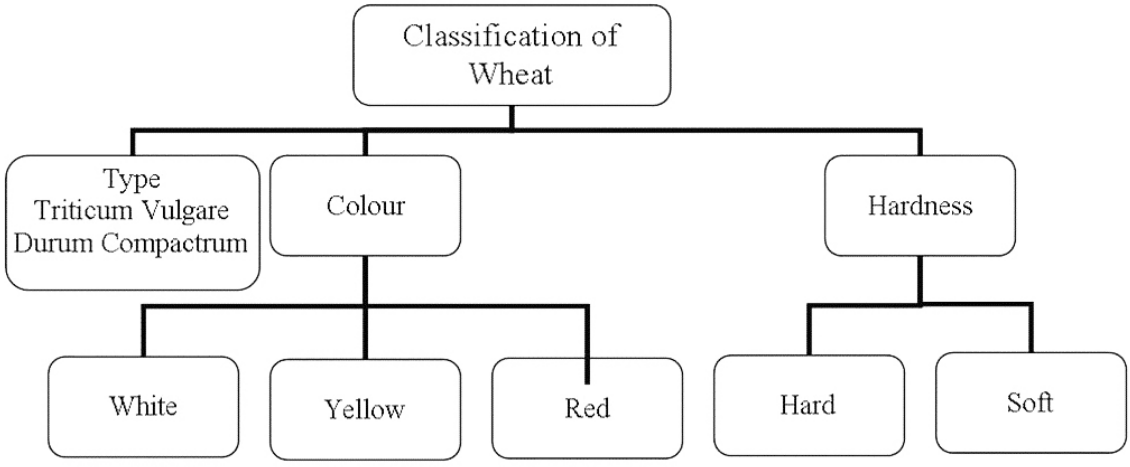
Composition –

1. Carbohydrate 95 %
2. Proteins 5 %
3. Minerals 3%
4. Vitamins 1 %
5. Water 1 %

Classification of wheat

Flour plays a major role in our bakery industry. The flour is obtained from wheat. So it is necessary to learn about wheat. Wheat is the most important cereal among all grains. We can get quality flour from good quality wheat. The quality of wheat depends upon the following

1. Soil
2. Quality of seeds
3. Climate
4. Manure
5. Farming techniques



Wheat is classified into its (i) type, (ii) colour, and (iii) hardness

According to type, there are – –

- Triticumtriticum (also called hard wheat)
- Triticumcompectum (also called soft, wheat)
- Triticum durum also called durum wheat)

The *Tritium sativum* wheat flour contains more proteins. This flour is used for the production of bread. The Tritium compectum wheat flour contains low protein. So it is

used for the production of biscuits, cakes and pastries. The Tritium durum wheat is mainly used to prepare semolina and macroon.

According to colour –which is due to environmental factors –

1. Red wheat
2. White wheat
3. Yellow

According to hardness, wheat is classified into –

- Hard wheat
- Soft wheat

Hard Wheat: Bakery products are made from the hard type of wheat flour because it has the following characteristics –

1. High in protein
2. More water absorption power (WAP)
3. Good mixing capacity, that is, it is easy to mix
4. Fermentation tolerance
5. Good gas retention power
6. Falls into separate particles if shaken by hand
7. Feels slightly coarse and granular

Hence it is mainly used for yeast products (e.g. bread).
Examples of hard wheat– (i) hard red winter, (ii) hard red spring and (iii) durum

Soft Wheat: Soft wheat flour contains the following characteristics –

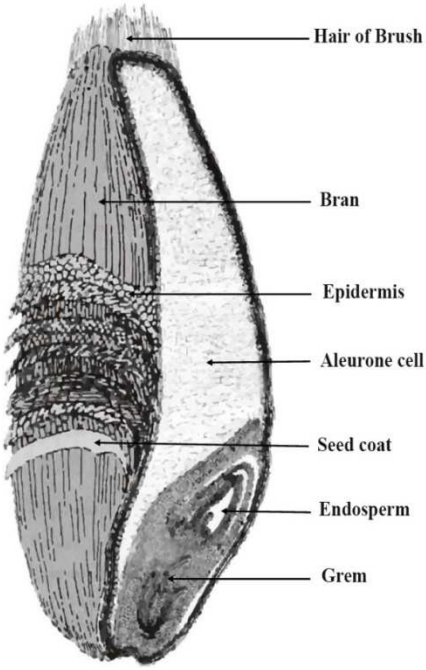
1. Less protein
2. Less WAP
3. Poor mixing capacity
4. Poor fermentation tolerance
5. Tends to clump and hold together if pressed
6. Feels soft and smooth

Hence, it is mainly used to make biscuits, cakes and pastries. Examples of soft wheat– (i) soft red winter and (ii) soft red spring.

MAJOR WHEAT GROWING COUNTRIES

S.No.	Countries	Type of Wheat	Type of Flour
1	England, Canada, Eastern Europe	Hard wheat	Strung flour
2	South America	Hard wheat	Medium strong flour, red winter, durum
3.	Australia	Durum hard white	Medium strong
4.	India	Red and white variety	Medium strong flour
5.	England, Europe, Australia	Soft wheat	Soft flour

6.	North America	Hard red spring, Hard red winter, Hard white	Hard or strong flour
7.	North America	Soft white, Soft red winter	Soft flour



STRUCTURE OF WHEAT

Wheat kernel: Wheat kernels are the seeds of the wheat plant, and they are the part of the plant that is milled into flour. Since cereal grains are in the grass family, wheat kernels can be thought of as a type of grass seed. In fact, when a field of wheat starts to grow, it looks like lawn grass. Wheat kernels have three main parts –

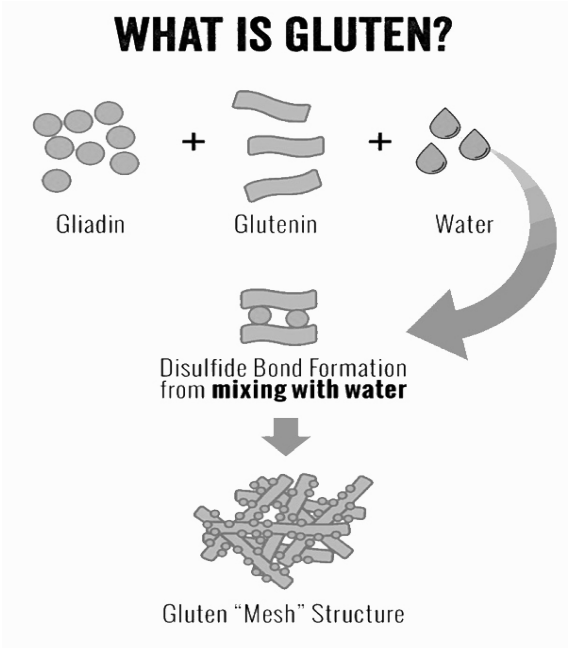
The endosperm– While whole wheat flour contains all three parts of the kernel, white flour is milled from the endosperm. Whole wheat flour is considered a *whole grainproduct* because it contains the entire wheat kernel. The *endosperm* makes up the bulk of the kernel. It is the whitest part, partly because it contains mostly starch–typically 70–75 percent starch. The starch is embedded in chunks of protein. Two important proteins in the endosperm of wheat kernels are the gluten –forming proteins, *glutenin*and *gliadin*. When flour is mixed with water, glutenin and gliadin form strands of gluten, important in the structure of baked goods. In fact, wheat is the only common cereal grain that contains sufficient glutenin and gliadin for the formation of good –quality gluten for bread making.

T**he germ–** is the embryo of the wheat plant. Given the right conditions, the germ sprouts—germinates—and grows into a new plant Wheat germ is high in protein, fat, B vitamins, vitamin E, and minerals. These nutrients are important to the germ as it sprouts. While germ protein does not form gluten, from a nutritional standpoint it is of a high quality.

The bran– is the protective outer covering of the wheat kernel. It is usually darker in color than the endosperm, although white wheat, which has a light bran.

Types of flour: Bakers use two primary types of white wheat flours– hard flour or strong flour and weak flour or soft flour. We get hard flour from hard wheat. It contains 11.2 –11.8% protein, 0.45 –0.50% ash, 1.2% fat and 74 –75% starch. The higher protein found in strong flour indicates a higher level of gluten. This type of flour is mainly used for high –structured products like yeast products like yeast products, choux pastry and puff pastries. We get soft flour from soft wheat. This type of flour contains 8.4 –8.8% protein, 0.44 –0.48% of ash, 1% fat and 76 –77% starch. Due to the less protein content, this flour is mainly used for low –structured products like biscuits, cakes, sponges, short and sweet paste. Apart from the above flours, there are other types of flour and they are classified according to their extraction rate. Some of them are given below.

Characteristics of good quality flour: Bakers need good quality flour for production. Good quality flour should have the following characteristics –



Colour: The flour should be creamish white in colour. Good quality flour will reflect the light when it is shown to the light. Bleaching the flour helps to get the colour.

Strength: There are two types of flour– (i) strong and (ii) weak. The strength depends upon the gluten quantity present in the flour. Strong flour is preferred for making bread and weak flour is preferred for making cakes and confectionery products.

Tolerance: Tolerance is the ability of the flour to withstand the fermentation and/or the mixing process in excess of what is normally required to mature its gluten properly.

High absorption power: High absorption power means the ability of the flour to hold maximum amount of water. If the flour has less WAP the bread will not be of good quality and will have fewer yields.

Uniformity: If the flour is used un –uniformly, the quality of the product will differ. So constant monitoring and adjustment are required to get a satisfactory result.

Type of flours obtained from wheat: The whole wheat grain consists of various components as discussed. Each of the components is milled in various proportions to yield different type of flours from the same plant and each one has a particular usage in the bakery kitchen. Let us discuss some of these flours.

Name of flour	Description
Whole meal flour	Also called atta in India, it is the whole milled wheat kernel. The flour is cream to brown in colour as it has the bran grounded with it. It is not advisable to sift the whole wheat flour as most of the bran, an important dietary component, will be lost.

Graham flour	It is usually found in the USA and the milling concept of this flour is very interesting. The wheat kernel is separated into its various components such as endosperm, germ, and bran. The endosperm is ground finely to produce white flour with gluten, whereas germ and bran are ground till coarse. The milled flour is then mixed back to yield graham flour. In case of non –availability of this flour one can mix refined flour, bran, and germ in the ratios that they naturally exist in the grain.
Brown flour	It is almost 85 percent of the grain millet, where some amount of bran has been extracted. It is nutritious as it has high percentage of germ.
Strong flour	It is milled from hard flour, in other words from high protein flour. The strong flours absorb more water than weak flours, as gluten can absorb twice their own weight or water. This flour is used form products which will have a high rise in the oven such as yeast breads, choux pastry, and puff pastry. Strong flour is also known as baker's flour.
Weak flour	Weak flour is also known as soft flour or cake flour. As the name suggests, this flour has less gluten and hence, it is used for products that need a softer texture such as cookies and cakes and sponges.
All purpose flour	The all purpose flour is a blend of flours and has medium strength. In India, all the refined flour that we get is all purpose flour.
Cake flour	Refer to weak flour.
Pastry flour	It is a very finely ground polished flour of soft wheat kernels, usually enriched and bleached.
Self–raising flour	This flour is usually of medium strength and contains baking powder in a proportion. Since the flour contains moisture, this can react with the baking powder lessening the effect of baking powder and hence, it is not advisable to buy the commercial self raising. This flour is commonly used to make afternoon cookies called scones.

Other Type of Flours: Flours are not only derived from wheat but also from other grains and seeds. It is very important for chefs to have knowledge of such flours as they can make different products with the range of the flours which will be healthier. Also since many people are suffering from gluten allergies, it is important for chefs to use products which are gluten free. Many types of grains are available in the market but few of the popular flours derived from them are discussed in flowing table.

Name of flour	Description
Rye flour	Rye flour does not have as much gluten as in popular flour and hence, it is sometimes mixed in proportions with flour for the production of breads. Breads which use only rye flour are more dense and chewy. This flour is majorly used in the Russian and Scandinavian breads. Rye flour dough is quite heavy and sticky.
Spelt flour	It is quite popular in European countries such as Germany, France, and Switzerland. It is made from spelt which is a species of wheat. It is good source of vitamin B.

Rice flour	It is the finely ground polished rice with a similar texture of corn starch, usually used as thickening agent. Rice flour is free of gluten and if the dough has to be made one would have to make it with hot water.
Maize flour	Popular in Mexico, this flour is made from cooked maize corn and then grounded. It is also known as Masaharina. This flour has also been used in India since time immemorial and a very popular north Indian dish called makki ki roti is made from it. This flour is also free from gluten.
Corn flour	It is made by grounding the white heart or the germ of the corn kernel, one of the widely used thickening agents in Chinese cooking. This is also free of gluten and usage of this flour in products gives crispness to the product. It can also be added to strong flour to turn into weak flour. Commercial custard powder is also made with corn flour with colour and flavor added. Corn flour is not flour, but it is actually a starch.
Arrowroot	This flour is finely milled from the arrowroot plant. It has the same properties as corn flour and the uses are very similar. It is widely used for making glazes.
Barley flour	Made from the pearl barley, it has low gluten content with mild flavor.
Buckwheat flour	It has distinctive grayish brown colour with earthy bitter taste. It is used to make classical preparations such as Russian blinis, pancakes, and French Galettes. In India it is widely eaten during fasts and is commonly known as kuttu ka atta.

Gluten –free flour: Apart from the flours discussed above, it is also very important for chefs to know about gluten –free flours, as the demand for the same are increasing constantly. Some of the gluten –free are discussed in flowing table.

Name of flour	Description
Amaranth	It is a green leafy vegetable related to spinach and beets. Tiny seeds of this plant are often ground into nutritious flour. It is light brown in colour and has a nutty aroma.
Rice flour	Refer to table
Pulse flour	These are the seeds of many edible legumes and can be ground into flours for use in gluten free breads. Chickpea flour is very commonly used in India and Mediterranean countries.
Maize flour	Refer to table
Buckwheat	Refer to table
Chestnut flour	It is a smooth shelled nut it is usually roasted and ground into flour. In India it is called Singharey ka atta and is commonly eaten during fasting.
Barley flour	Made from the pearl barley, it has low gluten content with mild flavor.
Cottonseed flour	The seeds are commonly used for making margarines or cooking oils, but these seeds can be ground into flour which is quite nutritious.
Flaxseed flour	It is an ancient seed which has been used in medicines from time immemorial. It is used whole toasted or ground into flour. It is believed to be a good cure for diabetic patients and is believed to lower cholesterol levels.

Millet	It can also grow in areas which do not get much rainwater. In India millets are commonly known as bajra.
Quinoa flour	This is one of the grains which have the highest amount of protein. It is mainly fond in china; but its popularity is catching up with the western world as well.
Soybean flour	It is high fat and high protein flour which has a strong distinctive nutty flavor.
Sunflower seed flour	It can be dried, roasted and ground into flour. It can be combined with other kinds of gluten free flour as it has a very nutty flavor.

COMPOSITION OF FLOUR

Flour contains the following ingredients –	
Starch	70%
Moisture	14%
Protein	11.5%
Ash	0.4%
Sugar	1%
Fat or lipid	1%
Others (enzymes –alpha and beta amylases)	2.1%

Starch: Starch is not soluble in water until it is heated to about 140 F with water of six times of its weight. Then the starch cells will swell and the cell wall will burst. Now the starch becomes soluble in water. This process is called **gelatinization.** Starch acts as filler as it gives rigidity to bread dough. It combines with lipids and gluten to retain the gas during fermentation. During milling 6% of starch cells are crushed and damaged due3 to the roller, type of wheat, moisture, etc. The water absorption power (WAP) of the flour mainly depends upon the damaged starch. Enzymes (alpha and beta amylases) act only on damaged starch to produce sugar for the yeast during fermentation. The damaged starch should not be more than 7 –9% for bread making. The damaged starch is not essential for cake or biscuit making. Hot bread directly from the over cannot be sliced immediately because the starch is not sufficiently stable and must be allowed to retrograde (slightly harden). When the bread cools down, starch cells shrink and become rigid so that the bread can be sliced easily.

Moisture: An ideal moisture content of flour is 14% the source of moisture may be tempering or the package materials or the humidity. If more moisture is in the flour it will reduce the storage life, induce insect infestation, may get fungus and bacteria and also will reduce the WAP of the flour. This will result in fewer yields during production.

Protein: Flour contains soluble and insoluble proteins, namely,

1. Albumin

2. Globulin
3. Gliadin
4. Glutenin

The soluble proteins (albumin and globulin) are useful in providing nourishment to yeast during the fermentation process for its growth and reproduction. The insoluble proteins, gliadin and glutenin form a rubbery material when water is added with flour. So when it is kneaded well, the rubbery material (texture) developed is called gluten. It gives structure to the baked products. While gliadin gives extensibility, glutenin gives strength and holds gas during baking. The quality of flour is decided by the gluten content. If the gluten content is more, then the flour will be suitable for high structured products like bread. This bread –making flour should have the gluten from 10% to 11.5%.

If the flour contains less gluten, then the flour will be suitable for lower structured products like cakes and biscuits/cookies. This flour requires a low, that is, 7 –10% gluten content.

Ash: The source of ash content in flour is bran. If the flour contains more ash, it means it has more bran. Too much ash gives dark colour to the flour and also cuts the gluten. Flour with higher ash content will not retain as much gas during different stages of processing and this affects the volume and gives poor texture to the products.

Sugar: Naturally, flour contains a small quantity of sugar, namely, sucrose and maltose. It is used as yeast food to produce CO_2 (carbon dioxide gas).

Fat or Lipids: Fat or Lipids should not be more than 1% in flour. They contain the pigment carotene which gives colour to the flour. There is a higher quantity of oil/fat in the low grade flour than in the high grade ones. The fat or oil when separated from the flour is a pale yellowish liquid without taste or smell.

Enzymes: Flour contains diastatic enzymes. They are alpha (A) amylase and beta (B) amylase. These enzymes hydrolyze starch and convert it into simple sugar. During fermentation, the simple sugar is used by the yeast to produce alcohol and carbon dioxide. The gas production depends upon the amount of enzymes found in the flour. Indian flours have less alpha amylase. These enzymes are necessary for producing good quality bread.
In rain –damaged wheat, these enzymes w2ill be available in excess. The bread made out of this flour will have dark crust colour and sticky c4rumbs. If these enzymes are less, the bread will have poor volume and dull crust colour.

WAP of flour: The absorbing power of a flour is determined by weighing out 25 gms of flour into a suitable dish and adding water from a graduated burette, then properly making up the two dough separately to a certain standard consistency, which latter always must be

alike for all samples tested. The number of cc and decimals of water used as indicated by the burette are multiplied by 4, and the product expresses the percentage of water – absorbing power.

This result is next confirmed by making a sample baking, using the proper amount of yeast, salt and other ingredients, taking care to make the dough of the same consistency as before. Weigh the dough carefully and make a notation of its weight. Next proceed to work the dough in the usual, but very careful, manner into bread. Immediately, upon drawing from oven, the bread is weighed, and the loss calculated. This gives the moisture –retaining power of flour. In order to get proper results, the sample dough must be carried at a uniform temperature, the length of fermentation must be always the same, and the same hold good for the heat of oven, which should be 425° F. Unless uniform conditions prevail, the retaining power of a flour will be affected.

MILLING OF WHEAT

Preparation of raw wheat : As wheat arrives in the mill it is passed through a cleaning process to remove coarse impurities and is then stored according to its quality. This is mainly determined by the hardness, protein content and gluten quality of the wheat.

Cleaning: Cleaning begins with screening to remove coarse and fine materials and the grain is separated by size, shape and weight. The finished product, whole pure wheat, is then passed into conditioning bins.

Conditioning: Conditioning takes place before milling to produce uniform moisture content throughout the grain. Moistening helps to prevent break – up of the bran (hard outer layer) during milling and improves separation from the floury endosperm (the mass that forms the white flour of the grain).

Gristing: After conditioning, different batches of wheat are blended together (gristed) to make a mix capable of producing the required flour quality.

Milling : In India milling is done through stone grinding, but modern flourmills are with more mechanized to give pure wheat flour. The process involves the following –

1. Vibrator screen – (Thresher) – this removes bits of straw and other coarse materials and the second screen sieves foreign materials like unwanted seeds.
2. Aspirator – Here the wheat is cleaned by suction. The stream of air sucks lighter impurities like dust and stones.
3. Disc separator – catches individual grains of wheat but rejects larger or smaller materials.
4. Scourer – In this the beaters attached to the central shaft throws the wheat violently against the surrounding drum, resulting breaking of kernel hairs.
5. Magnetic separator – pulls out any metal particles present.

6. Washer stone – Here the wheat is washed, resulting precipitation of stones, clay and lighter materials float leaving only clean wheat.
7. Tempering – In this the wheat is exposed to moisture and then dried.
8. Entoleter – In this the degraded quality kernel is removed.
9. Grinding bin – Here the first break of wheat takes place
10. Shifter – Here the flour is shifted through cloth or fine sieve, giving wheat flour.
11. Purifier – in this the coarse grains are subjected to controlled flow of air, which lifts the bran leaving behind refined grains, which are separated, again by their size and quality.
12. The down purifier – Here the final shifting is done and the grains are separates

The process is repeated over and over again. Shifters, purifiers reducing the rolls until the maximum amount of flour is separated consisting of at least 72 % of wheat.

Uses of wheat –

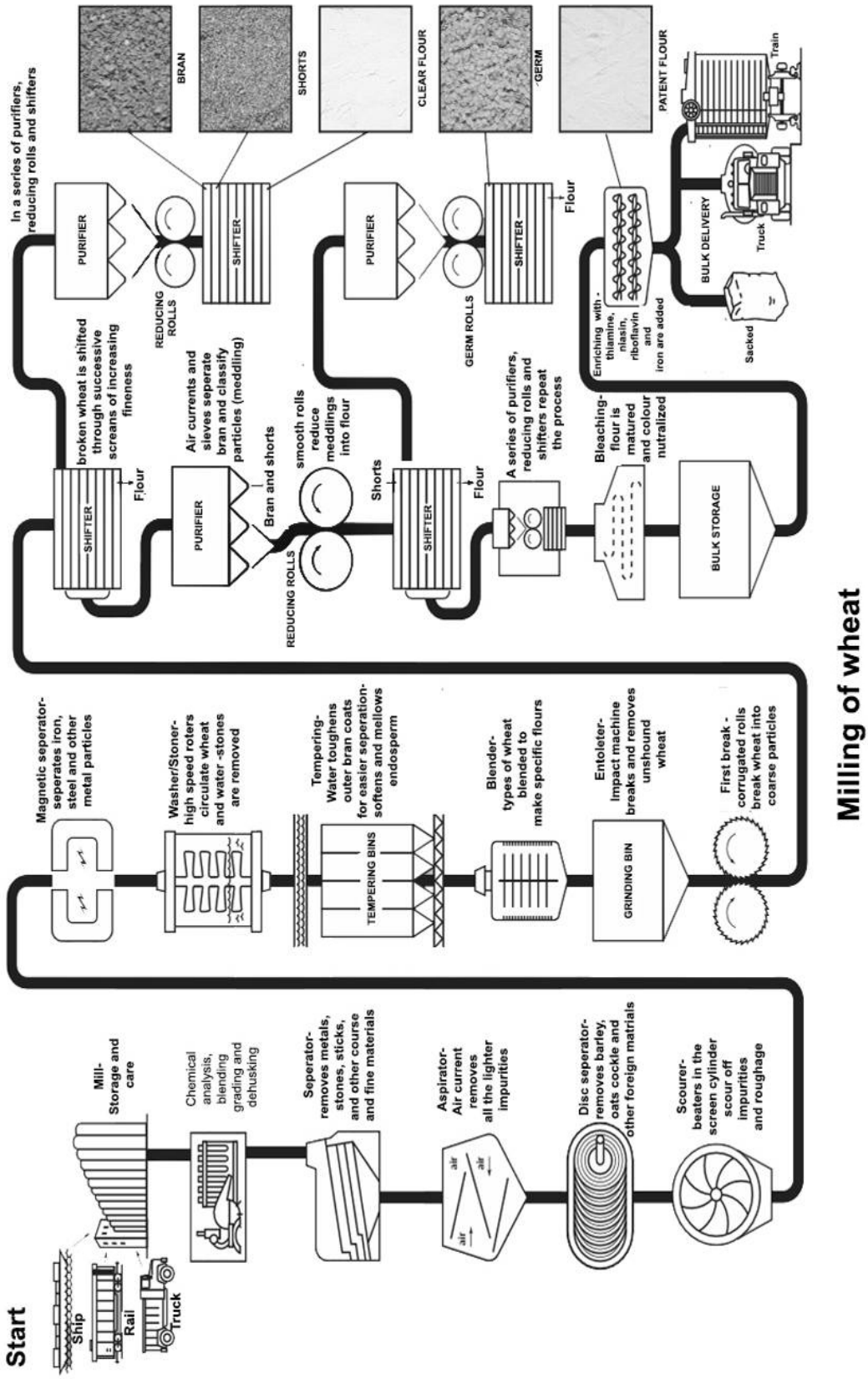
- Wheat flour – to prepare breads.
- Refined flour (maida) – loaf, breads and nuns, sweets.
- Semolina – Halwa. Pasta.
- Macaroni products – noodles, pastas.
- Cracked wheat – porridge.

The milling process –

Milling means the conversion of wheat into flour. There are two methods of milling –

1. Stone or home milling
2. Roller flour milling
3. Turbo milling

1. Stone milling: Stone milling is an ordinary method of milling. Here two circular thick stones with rough surfaces are used, one lying on top of the other. This rough surface helps crush the wheat. Thus the wheat is converted into flour. This is known as whole meal flour. It contains bran, germ and endosperm. The following are the qualities of the whole meal flour –


Milling of wheat
Start
Ship
Rail
Truck
Mill-
Storage and
care
Chemical
analysis,
blending
grading and
dehusking
Seperator-
removes metals,
stones, sticks,
and other course
and fine materials
Aspirator-
Air current
removes
all the lighter
impurities
Disc seperator-
removes barley,
oats cockle and
other foreign matrials
Scourer-
beaters in the
screen cylinder
scour off
impurities
and roughage
Magnetic seperator-
seperates iron,
steel and other
metal particles
Washer/Stoner-
high speed roters
circulate wheat
and water -stones
are removed
Tempering-
Water toughens
outer bran coats
for easier seperation-
softens and mellows
endosperm
TEMPERING BINS
Blender-
types of wheat
blended to
make specific flours
Entoleter-
Impact machine
breaks and removes
unshound
wheat
GRINDING BIN
First break -
corrugated rolls
break wheat into
coarse particles
In a series of purifiers,
reducing rolls and shifters
BRAN
SHORTS
CLEAR FLOUR
GERM
PATENT FLOUR
PURIFIER
SHIFTER
REDUCING
ROLLS
broken wheat is shifted
through successive
screams of increasing
fineness
Flour
Air currents and
sieves seperate
bran and classify
particles (meddling)
Bran and shorts
smooth rolls
reduce
meddlings
into flour
Shorts
GERM ROLLS
A series of purifiers,
reducing rolls and
shifters repeat
the process
Bleaching-
flour is
matured
and colour
nutralized
Enriching with -
thiamine,
niasin,
riboflavin
and
iron are added
BULK STORAGE
BULK DELIVERY
Truck
Train
Sacked

- It has more nutritive value.
- The colour of flour is dark.
- It has less shelf life.
- Small stone particles may be present in the flour.
- The bread made from this flour gives delicious flavour.

2. Roller milling: Roller milling is a commercial milling of wheat. Before milling the wheat, the following steps have to be followed –

Cleaning: The object of cleaning the wheat is to

- Obtain pure flour and
- Avoid damaging the milling machineries

If the foreign particles like stone, barley, oats and iron are not removed, the quality of flour will be affected and iron rods may damage the machines causing heavy loss.

CLEANING STAGES

Sieving– This process will remove the larger and smaller particles like damaged wheat, stone and husk

Magnetic separator– It removes the iron and steel particles.

Aspirator – The lighter impurities are removed using air currents.

Disc separator– This is used to separate barley, oats and other foreign material.

Scrubbing– Beard on the wheat is removed by brushes.

Tempering – After cleaning, the wheat is sprayed with water and left to be soaked for sometime, a process called tempering. The time of tempering varies according to the hardness of wheat.

The following are the merits of tempering

1. The moisture content of wheat is increased.
2. The burn become elastic and the endosperm become soft, so it makes barn removal easier.
3. The endosperm is made more friable which reduces soft, so it makes barn removal easier.
4. Germ also is rendered tough and flaky for easy removal.

The milling process has two stages –

1. Break milling
2. Reduction milling

Break milling: Break milling is the first operation in the milling process. After tempering, the wheat passes through two horizontal steel break rollers. The rollers rotate in opposite directions. The surface of the roller is rough, one rollers 3/2 time faster than the other. The break milling is done in the 4^{th} and 5^{th} stages. The first set of roller just cracks the wheat

grain. Then they are passed through the series of break roller. And from the last series of the process, break flour and sooji and rava or semolina are obtained. The break flour in the first three stages is also known as patent flour

Reduction milling: After the break milling process, the rest of the semolina is passed through the reduction rollers. The surface of this roller is smooth. They also rotate in opposite direction but the speed is lesser than the break rollers.

In the first stage we get some semolina germ and barn. The next reduction roller crushes the semolina into fine and the bran and flattened germs are removed. The flour, thus obtained is called straight run flour.

3. Turbo milling: Developed in 1950 is probably the greatest milling advances of the end century, because it gives us the opportunity to separate starch particles into different fractions and then blend the fractions into the desired ratio. This type of milling enable us to make custom blend flours for bread making, cake making, cookie making and other works.

Bleaching: The flour obtained after the milling process is called green flour. It contains high moisture and slightly yellowish colour due to xanthophylls. The fresh flour is not suitable for making bakery products. It has to be bleached by oxidation. Bleaching agents like chlorine, chlorine dioxide and benzyl peroxide are used to bleach the flour. The bleached flour is creamish white in colour..

Maturing: The fresh flour has poor water absorption power, poor strength and poor baking quality. It is improved by the oxidation process known as maturing. Chemicals like potassium bromated and ascorbic acid are used for maturing and to improve the above qualities.

Byproducts of wheat

There are many by product of wheat used in the kitchen in one form or the other. They may be –

Product	Description
Whole wheat	Unrefined or minimally processed whole –wheat kernels
Cracked wheat	Coarsely crushed, minimally processed wheat kernels
Bulgur	Hulled, cracked hard or soft wheat, parboiled and dried kernels
Semolina	Grounded polished wheat kernels with bran and germ removed
Couscous	Semolina pellets, often par cooked
Farina	Polished medium ground wheat cereals
Bran	Separated outer covering of wheat kernels and flaked or powdered
Germ	Separated embryo of wheat kernels, flakes

Flour is one of the structural ingredients used in pastry and bakery kitchens. There are many different kinds of flours used in the pastry kitchen and each flour has a different role to play in the final outcome of the product. Therefore it becomes important to choose the right type of flour for the right type of product. You would commonly hear chefs using words like strong flour and weak flour. These words merely indicate the amount of gluten present in the flour. There are two types of non –soluble proteins in the flour –"glutenin" and "gliadin". When the dough is kneaded these two proteins combine to produce gluten in the dough. Without gluten there will be no such thing as raised bread. Gluten provides elasticity to the dough, which in turn traps the air and gas released by yeast and forms a sponge –like texture in the baked breads. The gluten in the flour can be altered by various methods. Manipulating the dough for longer duration of time or adding some acid, such as lemon juice, will strengthen the gluten strands and time or adding some acid, such as lemon juice, will strengthen the gluten strands and addition of oils and fats will soften the gluten. Gluten can also be procured from the market as a commercial product and added to weak flours to increase their strength. It is almost impossible to knead corn flour and rice flour into dough as they have no gluten at all. Let us discuss some of the flours obtained from the wheat kernel in as they are commonly used in confectionery.

DIFFERENCES BETWEEN SEMOLINA, WHOLEWHEAT FLOUR AND REFINED FLOUR

Semolina – This is the coarsely ground endosperm (no bran, no germ) of durum wheat. Its high protein content makes it ideal for making commercial pasta, and it can also be used to make bread. Semolina flour is made with grooved steel rollers. Semolina has very high gluten content and the flour has a substantial amount of protein.

Whole wheat flour – Since roller milling separates the bran and the germ from the endosperm; the three components actually have to be reconstituted to produce whole –wheat flour. Because of the presence of bran, which reduces gluten development, baked goods made from whole –wheat flour are naturally heavier and denser than those made with white flour. Many bakers combine whole –wheat and white flour in order to gain the attributes of both.

Refined flour – Maida is a type of wheat flour from India. Finely milled without any bran, refined and bleached, it closely resembles Cake flour. Owing to this wide variety of uses, it is sometimes labeled and marketed as *"all –purpose flour"*, though it is different from all –purpose flour as commonly understood in the US, where it is made from the endosperm (the starchy white part) of the grain. The bran is separated from the germ and endosperm which is then refined by passing through a sieve of 80 meshes per inch (31 meshes per centimeter). Although naturally yellowish due to pigments present in wheat, maida is typically bleached, either naturally due to atmospheric oxygen, or with any of a number of flour bleaching agents.

FLOUR TESTING

These are the several methods for testing the flour.

Chemical analysis:

Moisture test	Flour should have 14% of moisture and more than this will affect the storing quality of the flour.
Ash test	It helps find the quantity of minerals found in the flour.
Protein test	Quantity and the quality of the protein can be analyzed.
Falling number	It indicates the activity of enzymes.

Physical analysis

Amylograph	For enzymic activity.
Farinograph or alveograph	Tests the strength of the flour and water absorption.
Extensographs	Tests the dough handling properties.
MacMichealViscosimeter	Tests the viscosity of a flour solution.

Physical examination

Colour test	Checks if the particles of endosperm are separated
Baking test	Tests the overall evaluation on the flour quality

Test for water absorption power (WAP): Take 100 gms of flour and mix 50 ml of water. Mix it well. If the dough is stiff, add 1 ml of Take 100 gms of flour and mix 50 ml of water. Mix it well. If the dough is stiff, add 1 ml of water at a time and mix until it becomes a pliable dough. After obtaining this quality, note the quantity of water added. This quantity will be the WAP of the particular flour. More protein flour has more WAP. It will increase the number of portion (yield).

Test for the quality of gluten in flour: Take some quantity of flour and mix it with enough water. Knead it well to get smooth dough. Then put this dough in water for 30 minutes at room temperature. Then take it out and wash it in the running water till the starch is completely removed. Squeeze the dough until it gives no white streaks, and what remains is called gluten. Squeeze out to remove the excess water and this is known as wet gluten. It can be expressed as a per cent of the flour sample.

Then keep the wet gluten in a cool oven (140 C) till all the moisture is evaporated. Now it is called dry gluten. The dry gluten weight should be 1/3 of the wet gluten. For example – If the wet gluten is 30 gms, the weight of dry gluten should be 10 gms.
If the dough in the oven rises, the flour will be considered to have a good quality of gluten.

pH value: pH value indicates the acidity or alkalinity. It is measured from 0 to 14.7 is neutral. When the ph is above 7, it is called alkaline. When it is below 7, it is acid. The pH value should be 5.5 –6.5 for bread making and 4.5 –5 for high –ratio cakes. However, some cakes are in the alkaline side.

Storage of flour: If moisture is allowed to get into the flour, it may cause it to become clumpy. In some cases, flour can attract psocids (tiny brown or black insects which live in dry foods) and cankers. The flour will itself sweat (absorb moisture), resulting in the formation of inferior products. For proper storage of the flour, the following things should be kept in mind –

1. The storage area should be well ventilated.
2. Hessian cloth or jute cloth is always preferred so that it can allow air to go in.
3. Flour bags should be piled off the floor on wooden boards to enable free circulation of air all around the piles.
4. Should be kept away from direct sunlight.
5. Should be stored away from foreign odours because it picks up these odours easily.
6. Avoid insect infestation.
7. Should be stored in dry clean bins with fitting lids.
8. Temperature of the storage area should be 19 –240 C
9. The relative humidity should be 55 –65%. Too low or too high relative humidity is detrimental to flour quality.
10. The containers should be clearly labeled with their content so as to avoid mistakes when selecting the correct flour for use.

CHECK YOUR PROGRESS-IV

1. Explain the composition of wheat flour.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

2. Write a note on Flour Milling Process.

_____
_____
_____
_____
_____
_____
_____
_____
_____

1.7 MILK AND MILK PRODUCTS

Milk: Milk may be defined as the whole fresh lacteal secretion obtainedby the complete milking of healthy animals excluding that from the animals that are within 15 days or after 15 days of calving.

Milk most often means the nutrient fluid produced by the mammary glands of female mammals. The female ability to produce milk is one of the defining characteristics of mammals and provides the primary source of nutrition for newborns before they are able to digest more diverse foods.

It is also processed into dairy products such as Cream (food) cream, butter, yogurt, ice-cream, gelato, cheese, casein, whey protein, lactose, condensed milk, powdered milk, and many other food –additive and industrial products. Other than cows and buffalo, milk can also be obtained from sheep, goats, horses, donkeys, camels, yaks, water buffalo and reindeer. Whale milk, though not used for human consumption has the highest fat content in mammals. It can also be used to mean –

The other forms of milk are –The white juice and the processed meat of the coconut in more –or –less liquid form, used especially in Thai, Indian, and Polynesian cuisine. A non –animal substitutes such as rice, soy milk etc. are also used.

Nutritive composition: The milk contains calcium necessary for the bone formation and teeth. It contains certain vitamin such as vitamin A and D, vitamin B –1, B –12 and vitamin C the last one is smaller amount. It is also rich in protein fat and carbohydrate and the rest 87% is water.

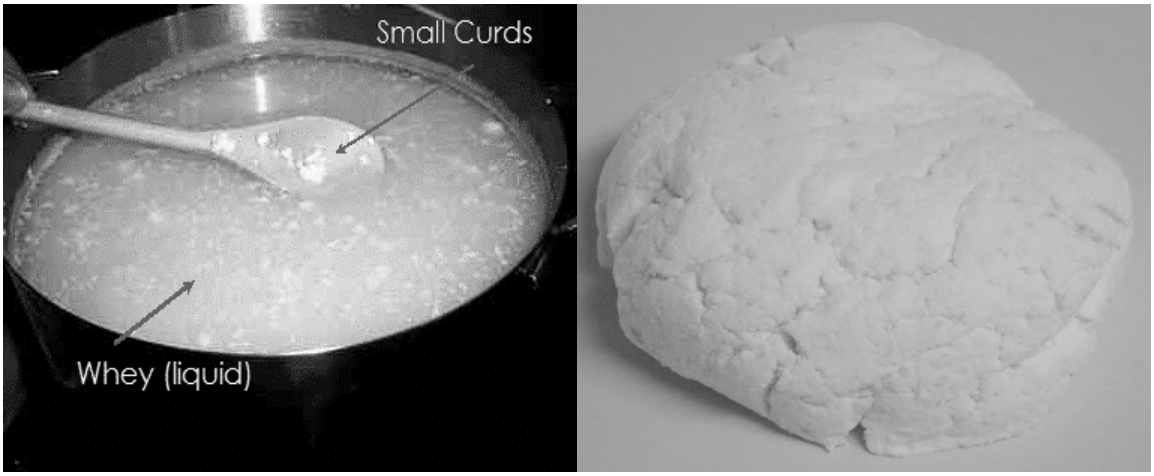
Human milk contains, on average, 1.1% protein, 4.2% fat, 7.0% lactose (a sugar), and supplies 72 kcal of energy per gms .

Cow's milk contains, on average, 3.4% protein, 3.6% fat, and 4.6% lactose, and supplies 66 kcal of energy per 10 gms.

Curdling of milk: Milk curdles naturally or made to curdle. Milk contains lactose and when raw milk is kept standing for few hours, the bacteria (*lactobacillus*) starts fermentation resulting the formation of lactic acid which causes the casein which is held in solution by the calcium to separate and to be simply thrown down without making further changes in a mass known as curds and the liquid left behind is called whey. Curdled milk is used to make cheese and curd. There are four periods of milk decay –

1. Rancid (also called on the turn. Milk is still consumable at this stage)
2. Curdling (separation of curd and whey will occur but may still be consumable)
3. Coagulation (beyond use. A period of aromatic decay sets in accompanied by mould)

4. Dry (beyond use. The milk has dehydrated and become hard and chalky)



TYPES OF MILK PRODUCTION

1. Pasteurized milk: By this method the bacteria is killed and their action of sour producing is retarded. Pasteurization is done by two ways –

a) ***Flash process*** –In this milk is heated to 71.1^{o}C (161^{o} F) and then subsequently held for 15 seconds and then it is rapidly cooled below 48^{o}C (50^{o} F).
b) ***Hold process*** –In this the milk is heated to 63 –65^{o} C (145 –150^{o} F) and then maintain this temperature for 3minutes and then cooled down immediately to 48^{o} C (50^{o}F)

2. Homogenized milk: In this milk and cream are mixed together briskly so that they do not separate when stand. This is done by subjecting the milk high pressure (200lb) per sq. inch through a small apparatus so that the fat globules are reduced in size and increase in number, which results in easy mixture and the fats do not rise above to the surface.

Advantages of homogenized milk –

1. Do not need mixing of fat and milk
2. Can be stored considerably for a longer period of time.
3. More palatable
4. Can be easily modified for infant feeding.
5. The viscosity of the milk increases.
6. Softer curd and cheese is formed.
7. Stiffer custards can be prepared.

Dis –advantage

1. It curdles the soup.
2. In a sauce the fat can be separated.

3. Sterilized milk: This is homogenized milk in which the milk is heated to 104 –110^{0}C for 30 –40 minute in sealed bottle or cans, which kills the souring and disease bearing

bacteria. It has a different taste from fresh milk and the shelf life of this type of milk is 2 – 3 months in sealed conditions.

4. Ultra – heat treatment milk : In this the milk is treated to ultra –heat treatment that is 132^0C for 1 second under sterile conditions. Shelf life is of 2 –3 months.

5. Condensed milk : It is richer than evaporated milk because more water has been removed. It may be sweetened or unsweetened, but sugar acts as preservation which is added in form of sucrose or dextrose.

6. Dried milk: Can be produced either by –

Roller Drying – The evaporated milk is run on to hot rollers which cause the removal of remaining moisture by further evaporation the solid milk which sticks to the roller in scraped off the roller. The temperature and the rate of rotation of the steel heated drums are controlled so that the milk is dried in less than a complete rotation.

Spray Drying – By this the milk is evaporated, to reduce the bulk, then it is forced through a fine spray into a hot chamber and here in the hot chamber the remaining water is removed. The temperature ranges from 380^0F to 400^0F. It is desirable to cool down the fired. Powder as quickly as possible in a separate cool room, because the prolonged temperature will deteriorate and discolour the product.

7. Skimmed Milk:It is that from which a part whole of their fat has been removed in the form of cream. Skimming of milk is done by machine, called separator, which applies the centrifugal force to remove the milk fat and often 1% of fat remains in the milk after skimming.

Milk Products –

a) Cream
b) Yoghurt and fermented milk(cultured milk – sharp taste, 5% fat and Smetana – cultured milk containing 10% fat)
c) Cheese and Paneer
d) Butter
e) Khoya

Storage of milk –

- As milk gets curdled, it should not be kept standing for not more than approx. 1 hour.
- Keep milk in refrigerated conditions
- As milk absorbs odor from other items easily and gets contaminated, so extreme precautions are taken. Milk should be always be kept covered.
- Frozen milk should be thawed first and then boiled
- Always boil the milk, cool and then refrigerate. Boiling kills all the harmful micro –organisms.
- Pasteurized milk will keep upto 5 days under refrigeration.

- Unopened sterilized milk can be kept for up to several days.
- Dried milk is stored in air –tight containers and kept in cool dry place.
- The storing container should be fresh without any swills or odor.
- Self –live in refrigerator in frozen condition is approx 4 –5 days.
- Tinned milk should be stored in cool, dry place.

Cream: Cream is the lighter weight portion of milk which still contains all the main constituents of milk but in different proportions. The fat content of cream is higher than that of milk and the water content and other constituents are low. Cream is separated from the milk and heat treated.

Two characteristics of cream are important to the cook; its taste, whether sweet or nutty (as with crème fraiche), and its fat content. Most cream is sweet; it has been pasteurized or ultra –pasteurized (sterilized), thus destroying disease causing bacteria and enzymes so the odour and flavour remains mild. In some countries, preservatives may be added that can further detract from the fresh flavour of sweet cream. Pasteurized or sterilized creams may also be homogenized to produce a smoother texture. Crème fraiche, on the other hand, has a strong flavour.

Crème Fraiche –When unpasteurized cream is left to stand, it develops a full slightly sour taste that mellows and intensifies over time. This is crème Fraiche, the standard crème in France.

Clotted Cream – as its name implies, clotted cream often called Devonshire or Cornish cream, has a different texture from other creams. To make it unpasteurized milk is left to stand until the cream rises to the surface, then heated so that the cream sets and can be skimmed off. The cream is pasteurized before sale. Creamy yellow, with a buttery texture and a fat content of over 55 %, clotted cream is famous in Britain, served with scones and strawberry jam and it makes an excellent accompaniment to fresh or poached fruit.

Reconstituted Cream – It is made by emulsifying butter with skimmed milk or skimmed milk powder. This is not true cream, but a substance which resembles it in appearance.
The fat content of the cream determines its richness and whipping characteristics.

Type	Fat content %	Characteristics and Uses
Half cream	12	Cannot be whipped or frozen, use in coffee, sauces for pouring
Single Cream	18	Cannot be whipped or frozen, use in coffee, sauces, for pouring
Soured Cream	18	Cannot be whipped or frozen, use– sweet and savory dishes, salads, dips.
Whipping Cream	35	Whips to double volume use – piping on cakes, desserts

Double cream	48	Whips to 1 ½ times volume use – pouring, cooking, piping
Clotted cream	55	Used on scones, fruit and fruit pies.
Sterilized half cream	12	A pouring cream with a distinct caramel flavour
Sterilized Cream	23	Will not whip, but thick consistency allows easy pouring.
Ultra heat treated Half Cream	12	Used for half, single and whipping
Ultra heat treated single cream	18	Used as for half, single and whipping
Ultra heat treated whipping cream	35	Used as for half, single and whipping
Extra thick cream single	18	Used as spoon on fruits and desserts
Extra thick cream double	35 –48	Used as spoon on fruits and desserts
Crème Fraiche	30 –40	Used as sweet or savoury dishes
Aerosol cream	18 –38	Used as instant dispensing of whipped cream, collapses quickly
Frozen cream single	18	Used for whipping ,double and clotted cream
Frozen cream whipping	35	Used for whipping ,double and clotted cream
Frozen cream double	48	Used as for whipping, double and clotted cream
Frozen cream clotted	55	Used as for whipping, double and clotted cream

Non –dairy cream: There are several types and qualities available which are produced from an emulsion of oil, margarine or butter with milk powder, water and other permitted substances.. Non –dairy creams can be used for filling and decorating small and large cakes and making and finishing sweet dishes.

Yoghurt: Yoghurt is a cultured milk product made from cows, ewes', goats' or buffaloes' milk. Differences in the taste and texture of the product depend on the type of milk used and the activity of the micro –organisms involved. A bacterial 'starter culture' is added to the milk which causes the natural sugar 'lactose' to ferment and produce lactic acid. There are two types of yoghurt –

- Stirred yoghurt, which is smooth fluid consistency
- Set yoghurt, which is more solid and has a firmer texture.

All yoghurts are 'live' and contain live bacteria which remain dormant when kept at low temperatures, unless it clearly states on the packaging that it has been 'pasteurized', sterilized or ultra –heat –treated'. If stored at room temperature or above, the dormant bacteria become active again and produce more acid. Too high acidity kills the bacteria, impairs the flavour and causes the yoghurt to separate.

Types of yoghurt –

Fat free yoghurt – contains less than 0.5% milk fat

- Low fat yoghurt – contains 1.5% milk fat
- Whole milk yoghurt – contains 3.8% milk fat
- Whole or real fruit yoghurt – contains whole fruit in sugar syrup
- Fruit flavoured yoghurt – contains fruit juices and syrups.
- Natural yoghurt – contains no colour, preservatives,, stabilizers or thickeners and may be fortified with vitamins.

Storage of yoghurt –

- Yogurt, as a dairy product, can spoil quickly if it is not properly stored. Bacteria grow at room temperature and yogurt must remain refrigerated at temperatures in between 34 to 40 degrees.
- Once cut opened, it should be used within three to four days.
- Prevent cross –contamination – Rather than eating it straight out of the pot, scoop some into a bowl and eat it from there. Also, every time you use it, make sure you use a clean spoon, so a bacterium doesn't contaminate your yoghurt. As a precaution, you should also avoid mixing fresh and used yoghurt.
- Use an airtight container to protect your yoghurt from strong odours.
- Don't store it in the door of your fridge – Keep your yoghurt fresh by being efficient and keeping it at the back of the fridge, where temperatures stay cool and consistent. Due to its delicate nature, small changes in temperature can affect the longevity of it.
- Freeze it – Although freezing yoghurt changes its texture in a way that might not make it suitable for eating, it can still be used as an ingredient to bake up a delicious cake.
- Expiration Date – Yogurt is sold with an expiration date, or a "sell by" date. These dates should be taken into consideration. Never buy yogurt that is past its expiration date.

Cheese: A solid food obtained from the pressed curdfrom the wholly, partially or skimmed milk of cow or from the any milk producing animal, like buffalo, ewe, goat, sheep, camel etc., it is often seasoned and aged. It is a generic term for a diverse group of fermented milk –based food products. Cheese is produced throughout the world in wide –ranging flavors, textures, and forms.

It is obtained by coagulating milk with rennet, lactic acid or other suitable enzyme or acid with or without further treatment of separated curd by heat or pressure or by means of ripening ferments, special moulds of seasonings. But the most commonly used technique is to use the action of rennet on milk. Curd formed at 106F is more firm whereas at low temperature the curd is soft.

Rennet is obtained from the gastric juices of calves and in the inner lining of the stomach. Rennet precipitates the casein of the milk to form curd. The coagulation of casein may also be brought by the addition of certain acids. The rennet formed curd is firm and elastic

where as acid formed curd is sticky.

Origin : The origins of cheese have not been documented. One does not know where or when it came into existence, but the farmers of Mesopotamia, who first domesticated goats and sheep certainly made their cheese from milk. There is a story –around 900years ago; an Arabian merchant was riding on a camel through the desert. He had brought with him a bag of skin that was filled with goat milk. When he opened the bag to drink the milk, he found that the milk had converted to cheese. Apparently, the heat and rocking motion of the camel had turned the milk into solid cheese and whey. Cheese is made by almost every country in the world. There are varieties of cheese with different textures, flavours and colours. Though cheese is primarily made of cow's milk but in certain parts of Europe and the Middle East, it is also made of goat's milk. Other sources for making cheese are the milk of yak (China), buffalo (Philippines, India and Italy) and even from donkey and horse's milk in Afghanistan and Iran.

Nutritive Value of Cheese: Cheese, like many other milk products, provides protein, vitamins, minerals, fat, saturated fat and cholesterol. While cheese is one of the best sources of calcium, it may also be high in sodium and saturated fat.1 gms. Serving of natural cheese supplies the same amount of calcium as 110ml. of milk or yogurt, as well as 12 to 14 gm. total fat, gm. saturated fatty acids, 44 ml. cholesterol and 173 calories. For sodium, while 10ml of milk contains 12ml, 1 gm of natural cheese could contain from 11to 45ml, while 2 gm of process cheese could contain 80ml.

Making of Cheese: Milk is heated to a certain degree depending upon the type of curd required. The rennet is then added to this milk, which takes 8 –1hours to coagulate all the milk casein and removing the whey. When all the whey is removed, the curd mats together and forms mould which is left for ripening. Ripening helps to improve the flavour, texture and the colour of the cheese. The ripening period may vary from weeks to years depending upon the quality desired. Then the cheese is stored which are called curing, which again depends upon the period of the storage. The longer the curing period, the sharper, richer and flavourful cheese is developed. In the process of ripening cheese looses its toughness, rubbery qualities and becomes soft and mellow. During ripening process the bacterial action takes place, which produces CO_2 , which produces holes and veins in cheese.

Classification of cheese: A cheese can be distinguished by its flavor, smell and texture. Fresh cheese is un –ripened curd eaten shortly after it is made, while soft cheese is briefly ripened and can be easily spread and is also very fattening. Semi –Hard cheese is matured with less moisture and is pretty easy to cut and hard cheese is matured over a long period with less moisture content and may have up to 50% fat.

Fresh and Soft Cheese –

1. **Cottage Cheese or Paneer –** A lumpy and bland curd cheese, usually containing cream, has a moist texture. It is available in most countries and is used mainly for making cheesecakes and salads. In India, cottage cheese is very commonly used in most houses and goes by the name of 'paneer'.

2. **Cream Cheese –** This cheese is prepared in the same way that cottage cheese is made but only from full –cream cow's milk. There are different types of Cream Cheeses – they could be double cream cheese and singles cream cheese. White and smooth, cream cheese is usually used for snacking and spreading.

3. **Curd Cheese –** 'Curd' is the general name given to all un –ripened cheeses made from the separated curds of cow's or goat's milk. Curd cheese has a slight acidic taste and is used in the preparation of sweets and savory fillings. It is also used to make dips and spreads and is available in most countries easily.

4. **Mozzarella** – This Italian un –ripened curd cheese was originally made from buffalo milk but now is made from cow's milk as well. This is an extremely soft cheese with a chewy texture and has a mild and creamy taste. This cheese is used primarily to make pizzas, lasagna and grilled sandwiches.

5. **Ricotta –** Another Italian un–ripened cheese made from the whey ofcows milk. This cheese is very smooth and has a milky taste and is used for the preparation of sweets and savory dishes as well as for making pizzas.

Semi Hard Cheese

1. **Cheshire –** An English specialty made of cow's milk with a crumbly texture and a salty ting. This cheese ripens at a fast rate. Cheshire cheese is available in two varieties – Red Cheshire and White Cheshire. It makes a very good snack cheese.

2. **Emmental –** This world famous Swiss cheese is made of cow milk and has a slight sweet and nutty taste. It is usually used as a base for fondues and toasted snacks.

3. **Dunlop –** This is a Scottish cheese, made of cow's milk with a bland and buttery taste. It is an ideal snack cheese and is good for toasting.

4. **Gruyere –** This is a Swiss cheese but variations are produced in France and Switzerland. It has a smooth and uniform paste with a few pea –sized holes and a dark brown rind. It is a good table cheese and is used to make fondues, sauces and quiches.

5. **Cheddar –** This cheese by far is England's most famous. Made from cow's milk, it varies from mild to very sharp. Cheddar cheese is used mostly for cooking and also made for making sauces, souffles, salads and pizzas.

Hard and Smoked Cheese –

1. **Parmesan –** An Italian cheese with a grainy texture and a golden color, it is made of finely cut and carefully separated curd, which then is stirred and scalded before being pressed. It has a sharp and salty flavor. Parmesan cheeses are used for Italian cooking.

2. **Sapsago –** A Swiss cheese made from sour and skimmed milk, is also known as green cheese because of its pale green color.

3. **Smoked Emmental** – This cheese is traditionally made in a long sausage like shape and is used often as a snack cheese.

4. **Mycella** – A Danish cheese that's made from cow's milk and has blue –green streaks. It's a relatively mild blue cheese, and is usually used as a table cheese but can also be used in salads and salad dressings.

Blue Cheese –

1. **Danish Blue –** Danablu or Danish Blue is made from homogenized cow's milk. This cheese is creamy and soft textured and has a very strong taste. It makes a very good dessert cheese.

2. **Blue Cheshire –** A cylindrical and blue version of the Cheshire and the finest of all blue cheeses, this is made from cow milk and ripens and turns blue 'accidentally'. With a very rich taste, it is best used as a dessert cheese.

3. **Bavarian Blue** – A double creamed, soft and blue –veined cheese with a mildly sour taste, it is best used in sandwiches as a spread.

4. **Blue Castello –** This is a rich, moist, and creamy blue cheese. It's fairly mild and a good choice for unadventurous guests.

5. **Gorgonzola –** Italian Gorgonzolas are creamy and mild, while domestic versions are sharper and more crumbly. A Gorgonzola dolce is young, creamy, and mild, while a Gorgonzola naturale = mountain Gorgonzola is aged until it's firmer and more pungent. Use within a few days after purchasing. For best flavor, serve at room temperature.

How to store cheese –

1. Once you've brought the cheese home, leave it in its original packaging and tightly cover it in plastic wrap. This reduces air circulation, which in turn reduces the possibility of mold. Store the cheese in the coldest part of your refrigerator – not on the door.
2. Cheese is more flavorful at room temperature. Let it stand for a half hour before serving.
3. Cheese will continue to ripen, no matter how carefully it is stored. Hard cheeses will generally keep for several months, whereas softer cheeses will keep from one to three weeks after opening, if stored in an airtight container.
4. Shredded cheese is more prone to mold because it has more exposed surface area. Try to use shredded cheese within a few days.
5. Use moisture –proof and airtight wrapping.
6. Freeze quickly and store at F for two to six months.

7. Thaw in refrigerator so cheese won't lose moisture; the slower the cheese is thawed, the better.
8. Use as soon as possible after thawing.

Uses of Cheese in bakery –

- It is creaminess helps keep baked goods moist
- It is tanginess imparts a crave –worthy, old –fashioned flavor
- It is acidity helps activate baking soda , which can make baked goods fluffy and light
- It can step in for sour cream, mayonnaise or crème fraîche, bring in the same tangy with less guilt
- It can act as a garnish, in place of ice cream or whipped cream topping.

Purchase of cheese –

1. From well –known and reliable shopkeeper.
2. Inspect for any type of spoilage, breakage, mould formation, smell.
3. Inspect the package and labels.
4. You should have enough knowledge about the characteristics and texture of the cheese. Examine the cheese, especially the aroma, appearance, and flavor. An ammonia, sour milk, barnyardy or unclean aroma is undesirable. The cheeses should be characteristic of their style, with an interior that is free of cracks, discoloration, and mold (unless it is a blue cheese).
5. If possible taste the cheese before buying.

Butter : Butter is the fat of cream that is separated – more or less – completely from the other milk constituents by agitation or churning. The mechanical rupture of the protein film around the fat globules allows the fat globules to clump together. Butter formation is an example of breaking of oil –in –water emulsion by agitation. The resulting emulsion that forms in butter itself is water –in –oil emulsion, with about 18% water being dispersed in 80% fat and a small amount of protein acting as an emulsifier. Most frequently made from cow's milk, butter can also be manufactured from the milk of other mammals, including sheep, goats, buffalo, and yaks. Butter is made from either sweet or sour cream. Butter from sour cream has a more pronounced flavour. The cream may be allowed to sour naturally or may be acidified by the addition of pure culture of lactic acid bacteria to sweet cream, which produces a butter of better flavour and keeping quality. Salt and food colorings are sometimes added to butter. Rendering butter, removing the water and milk solids, produces clarified butter or ghee, which is almost entirely butterfat.
It consists of more than 80% butterfat and small amounts of protein, vitamin A and D, minerals, lactose and water. Butter must have a minimum of 80% fat content, a non –fat solid content of 8% and a maximum of 12% moisture (water).

Factors that affect quality of butter –

- The breed of animal (cow or buffalo) from which the milk was obtained.
- The type of feed that was available for the animal.
- The method of manufacture (fresh or ripened cream).
- The efficiency of manufacture (wrong temperature may affect the colour

and flavour of butter).
- Whether or not the butter was blended.
- The addition of salt and colour.
- The method of packing and storing.

Classification of butter : There are four main types of butter –
- Fresh or Sweet cream Butter,
- Ripened cream or Lactic butter,
- Blended or milled butter and
- Special Butter

(Fresh and ripened cream Butters are known as "Creamery butters").

Manufacture of creamery butter: The manufacture of creamery butter takes place in four main stages, as mentioned –

1. ***Holding*** – The cream (35%) is pasteurized at 95°C (203°F) and held for 2 to 4 seconds. It is then cooled to 4.5°C (40°F) and held there for several hours to ensure the uniform hardening of the fat globules.

2. ***Ripening*** – When the end product is going to be a ripened butter or lactic butter, a "starter" (which is a laboratory culture of acid –producing bacteria) will be added during the Holding stage, in which the holding temperature will be 15.5 –18.5°C (60–65°F) for 3 to 4 hours before being cooled to 4.5°C (40°F). This gives the butter a much fuller flavour. However, the flavour tends to fade and therefore the ripened cream butter has a shorter life than the sweet cream butters. This stage will be omitted when making the sweet cream butter.

3. ***Churning*** – The churning of cream is done in large stainless steel churns that hold about 1000 gallons of cream. The temperature must not exceed more than 4°C. The churns are rotated while internal rollers pass through the cream. This breaks the envelope of non –fat particles/solids that surround the small fat globules and coalesce to form larger groups of butter fat. The envelope is dispersed in the thin liquid part of the cream to form buttermilk. After about 30 minutes of churning, the butter separates out in the form of grains and floats in the buttermilk. The buttermilk is carefully drained away and used for other purposes.

4. ***Washing and salting*** – The butter grains are now washed with ice water to remove any traces of buttermilk left on the surface of each grain, in order to maximize the keeping quality. Ice water also helps to harden butter grains. Salting can be done in two ways –
    a. By adding fine grains of dairy salt, and
    b. By soaking in a brine solution for 10 –15 minutes and allowing the butter to absorb it.

    The quantity of salt added usually average 1% for ripened cream butter and 1.5% for fresh cream butter. Salt contributes to flavour and improves the keeping quality.

The butter grains are then worked into a smooth solid mass by rotating the churns slowly for 10 –15 minutes, then weighed and packed. Colouring (annatto) may also be added at this stage. If unsalted butter is required, the salting stage is omitted.

Blended Butter : Blended butter is a blend of butters from different regions or countries. These are mixed together to produce a product of standard quality at a competitive price, under a brand name.

Special Butters : This group includes some butter that are not commonly available and those which are not true butters. These include –

1. ***Whey butter*** – Whey is the liquid which separates from the curd while making cheese. The butterfat obtained from the whey may be used to produce butter, or it may be added to fresh cream/milk prior to it being processed into butter. Due to its origin, this butter has a faint cheesy flavour.

2. ***Milk blended butter*** – Quantities of milk are blended into butter, thereby increasing the moisture content to 24% (max.).

3. ***Powdered butter*** – This is spray –dried butter containing 80% milk fat and non –fatty solids. It is produced on a large scale in Australia and is used mainly in the Bakery trade.

4. ***Compound butters*** – These are made by adding a particular natural flavour or colour to butter, depending on the type of food with which it is served. It is generally used as an accompaniment e.g. Lobster butter, Parsley butter etc.

5. ***Cocoa butter*** – This is not a true butter, rather obtained by crushing the cocoa beans. It is the most expensive ingredient used in chocolate making. Cocoa butter substitutes, using palm oil, are also available.

6. ***Peanut butter*** – It is a paste –like substance obtained by grinding roasted peanuts that may be further emulsified and flavoured.

Uses of Butter –

1. As a spread for bread, toast and scones.
2. As a basic ingredient in pastry –making and cake –making.
3. Used as an accompaniment (compound butter).
4. To enhance the taste and flavour of soups and sauces.
5. As a cooking medium (The smoke point of butter fat is only 127 –130°C; so a vegetable oil should be used when high cooking temperatures are required).
6. For butter sculptures.

Purchase of butter –

1. Good quality butter should have a clean flavour and aroma characteristic of the type of butter.
2. Have a close body, a waxy texture,
3. Be of uniform colour
4. Have a uniform distribution of salt (if added), be clean in appearance and have an absence of any free moisture.
5. Butter is available in 10 Gms, 100 Gms and 500 Gms packs in the market.

Storage –

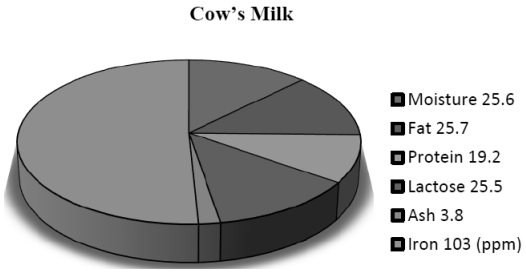
1. Butter is a perishable product and tends to loose flavour and go rancid on prolonged storage. Exposure to sunlight can make it go rancid faster.
2. It must be stored at refrigerated temperatures (2°C), well wrapped and away from strong flavoured foods, for it absorbs odours and flavours easily.
3. If purchased in bulk, it can be frozen at –25 to –35°C.

Khoya: Khoa is a concentrated whole milk product obtained by open pan condensing of milk under atmospheric pressure. According to Food Safety and Standard Regulations 2011, Khoya, by whatever variety of names it is sold such as Pindi, Danedar, Dhap, Mawa or Kava, means the product obtained from cow or buffalo or goat or sheep milk or milk solids or a combination thereof by rapid drying. The milk fat content shall not be less than 30 percent on dry weight basis of finished product. It may contain citric acid not more than 0.1 percent by weight. It shall be free from added starch, added sugar and added colouring matter.

- Yield of khoa from cow milk = 17 –19%
- Yield of khoa from buffalo milk = 21 –23%

Manufacture of Khoa : Khoa is made by simmering milk in an iron karahi for several hours, over a medium fire. The gradual vaporization of its water content leaves coagulated solids in milk, which is khoa. 175–180°F (about 80°C) is ideal temperature to avoid boiling and to minimize scorching. Other quick way of making khoa is to continue mixing full fat milk powder to skimmed milk until it becomes khoa.

Chemical Composition of khoa:



Varieties of Khoa: There are three distinct varieties of khoa. They differ in their composition, body and textural characteristics and end use.

Pindi or batti – This variety is identified as a circular ball of hemispherical pat with

compact mass, homogenous and smooth texture. It shall not show any sign of fat leakage or presence of free water. It possesses pleasant cooked flavour and devoid of objectionable tastes like burnt, acidic, etc. This variety of khoa is used in the manufacture of burfi, peda and other varieties of sweets.

Dhap or chikna – It is a raw (katcha) khoa characterized by loose but smooth texture and soft grains and sticky body. Dhap variety carries highest percentage of moisture over other varieties of khoa. This high moisture is necessary to provide adequate free water for soaking of maida (refined wheat flour) and semolina (suji) and for homogenous distribution of other ingredients in the preparation of smooth gulabjamun balls. This variety of khoa is used in the manufacture of gulabjamun, kalajamun, pantooa, carrot halwa, etc.

Danedar **–** This is characterized by the granular texture with hard grains of different sizes and shapes embedded in viscous serum. Slightly sour milk is preferred in the manufacture of this variety as it yields granular texture. This variety of khoa is used in the manufacture of kalakand, milk cake, etc.

Comparison between cow and buffalo milk Khoa –

Particulars	Cow	Buffalo
Color	Straw/pale –yellow, brown tinge	Whitish, brown tinge
Appearance	Moist surface	Slightly oily
Body	Slightly hard	Soft
Texture	Slightly sandy	Smooth, granular
Smell	Rich, nutty	Rich, nutty
Taste	Slightly salted	Slightly sweet
Suitability for sweets	Suitable	Highly suitable

Spoilage of Khoa: Due to higher nutrients and high water content, Khoa is easily susceptible to growth of bacteria. *Staphylococcus aureus* and *Bacillus cereus* are the main contaminating micro organisms in khoa and they cause many food–borne diseases.

Rancidity is one of the reasons which deteriorate quality of khoa and it adversely affects storage life of khoa. Addition of potassium sorbate effectively improves the storage life of khoa at higher temperatures.

Storage of khoa –

- Khoa should always be stored in cool dark place and away from any pungent smelling item.
- The storage life of khoa is only two to three days, under ambient conditions, and 15 –20 days under refrigerated conditions (5 –10□).
- Increased storage stability of khoa for 40 days can be achieved by addition of potassium sorbate.

CHECK YOUR PROGRESS-V

1. What role does milk play in baking?

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2. Write a note on Milk Products.

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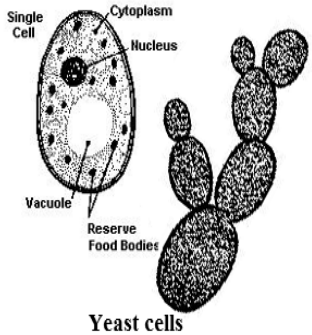
1.8 YEAST


Yeast Granules



Yeast cells

Yeast is an egg –shaped single –cell fungus that is only visible with a microscope. It takes 20,000,000,000 (twenty billion) yeast cells to weigh one gram. Yeast is the heart of the bread –making process. It's the essential ingredient that makes the dough rise and gives home –baked bread its wonderful taste and aroma. Other ingredients are added to complete the reactions that result in a perfectly baked loaf of hot, crusty homemade bread. There are innumerable varieties of yeast. Of these, only a few are suited to bread –making such as *Saccharomyces cerevisiae*, which means "sugar eating yeast". Strains of such yeast are isolated and then nurtured under simulated conditions. It is a biologically raising agent and its function is to make the dough rise in volume. It is during the rising and proving that carbon dioxide (CO_2) is emitted and forms bubbles which not only cause the dough to rise,

but make the baked bread porous, improves the grain, compressed and sold fresh or dried and sold in granular form. Yeast conditions the dough (gluten) so that it attains sufficient mellowness to stretch under the pressure of CO2 gas and form the structure of the products. The small quantity of alcohol produced evaporates in the heat of the oven.

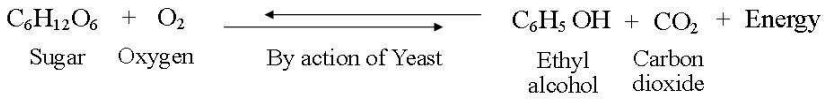
Functions of yeast in bakery: Yeast fermentation happens when the yeast cells "eat" sugar, the food of choice for yeast. Yeast fermentation in dough has three functions in bread making –

Rising the dough – yeast fermentation makes carbon dioxide, a gas responsible for stretching and expanding the dough like a balloon.

Dough development – other compounds formed during yeast fermentation make the flour stronger so it can capture and hold the carbon dioxide gas that the yeast produces.

Flavor, aroma and texture – yeast fermentation also provides these wonderful sensory and physical attributes that you expect from yeast –raised products.

How does yeast make bread rise? As bread dough is mixed and kneaded, millions of air bubbles are trapped and dispersed throughout the dough. Meanwhile under favourable moisture, warmth and pH, the yeast in the dough metabolizes the starches and sugars in the flour and starts to multiply. While multiplying, they excrete alcohol and carbon dioxide gas. The more the multiplication, the more will be the quantity of alcohol and carbondioxide. This gas inflates the network of air bubbles, causing the bread to rise. During rising, the yeast divides and multiplies, producing more alcohol and carbon dioxide. As long as there is ample air and food (carbohydrates) in the dough, the yeast will multiply until its activity is stopped by the oven's heat. During baking process the alcohol and carbon dioxide escapes with the vapour due to heat.



Yeast reproduction and multiplication: Yeast cells reproduce and multiply under favourable conditions like –

- ***Sugar*** – Yeast feed upon the sugar, thus multiply through the process of fermentation. Sufficient sugar (up to 10%, average 6 –8%) must be added to facilitate proper fermentation.
- ***Warmth*** – 25 –40^{0}C
- ***Moisture*** – 80%
- ***Correct pH*** value of the ingredients – 4.5

The moisture is obtained from the liquid we use (water, milk, etc.). If the water used for making bread contains more salt (base), the growth is retarded. For the growth of yeast the food is available from the starch in flour or in the sugar added or by the addition of mineral yeast food (MYF). The warmth is obtained from the ingredients kept at room temperature.

Addition of acid (eg.acetic acid) is recommended in the formula to correct the pH value to 4.5.

Types of Yeast: There are two types of yeast–

- Fresh Yeast
- Dried Yeast

A. Fresh yeast: Fresh yeast is also known as compressed yeast or cake yeast. It is a moist mixture of yeast plants and starch. It should be kept in the refrigerator and should be maintained at 40 –45^0 F. It has a pleasant aroma like ripe apples and is inactive at cool temperature, yellowish cream in colour and when broken, it shows clean fracture without crumbling. It produces gas rapidly when added to dough. Bakers prefer fresh yeast because it is cheaper and reliable. It can be stored for 2 –4 weeks as it contains high moisture content. Fresh yeast is divided into two –

- ***Cream yeast*** – Cream yeast is not available in Indian markets. This yeast is available in the suspension form and is transported by motor and tube. It can be stored only for 7 –10 days as it contains very high moisture content.

- ***Compressed yeast*** – is essentially cream yeast with most of the liquid removed. It is soft solid, beige in color, crumbly in appearance, and arguably best known in the consumer form as small, foil –wrapped cubes of cake yeast.

B. Dry yeast – contains very less moisture and has a good shelf life. It is grayish brown in colour and granular in form with a distinctive smell.

- ***Active dry yeast*** – It is a mixture of yeast with corn flour or corn meal pressed into cakes and dried. It is available in granular or and multiply. It with some growth medium. Under most conditions, active dry yeast must first be proofed or rehydrated is suitable for the sponge and dough methods. It can be stored for a long time (4 –6 months) due to less moisture content.

- ***Instant dry yeast*** – is the form of yeast most commonly available to noncommercial bakers. It consists of coarse oblong granules powder form. It continues to live but in an inactive stage. When it gets warmth and moisture it begins to develop of yeast, with live yeast cells encapsulated in a thick jacket of dry, dead cells. It can be stored at room temperature for a year, or frozen for more than a decade, which means that it has better keeping qualities than other forms, but it is generally considered more sensitive than other forms to thermal shock when actually used in recipes.

- ***Rapid –rise yeast*** – is a variety of dried yeast (usually a form of instant yeast) that is of a smaller granular size, thus it dissolves faster in dough, and it provides greater carbon dioxide output to allow faster rising. This yeast is not generally used in bakery as most baking experts believe it reduces the flavor potential of the finished product.

- ***Deactivated yeast*** – is dead yeast which has no leavening value and is not interchangeable with other yeast types. Typically used for pizza and pan bread doughs, it is used at a rate of 0.1% of the flour weight, though manufacturer specifications may vary. It is a powerful reducing agent used to increase the extensibility of dough.

Preparing yeast for dough: Yeast can be added directly to dry ingredients.

- Use liquid temperatures of 120°F to 130°F for dry yeast.
- Use liquid temperatures of 90°F – 95°F for cake yeast.

Yeast can be dissolved in liquids before mixing with the rest of the dry ingredients.

- Rehydrating dry yeast before using gives it a "good start" – the yeast feeds on the sugar allowing it to become very active and ready to work in your dough.
- Water is recommended for dissolving yeast.
- Dissolve 1 tsp sugar in ½ cup 110°F –115°F water.
- Add up to 3 packets of yeast, depending on your recipe, to the sugar solution.
- Stir in yeast until completely dissolved.
- Let mixture stand until yeast begins to foam vigorously (5 – 10 minutes).
- Add mixture to remaining ingredients.
- Remember to decrease the total liquids in your recipe by ½ cup to adjust for the liquid used to dissolve the yeast.

Important tips

- Salt controls the yeast activity during fermentation and it has a tightening action on flour protein. So if the formula contains more salt, it reduces the yeast activity.
- If the sugar is concentrated, it will be difficult for the yeast to take food from it. If sugar is increased.
- Yeast should be slightly reduced if baking at high altitude.
- Milk and egg protein have a tightening action on flour proteins. In their presence the yeast function will be difficult and so more yeast will be necessary.
- During winter, yeast content should be increased.
- During summer, yeast content should be reduced to prevent souring of dough.
- If dough requires long fermentation period to develop flavor in bread, then one should reduce the yeast content.
- If dough requires fast fermentation, the quantity of yeast should be increased to make the dough light and spongy.
- If formula contains baking powder the quantity of yeast should be reduced.
- Using a thermometer is the most accurate way to determine the correct liquid temperature. Any thermometer will work as long as it measures temperatures between 75°F and 130°F.

Yeast culture: A culture would be started by leaving a rye dough to stand at 24–27^{o}C for several hours, which is likely to induce the grain microorganisms to start a lactic acid fermentation. An alternative is to add sour milk to the dough followed by resting the dough for a few hours. A mixture of pure organic acids can be added to simulate the flavour of proper sour dough. If the culture is to provide both the yeast and the flavour of sour dough then either it must acquire wild yeast or a starter culture that includes yeast must be added. In some cases the sour dough culture is only used to give the sour dough taste while conventional yeast is added. If a started culture is used the culture is activated by mixing it with rye flour and water and leaving it to stand in a warm place until the culture is fully active. The active culture is then kept going by feeding it flour and water. When the culture is fully active the culture is mixed in with flour, water, salt and any fat. The resulting dough is kneaded carefully to avoid too much toughening. The dough is then fermented say for half to one hour, knocked back, scaled, proved and baked.

Some sour dough bread is made by using commercial yeast but with a proportion of genuine sour dough. Ordinary baker's yeast is at a disadvantage in rye sour dough because the low pH that is essential for rye bread is not the optimum pH for the yeast. Conventional improvers are not used in rye bread but additives are sometimes used to increase the water absorption of the dough. Examples are polysaccharide gums such as guar and locust bean gum as well as pre –gelatinized potato flour, rice starch or maize starch.

Storage of Yeast : Yeast has three enemies –

- Air
- Moisture
- Heat

Excess of moisture, heat and air will retard in multiplication of yeast and also kills them. Dead yeast does not work on bread doughs, so extra precaution has to be observed while storing yeast.

- Unopened pack should be kept in clean, dry and cool place. In cool climate, they can be kept on shelves or cupboards. Where as in hot climate, they should be kept in refrigerator. Unopened, yeast will last about 2 years from the date of manufacture.
- Opened pack should be kept in airtight containers. It is preferable to purchase small packs, so that they can be used at one time.
- Never put damped spoon or finger into the yeast container. This type of yeast may last for 4 –5 months from the date of manufacture.

CHECK YOUR PROGRESS-VI

1. What are the characteristics of Yeast?

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2. Write a note on Types of Yeast.

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1.9 CHEMICAL LEAVENING AGENTS

Chemical leavening is a mechanism used in the baking industry to provide volume through the release of gases to enhance the eating quality of baked goods. Chemical leavening agents added to doughs and batters undergo various decomposition and neutralization reactions to produce carbon dioxide, water vapor and in some cases ammonia. These gases are responsible for expansion, flavor, color and other aesthetic aspects of baked products, namely crumb grain size, tenderness, etc. Chemical leaveners are used in quick breads and cakes. Some common chemical agents include –

Some common chemical agents include –

1. Baking Powder
2. Baking soda (Sodium Bicarbonate)
3. Cream of tartare
4. Ammonium Bicarbonate (Hartshorn, Horn Salt, Bakers Ammonia)
5. Potassium Bicarbonate (Potash or pearl ash)
6. Monocalcium phosphate monhydrate

1. Baking powder: Baking powder is a dry chemical leavening agent used in baking. There are several formulations; all contain an alkali, typically sodium bicarbonate (baking soda), and an acid in the form of salt crystals, together with starch to keep it dry. It usually reacts in the presence of any acidic medium such as sour milk butter milk or orange juice, which causes carbon dioxide gas to release causing the desired result in baked goods. Mainly used in a variety of dishes such as biscuits batters pudding, etc. Baking powder is usually a single acting agent, which means it reacts as soon as it comes into contact with any liquid. Hence, it is extremely important to work quickly once milk or water comes into contact with the dry ingredients so that the resulting carbon dioxide does not get a chance to escape.

$$NaHCO3 + H+ \text{ (from the acid)} \rightarrow Na + H2O + CO2$$

2. Baking soda: It is also known as Sodium bicarbonate NaHCO3 or sodium hydrogen carbonate, or bread soda, or bicarbonate of soda, which is a soluble white chemical compound, with a slight alkaline taste resembling that of sodium carbonate. It is found in many mineral springs and also produced artificially. Baking soda can be used either on its own or combined with an acid like cream of tartar to produce baking powder.
Sodium bicarbonate can only be used without acid in systems in which the baking soda

reaches a high enough temperature (>1201C) to decompose thermally –

$2NaHCO3 + heat \rightarrow Na2CO3 + Co2 + H2O$

The reaction with acids is:

$2NaHCO3 + heat^{+} \rightarrow Na^{+} + CO2 + H2O$

Sodium bicarbonate is soluble in water at 01C; a saturated solution is 6.5% with the solubility rising to 14.7% at 601C. It can be expected then that sodium bicarbonate will dissolve in the aqueous phase of a batter or dough. It will then react with any acid present, including any acid ingredients such as butter milk.

3. Cream of tartar: Cream of tartar is fine white powder which is extracted from the tartaric acid that crystallizes in wine casks during the fermentation process of grapes. It is also known as potassium salt and has a number of uses. It may be combined with bicarbonate of soda to produce baking powder it can also be added to increase stability and volume of whisked egg whites to increase their stability when making meringues or folded into cake batters. Adding a small amount to sugar syrups will prevent it from crystallizing and hence used in sugar work and decorations.

4. Ammonium Bicarbonate: Commercial ammonium bicarbonate was formerly known as salt volatile or salt of hartshorn or bakers ammonia and was formerly obtained by the dry distillation of nitrogenous organic matter such as hair, horn, decomposed urine, etc., but is now obtained by heating a mixture ammoniumcarbonate, ammonium bicarbonate, and ammonium carba –mate.. Ammonium bicarbonate is used in the food industry as a raising agent for flat baked goods, such as cookies, crackers, steamed buns and cookies. It was commonly used in the home before modern day baking powder was made available to home bakers. It decomposes rapidly during baking to form carbon dioxide gas, ammonia gas, and water. Only heat and moisture are necessary for it to work. No acids are needed. Compared to baking soda or potash, hartshorn has the advantage of producing more gas for the same amount of agent, and of not leaving any salty or soapy taste in the finished product, as it completely decomposes into water and gaseous products which evaporate during baking. It cannot be used for moist, bulky baked goods however, such as normal bread or cakes, since some ammonia will be trapped inside and will cause an unpleasant taste. It is stable at room temperature, but decomposes 401C, i.e. in the early stages of the oven. The reaction for the decomposition is –

$NH4CO3 \rightarrow NH3 + CO2 + H2O$

5. Potassium bi –carbonate: Potassium bicarbonate (also known as potassium hydrogen carbonate or potassium acid carbonate), is a colorless, odorless, slightly basic, salty substance. The compound is used as a source of carbon dioxide for leavening in baking. It is used as a base in foods to regulate pH. It is a common ingredient in club soda, where it is used to soften the effect of effervescence. This is also known as pearl ash or Potash. It is KHCO3 which causes leavening in a baked product. This is sometimes used to make gingerbreads, biscuits and honey cakes. Potassium bicarbonate is also more expensive. The reaction for its thermal decomposition is –

$2KHCO3 + heat \rightarrow K2CO3 + CO2 + H2O$

6. Monocalcium phosphate dehydrate: The most important use of the monocalcium phosphate in the food industry is as the acid component in the baking powders. It has application in foods such as Pancakes, cookies, angel food cakes, self –rising flour, double acting baking powder and single acting baking powder.Once it is combined with sodium bicarbonate or another alkali, it will produce carbon dioxide, It is a low temperature acid, which will react immediately as moisture is added. It also works as a pH regulator in the baked product, due to the resulting buffer salts from the fermentation process.

Other chemical leaveners used may be –

1. Dicalcium phosphate dihydrate (CPD)
2. Sodium aluminum sulfate (SAS)
3. Anhydrous monocalcium phosphate (AMCP)
4. Sodium aluminum phosphate (SALP)
5. Sodium acid pyrophosphate (SAPP)
6. Tartaric acid
7. Glucono –delta –lactone
8. Calcium sulfate
9. Calcium carbonate

Ingredient name	Common Name	Function	Considerations
Sodium carbonate	Baking powder	CO2 source	Most common CO2 source
Sodium bicarbonate	Baking soda	CO2 source	Most common CO2 source, required in baking powder
Potassium bicarbonate	Potash or pearl ash	CO2 source	Used in place of baking soda in low –sodium applications
Ammonium bicarbonate	Hartshorn, Horn Salt, Bakers Ammonia	CO2 source	Ammonia taste limits use to low –moisture products
Tartaric acid		Leavening acid	Very rapid action
Monopotassiumbitartrate	Cream of tartar	Leavening acid	Rapid action
Monocalcium phosphate monohydrate	MCP	Leavening acid	Rapid action, used in double –acting baking powder
Anhydrous monocalcium phosphate	AMCP	Leavening acid	Coated for slower action than MCP
Sodium acid pyrophosphate	SAPP	Leavening acid	Slow to very slow action, slightly bitter aftertaste

Monocalcium phosphate dehydrate	MCPD	Leavening acid	Rapid action, used in double –acting baking powder
Sodium aluminum phosphate	SALP	Leavening acid	Slow action, used in single – acting baking powder
Sodium aluminum sulfate	SAS	Leavening acid	Very slow action
Dicalcium phosphate dihydrate	DCPD	Leavening acid	Very slow action
Glucono –delta – lactone	GDL	Leavening acid	Slow action, slightly bitter aftertaste
Calcium sulfate		Filler	Inert
Calcium carbonate		Filler	Inert

Storage of Chemical Leaveners: All chemical leaveners have a shelf life upto 3 years if stored properly. They should be kept tightly closed air proof containers. If left open, they can absorb moisture from the air and lose part of their leavening power. Also, they must be stored in a cool and dark place, because heat also causes them to deteriorate due to oxidation.

CHECK YOUR PROGRESS-VII

1. List the various chemical raising agents used in baking?

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2. Write a note on Storage of Chemical leaveners.

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1.10 SALT

These are chemical compound (other than water) formed by a chemical reaction between an acid and a base. Salt for human consumption is produced in different form sun refined salt (such as sea salt), refined salt (table salt), and iodized salt. It is a crystalline solid, white, pale pink or light gray in color, normally obtained from sea water or rock deposits. Edible rock salts may be slightly grayish in color because of mineral content. It is essential for animal life in small quantities, but is harmful to animals and plants in excess. Salt is one of the oldest, most ubiquitous food seasonings and salting is an important method of food preservation. The taste of salt (saltiness) is one of the basic human tastes.

Classification of salt –

1. ***Table salt*** – Once of the most widely used salts, table salt goes through a refining process that removes traces of other naturally occurring minerals. Chemical additives such as sodium silicoaluminate, calcium phosphate, or magnesium carbonate are sometimes blended in to prevent clumping. Table salt and iodized salt are preferred in baking for their fine –grained texture and accuracy of measure.

2. ***Iodized salt*** – A form of table salt, iodized salt is fortified with iodine that was lost during processing. Iodized salt was the first functional food, fortified in the early 1920s in response to a Midwest –focused epidemic of goiter (hyperthyroidism) that was caused by iodine deficiencies.

3. ***Kosher salt*** – This inexpensive coarse salt is evaporated from a brine, usually under specific conditions approved by the Orthodox Jewish faith. It contains no additives or added iodine. It has a much larger grain size than some common table salt. Like common table salt, kosher salt consists of the chemical compound sodium chloride. Kosher salt typically contains no additives (for example, iodide), although some brands will include anti –clumping agents in small amounts. Additive –free non – kosher salt is also readily available and is generally preferred in professional kitchens due to its ease of being measured by hand.

4. ***Sea salt*** – Available in, fine and coarse grains, sea salt has become increasingly available in markets but at a higher cost than table or kosher salt. Sea salt is made from evaporated sea water. Some salt farmers evaporate the water in enclosed bays along the shoreline, and then rake up the salt by hand. This type of salt tends to include several naturally present trace minerals, such as iodine, magnesium, and potassium, which give sea salt a fresher, lighter flavor than standard table salt. These are best used where their tremendous flavor and presence is pronounced, such as on a boiled potato or a slice of tomato.

5. ***Rock salt***– Sold in large crystals, rock salt has a grayish hue because it is unrefined. Rock salt makes a great bed for serving oysters and clams. Or combine it with ice to make ice cream in hand –cranked ice cream makers.

6. ***Black salt or kalanamak or black Indian salt*** – is a salty and pungent smelling condiment used in India. The condiment is composed largely of sodium chloride with several impurities lending the salt its colour and smell. The smell is mainly due to sulfur content.

7. ***Smoked salt*** – is an aromatic edible salt product with smoke flavoring. It is a seasoning and is used as a shortcut to add smoked flavor to foods. Smoked salt consists mainly of sea salt and smoke volatiles condensed on the salt. An ingredient typically listed on smoked salt is sawdust.

Uses of salt in bakery –

1. Acts as preservative, as it acts on microorganisms, extracts the liquid from them and then kills them.
2. Acts as anti –raising agent – regulates the leavening processes in breads by controlling the action of yeast.
3. Salt slows down all the chemical reactions that are happening in the dough, including calming fermentation activity to a steadier level.
4. Salt also makes the dough a little stronger strengthening effect on the gluten protein in the dough.
5. Salt adds flavor to baked goodsand mask the off –flavours. It also potentiates the flavor of other ingredients, including butter and flour.

CHECK YOUR PROGRESS-VIII

1. What are the different types of salt used in bakery?

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2. Write a note on Usages of salt in baking.

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1.11 SPICES

Spices are used for flavour, colour, aroma and preservation of food or beverages. Spices may be derived from many parts of the plant– bark, buds, flowers, fruits, leaves, rhizomes, roots, seeds, stigmas and styles or the entire plant tops. The term 'herb' is used as a subset of spice and refers to plants with aromatic leaves. The characteristics and environmental needs of the crops dominating the global spice trade are described below. Spices are often dried and used in a processed but complete state. Another option is to prepare extracts such as essential oils by distilling the raw spice material (wet or dry), or to use solvents to extract oleoresins and other standardized products. Coriander, cumin, mustard, and sesame seeds and the herbs sage, oregano, thyme, bay and the mints are the most important spice crops from non –tropical environments.

Allspice– Allspice (also known as English Spice, English Pepper, Jamaica pepper, Clove Pepper, Myrtle pepper, Pimenta, Pimento, or Newspice) is a Caribbean spice discovered by Christopher Columbus on the island of Jamaica during his second voyage of 1493–1496 CE. The spice itself is the dried, unripe, (green) fruit of the *Pimentadioica* plant which is a small shrubby tree, quite similar to the bay laurel in size and form and a member of the *Myrtaceae* (Myrtle) family.The English name 'allspice' was coined in England by 1621 and is derived from the English belief that this spice combined the flavour of several spices– most notable cloves, pepper, cinnamon and nutmeg. It is also an ingredient in commercial sausage preparations and in many curry powders and barbecue sauces. It is also a common ingredientof British cooking where it is often used to lift the flavour of many dishes (especially cakes).

Aniseeds– Aniseed (also known as Anise, Anís or Sweet Cumin) are the seed pods (fruit) of *Pimpinellaanisum* a herbacious flowering plant of the *Apiaceae* (also known as *Umbelliferae*) family of flowering plants. The plant is native to the eastern Mediterranean and southwest Asia and grows to 50cm tall. The plant is native to the eastern Mediterranean and southwest Asia and grows to 50cm tall. This is a very versatile spice with a rather heady aroma which explains its versatility. Aniseed is also believed to be a substance that enhances lactation. In the West (and the Middle East), aniseed is most typically used to flavoure breads, cakes and most especially biscuits (cookies) is also used in anise –flavored liqueurs (such as raki, arak and ouzo) and is the dominant ingredient used in absinthe.

Black peppercorn– Black pepper represents the dried fruit of the flowering vine, *Piper nigrum*a member of the *Piperaceae*(pepper) family. The pepper vine is a native of south – western India and has been traded from there since prehistory. White pepper (image, bottom) in contrast is made from only the seed of the pepper fruit. The outer fruit wall is removed by allowing fully ripe berries to soak in water for about a week, during which time the flesh of the fruit softens and decomposes. Rubbing then removes what remains of the fruit, and the naked seed is dried. Pepper gains its spicy heat from the *piperine*compound which is present both in the seed and the outer fruit (which is why most people believe white pepper to be milder than black pepper).Asian cooks tend to prefer

white pepper to black pepper and the unique blend of pungency and aromatic overtones found in black pepper means that this spice marries with both savoury and sweet dishes

Caraway seeds– Ajwain (also known as – Carom, Caraway, Ajowan, Bishop's Weed and Seeds Of Bishop's Weed) represent the seed –like fruit of the Bishop's Weed plant *Trachyspermumammi*. *Carumcopticum,* a member of the Apiaceae (parsley) family. It is primarily used in Indian cuisine, but is also used in dishes from Iran, Egypt, Ethiopia and Afghanistan. Raw ajwain smells almost exactly like thyme because it also contains thymol, but is more aromatic and less subtle in taste, as well as slightly bitter and musty. The heat being produced by capsaicin (8 –methyl –N –vanillyl –6 –nonenamide) and several related chemicals, collectively called *capsaicinoids*. They are used in preparation of vegetable fillers, breads and pies.

Cardamom– Cardamoms are members of the ginger family, the*Zingiberaceae* and both the entire seed pods and the seeds themselves can be used as spice distinct yet overlapping sensory qualities. Cardamom is of two types– green and black. Although Indian green cardamom (sometimes known as 'True Cardamom') is by far the most familiar, there are in fact five related species, distributed from Africa to Australasia, that yield four separate and distinct spices, with. Cardamom can also be used to flavour milk in the generation of custards and cakes. Indeed, unlike all the other cardamoms described above, green cardamom is the only one used in both sweet and savory dishes. Ground cardamom is of much poorer quality, as the aromatic compounds that give cardamom its unique flavour are volatile and are lost quickly on grinding. It is always better to use freshly –ground cardamom. Although black cardamom (which is more robust in terms of flavour profile) tends to be used in spicier or more rustic dishes whereas green cardamom is used in more fragrant and subtly spiced dishes. Both spices have distinct places in cookery.

Cayenne– orChillies (also known as Chili, Chilé and Ají) are the fruit of the Capsicum members of the *Solanaceae*(deadly nightshade) family.They all originate in the Americas, where they have been cultivated for at least 7500 years.Chilli peppers add both flavour and 'heat' to a dish. . Indeed, the flavour is so strong that even a small amount can completely overwhelm the flavour of a dish. The spice is often added to Indian breads and is used as a flavouring to snack foods such as biscuits.

Celery seeds– Celery seeds are the fruit of the Celery plant, *Apiumgraveolens*, a herbaceous biennial plant in the family *Apiaceae* (Umbellifarae) a huge family that contains carrots, cumin, caraway and fennel.They add greatly to the flavour of potatoes and are especially potato salad. The seeds can also be used in buns, breads, salad dressings, sauces and gravies. However, celery seeds do have a strong celery –like flavour (and a slightly bitter aftertaste) and should be used sparingly so as not to overwhelm a dish.

Nigella – Nigella seeds (also known as Fennel flower, Nutmeg flower, Onion seed, Gith, Kalonji Seeds, blackseeds) are produced by the plant *Nigella sativa* — though there are about 14 species of Nigella in all, which are annual plants in the *Ranunculaceae* (buttercup) family; all native to southern Europe, north Africa and southwest The black seeds are small and sharp –edged and have a peppery, slightly nutty, taste and are generally

used as a pepper substitute in recipes that incorporate pod fruit, vegetables, salads and poultry. Nigella flavoured breads, pies and buns are readily available in the bakes shop.

Cinnamon – Cinnamon (also known as Celylon Cinnamon) is the dried inner bark of *Cinnamomumverum* a small evergreen tree reaching about 15m tall and a member of the Lauraceae (laurel) family (which also includes Bay, Avocado and Sassafrass) which is a native of Sri Lanka and Southern India. The bark of the tree is sliced off and then let to dry.Cinnamon is generally used as flavouring for sweet foods such as cakes and desserts.

Cloves – Clove trees are members of the *Myrtaceae* (Myrtle) family. It is native to Indonesia and used as a spice in cuisine all over the world.The name derives from French *clou*, a nail, as the dried buds, which form the spice itself, vaguely resemble that makes this spice suitable for both sweet and savoury dishes and why it is frequently employed in aromatic small irregular medieval nails in shape. Cloves are unusual in that they combine an aromatic and floral fragrance (that can be a little medicinal) with a fiery and burning taste. It is this combination vegetable fillings and breads. The essential oil of cloves is dominated by eugenol (70 to 85%), eugenol acetate (15%) and β –caryophyllene (5 to 12%).

Coriander– Coriander (commonly called cilantro in North America) is the plant *Coriandrumsativum* which is an annual herb of the family *Apiaceae* (also known as *Umbelliferae*). As such it is a member of a huge family that contains carrots, cumin, caraway and fennel. Coriander is native to southwestern Asia west to North Africa. Ground coriander seeds are major component of most curry powders and are used as a flavouring ingredient in breads,fillings, and savoury mousses.

Cumin– As a spice Cumin (also known as White Cumin) is the dried fruit of the *Cuminumcyminum*plant which is a member of the *Apiaceae* (also known as *Umbelliferae*) family. It is therefore related to carrots, caraway and fennel and distantly related to Black Cumin. The plant is native to a region from the eastern Mediterranean through to India. Cumin is used as a spice for its distinctive aroma, and is popular in North African, Middle Eastern, western Chinese, Indian and Mexican cuisine.

Dill– Dill, *Anethumgraveolens* (also known as Dillby, King Desertparsley, Shepu or Sowa) is a short –lived annual herb that's a member of the *Umbelliferae* (carrot/parsley) family. Originally a native of southwest and central Asia it has been naturalized to much of the world due to its culinary uses. Like the herb, dill seeds are sweet and aromatic, with a flavour that is mildyaniseedy, coming somewhere between anise and caraway. The main component of the essential oil from the fruit is carvone and limonene. Plants in Europe and south –western Asia can grow to 2m tall. Dill is characteristic of central European cuisines, particularly Germany where they are used to flavour breads, salads and pickles. Apart from in India, the dill herb is much more popular than the spice.

Fennel– Fennel (also known as Sweet Cumin), *Foeniculumvulgare* is a species in the Apiaceae (also known as *umbellifearae*) family, which also includes carrots, cumin, caraway and fennel. It is an aromatic perennial herb, a native of southern Asia.The main

component of the essential oil of fennel seeds is anethole (the oil also contains limonene, fenchone, estragole (methyl chavicol), safrole, α –pinene, camphene, β –pinene, β –myrcene and p –cymene, but to a much lesser degree). It is an essential ingredient in the Bengali spice mixture *panchphoron* and in Chinese five –spice powders. In the west, fennel seed is a very common ingredient in Italian sausages and northern European rye breads.

Fenugreek– Fenugreek, *Trigonellafoenum –graecum* has a native realm that extends from the eastern Mediterranean across to China, though it is now cultivated worldwide. This is an important element of many pickles, curry powders and pastes, and is often encountered in the cuisine of the Indian subcontinent and Thailand. The seeds are quite large (about 3mm), are brownish –yellow in colour and rhombic in form and have a bitter taste that mellows when cooked and a very distinctive 'curry –like' aroma which is created by the aromatic compound, sotolone . It is also used in Ethiopian spice mixtures (particularly Berbere spice), is particularly favoured in Yemeni cuisine and is used in the cuisines of West, Central and South Asia (which are now the largest consumers).

Garlic– *Alliumsativum*, commonly known as garlic, is a species in the onion genus, *Allium*. Its close relatives include the onion, shallot, leek, chive,andrakkyo.It is also used in Ethiopian spice mixtures (particularly Berbere spice), is particularly flavoured in Yemeni cuisine and is used in the cuisines of West, Central and South Asia (which are now the largest consumers). Garlic is a particularly pungent spice, though the pungency disappears after frying in oil (or baking for a lengthy period). The pungency and distinctive aroma of garlic is due to the large number of sulfur –containing compounds within each clove. Though typically cooked in Europe (exceptions being Aïoli and Tzatzike), raw garlic is commonly used in the cuisines of India, Pakistan, Bangladesh, China and Vietnam. In Thailand, garlic is often fried until crisp and is then used to garnish dishes.

Ginger– Ginger, *Zingiberofficinale* is the archetypical member of the *Zingiberaceae* (ginger) family and though it is generally termed as 'ginger root' the spice is actually the rhizome of the plant. Originating in southern China, cultivation of ginger spread to India, juice from old ginger roots Southeast Asia, West Africa, and the Caribbean. Young ginger roots are juicy and fleshy with a very mild taste where as mature ginger roots are fibrous and nearly dry. The is extremely potent and is often used as a spice in Asian cuisine to cover up other strong odours and flavours such as in seafood and mutton. Ginger has been used in European cuisine since medieval times when it arrived as a dried spice and gave rise to Ginger Bread. Powdered ginger is extensively used in flavouring biscuits, pies, breads and mousse.

Juniper– The Common Juniper *Juniperuscommunis* is a large woody shrub and a member of the *Cupressaceae* (cypress) family of conifers. It is highly aromatic with found in sub –artic and temperate zones throughout the Northern Hemisphere and is knon in the Americas, Europe and Asia. The astringent blue –black seed cones, known colloquially as 'juniper berries' (they are actually cones or pseudofruit) are usually sold dried and used to flavour meats, sauces and stuffings. They are generally crushed before use to release their flavour. Juniper berries are a sweet slightly pine –like scent, though there is a marked bitter

after –taste. These find their ways in preparation of a number of fillers, breads, jams, jellies etc.

Mace and Nutmeg– These both come from the evergreen tree species *Myristicafragrans* that originate only from the Banda Islands of Eastern Indonesia (the Moluccas). This tree is a member of the *Myristicaceae* (generally referred to as the Nutmeg) family. Nutmegs bear yellowish fruit with a white pulp (which is rather apricot –like) — see the image, below. This is split to reveal the seed inside. The seed itself is covered by'lacy' reddish covering (the arillus) and it is this arillus in dried form that yields mace. The seed within is the nutmeg. Both seed and arillus are generally sun –dried for about two months after which the arillus is removed and the seed itself is cracked, revealing the fragrant nutmeg interior. Both nutmeg and mace have similar taste qualities, though nutmeg is slightly sweeter in taste and mace has a more delicate flavour. Mace is more expensive and tends to be used in light –coloured dishes where it imparts a bright yellow saffron –like colour.

Marjoram– Marjoram (*Origanummajorana, Lamiaceae*) is a somewhat cold –sensitive perennial herb or under –shrub with sweet pine and citrus flavours. In some Middle –eastern countries, marjoram is synonymous with oregano, and there the names sweet marjoram and knotted marjoram are used to distinguish it from other plants of the genus *Origanum*. It is cultivated for its aromatic leaves, either green or dry, for culinary purposes. Marjoram is sweeter and milder than oregano. It is an important ingredient for German sausages, breads and savoury puddings.

Mustard–Mustard seeds are the seeds of several plant species (all related to rapeseed) that produce seeds which are used as a spice. They are members of the *Brassica* family that includes broccoli, cauliflower, cabbage, kale and Swedes. Once the cell is damaged (such as by crushing or grinding), the enzyme myrosinase hydrolyzes the sinalbin and produces free p –hydroxyl benzylisothiocyanate, a pungent and non –volatile substance. Mustards Indian recipes may be white ones, the brown ones and the black ones. White mustard in the native of North Africa, the Middle East and Mediterranean Europe and are grown for their seeds only. The dried seeds themselves do not have any taste, but exhibit a considerable pungency when crushed or ground and mixed with water (such as on chewing). Brown mustard is grown in the foothills of the Himalaya, UK, Canada and the US. This is an essential ingredient in many and has a higher level of volatile mustard oils that white mustard (and is thus stronger in taste and pungency, but not as strong as black mustard). Black mustard (*Brassica nigra*) is grown in Argentina, Chile, the US and some European countries. This has the highest concentration of volatile mustard oil of all the mustard seeds and is by far the most pungent variety.

Oregano– It is a common species of *Origanum,* a genus of the mint family (*Lamiaceae*). It is native to warm –temperate western and southwestern Eurasia and the Mediterranean region. Oregano's most prominent modern use is as the staple herb of Italian –American cuisine. Oregano's most prominent modern use is as the staple herb of Italian –American cuisine. It is also popularly used in making vegetables fillers and breads.

Poppy seeds– Poppy Seeds are the seeds of the annual plant *Papaversomniferum* (the opium poppy), a member of the *Ranunculales* (buttercup) family. This is a very ancient spice, known to have been cultivated for at last 5000 years and there is some indication that the culinary use of poppy seeds extends much further back in time (the seeds have been found in many ancient burials). Poppy seeds have a pleasant and nutty flavour, which intensifies upon baking (which is why poppy seeds are used as a topping for many baked goods). Interestingly, poppy seeds are a good source of linolenic acid, which is an essential compound in the human diet. It is used profoundly in making cakes, breads, strudels etc.

Rosemary– Rosemary, *Rosmarinusofficinalis*, is a woody, perennial herb with fragrant, evergreen, needle –like leaves and white, pink, purple or blue flowers, native to the Mediterranean region and is a member of the mint family *Lamiaceae*, The leaves, both fresh and dried, are used in traditional Mediterranean cuisine. They have a bitter, astringent taste and are highly aromatic, which complements a wide variety of foods.

Saffron– Saffron is a spice derived from the saffron crocus *Crocussativus*, members of the *Iridaceae* (Iris) family. The flower itself has three red stigmas (right –hand image) that are the distal ends of the plant's carpels. Together with its style (the stalk that connects the stigmas to the remainder of the plant) these components are often dried and used in cooking as a seasoning and colouring agent. Saffron is native to Southwestern Asia, Saffron's aroma is often described by connoisseurs as reminiscent of metallic honey with grassy, while its taste has been noted also as hay –like and yet somewhat bitter. Saffron also contributes a luminous yellow –orange colouring to foods. Because of the unusual taste and colouring it adds to foods, saffron is widely used in Arab, Central Asian, European, Indian, Iranian, and Moroccan cuisines

Sesame– Sesame seeds (also known as Gingelly and Benneseed) are the seeds of the sesame plant *Sesamumindicum*, and being the plant's *seeds* they are classed as a spice. Indeed, they are the oldest spice known from written human records and figure in an Assyrian myth circa 3000 BCE. Sesame seeds can range in colour from off –white through brown to black. The seeds have a nutty flavour and are distinctly oily when chewed. The nutty taste is significantly increased by toasting (which is why sesame seeds are often used as toppings for breads and cakes)

Star anis– Star Anise is the star –shaped pericarp (the outer part of a fruit, excluding the seeds) of *lliciumverum*, a small native evergreen tree of southwest China. The dried fruit resembles an eight –pointed star and has a flavour that closely resembles that of anise (hence the English and Chinese names). It forms on of the key components of Chinese five spice powder. It can be used as cheaper version of aniseed.

Turmeric– Turmeric (also Tumeric, Indian Saffron or Kunyit) is a spice formed from the rhizome of *Curcuma longa*, a representative of plant genus *Curcuma* and a member of the ginger family, the *Zingiberaceae*. The most common form of turmeric is the dried and powdered rhizome which is commonly used in curries and other South Asian cuisine and is a significant ingredient in most commercial curry powders. Turmeric is often used as a yellow colourant in food and is a crucial component in many curries.

SPICES USED IN BAKERY

CHECK YOUR PROGRESS-IX

1. Write a note on Spices used in baking.

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1.12 FLAVOURINGS

There is a good deal of evidence that the sensory characteristics of food, in particular the taste and flavour have a very specific effect on the consumer's food choice. In many ways the sensory attributes could be seen as a key area in which food manufacturers can differentiate their products. These elements add sensory impressions of the food added with. They play a vital role on the characteristic of the cooked products and their patability, nutrition, aroma and taste. There are numerous taste enhancers used in food industry to meet the choice of requirement by the consumers.

Flavor or flavour (see spelling differences) is the sensory impression of a food or other substance, and is determined mainly by the chemical senses of taste and smell. The flavor of the food, as such, can be altered with natural or artificial flavorants, which affect these senses. Flavorant is defined as a substance that gives another substance flavor, altering the characteristics of the solute, causing it to become sweet, sour, tangy, etc.
Of the three chemical senses, smell is the main determinant of a food item's flavor. While the taste of food is limited to sweet, sour, bitter, salty, and savory – the basic tastes – the smells of a food are potentially limitless. A food's flavor, therefore, can be easily altered by changing its smell while keeping its taste similar. Nowhere is this better exemplified than in artificially flavored jellies, soft drinks and candies, which, while made of bases with a similar taste, have dramatically different flavors due to the use of different scents or fragrances.

Although the terms "flavoring" or "flavorant" in common language denote the combined chemical sensations of taste and smell, the same terms are usually used in the fragrance and flavors industry to refer to edible chemicals and extracts that alter the flavor of food and food products through the sense of smell. Due to the high cost or unavailability of natural flavor extracts, most commercial flavorants are nature –identical, which means that they are the chemical equivalent of natural flavors but chemically synthesized rather than being extracted from the source materials.

Flavoring agents –

Flavoring agents are the largest single group of food additives. Food and beverage applications of flavors include dairy, fruit, nut, seafood, spice blends, vegetables and wine flavoring agents. They may complement, magnify, or modify the taste and aroma of the foods. There are over 1200 different flavoring agents used in foods to create flavor or replenish flavors lost or diminished in processing, and hundreds of chemicals may be used to simulate nature flavors.

Classification of flavouring agents –

1. **Natural flavoring agents –** Natural materials include spices and herbs; essential oils and their extracts, concentrates, and isolates; fruit, fruit juices, and fruit essence; animal and vegetable materials and their extracts; and aromatic chemicals isolated by physical means from natural products, eg. citral from lemongrass and linalool from bois de rose, extraction from certain plant products such as vanilla beans, licorice root, orange and lemon peel, coffee, tea, kola nuts, catechu, cherry, elm bark, cocoa nibs, and gentian root.

2. **Nature identical flavoring substances –** Flavoring substances that are obtained by synthesis or isolated through chemical processes, which are chemically identical to flavoring substances naturally present in products intended for human consumption. They cannot contain any artificial flavoring substances.Nature identical flavouring substances include– ethyl acetate (identical in nature to many fruits) and decanal (nature identical to orange). Vanillin may be obtained from vanilla pods but the flavour is now produced chemically from a plant material called lignin.

3. **Artificial flavoring agents –** Synthetic flavoring agents are chemically similar to natural flavorings, and offer increased consistency in use and availability. They may be less expensive and more readily available than the natural counterpart although they may not adequately simulate the natural flavor. Some examples of synthetic flavoring agents include the following: **–**

Item		Chemical flavourants
Almond	–	5 –methylthiophen –2 –carboxaldehyde, benzaldehyde
Anise	–	anethole, methyl chavicol (estragol)
Apple	–	isoamyl acetate ,ethyl 2 –methylbutyrate, damaseneone, n –hexanal,trans –2 –hexenal
Banana	–	isoamyl acetate
Butter	–	diacetyl
Caramel	–	2,5 –dimethyl –4 –hydroxy –3(2h)furanone
Caraway	–	d –carvone
Celery	–	3 –propylidene –1(3h) –isobenzofuranone, cis –3 –hexenyl pyruvate
Cherry	–	benzaldehyde,tolylaldehyde,benzyl acetate

Chocolate	–	5 –methyl –2 –phenyl –2 –hexenal,isoamyl butyrate,vanillin, ethyl vanillin,isoamylphenylacetate, 2 –methoxy –5 –methylpyrazine
Cinnamon	–	cinnamic aldehyde
Coconut	–	g –nonalactone
Coffee	–	furfurylmercaptan, furfurylthiopropionate
Clove	–	eugenol
Coriander	–	linalool
Cream	–	cis –4 –heptenal
Cucumber	–	nona –trans –2 –cis –6 –dienal, 2 –nonenal
Garlic	–	methyl anthranilate, ethyl 3 –hydroxybutyrate, nootkatone
Hazelnut	–	methyl(methylthio) pyrazine,5 –methyl –2 –hepten –4 –one
Lemon	–	citral
Maple	–	2 –hydroxy –3 –methyl –2 –cyclopenten –1 –one
Mint	–	menthol
Mustard	–	allylisothiocyanate
Orange	–	b –sinensal, octyl aldehyde, decyl aldehyde
Peanut	–	2,5 –dimethylpyrazine,2 –methoxy –5 –methylpyrazine
Pineapple	–	allylcaproate, methyl b –methylthiopropionate, ethyl butyrate,allylcyclohexanpropionate
Raspberry	–	6 –methyl –a –ionone,trans –a –ionone,p –hydroxypheny –1 –2 –butanone,damasceneone
Strawberry	–	ethylmethylphenylglycidate, ethyl maltol, methyl cinnamate,4 –hydroxy –2,5 –dimethyl –3(2h) –furanone
Vanilla	–	vanillin, ethyl vanillin, propenylquaethol

CHECK YOUR PROGRESS-X

1. Classify favoring agents?

2. Write a note on flavoring agents.

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1.13 COCOA AND CHOCOLATE

Cocoa is the dried and fully fermented fatty seed of the cacao tree, from which cocoa solids and cocoa butter are extracted. They are the basis of chocolate.

The cacao tree (*Theobroma cacao*) is native ofwarm and humid climates around the equator. It is s a small (48 m or 1526 ft tall) evergreen tree in the family. It may have originated in the foothills of the Andes in the Amazon and Orinoco basins of South America where today, examples of wild cacao still can be found. Cacao trees will grow in a limited geographical zone, of approximately 2 degrees to the north and south of the Equator. Nearly 70% of the world crop is grown in West Africa. A tree begins to bear when it is four or five years old. A mature tree may have 6,00 flowers in a year, yet only about 2pods. About 300 –60 seeds (1pods) are required to produce 1 kg (2.2 lb) of cocoa paste.

Varieties of Cocoa : Cocoa can be classified into 4 types –

- ***Forastero*** – forms the greater part of all cocoa grown, is hardy and vigorous producing beans with the strongest and more bitter flavour flavor and is usually blended with other varieties.

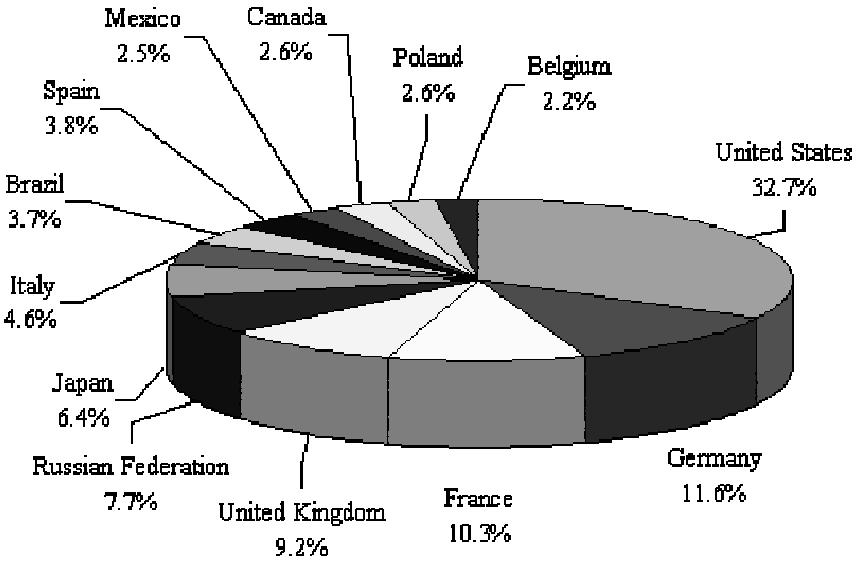
- ***Amelonado*** –is the Forastero variety most widely grown in West Africa and Brazil. It has a smooth yellow pod with 3 or more pale to deep purple beans.

- ***Crillo*** –with its mild chocolate flavour is grown in Indonesia, Central and South America. Crillo trees are not as hardy and they produce softer and fragile pods which are red in colour, containing 20 –30 white, ivory or very pale purple beans.

- ***Trinitario*** –plants are not found in the wild as they are cultivated hybrids of the other two types (crillo and forastero). Trinitario cocoa trees are grown mainly in the Caribbean area but also in Cameroon and Papua New Guinea. The mostly hard pods are variable in colour and they contain 3or more beans of variable colour but white beans are rare.

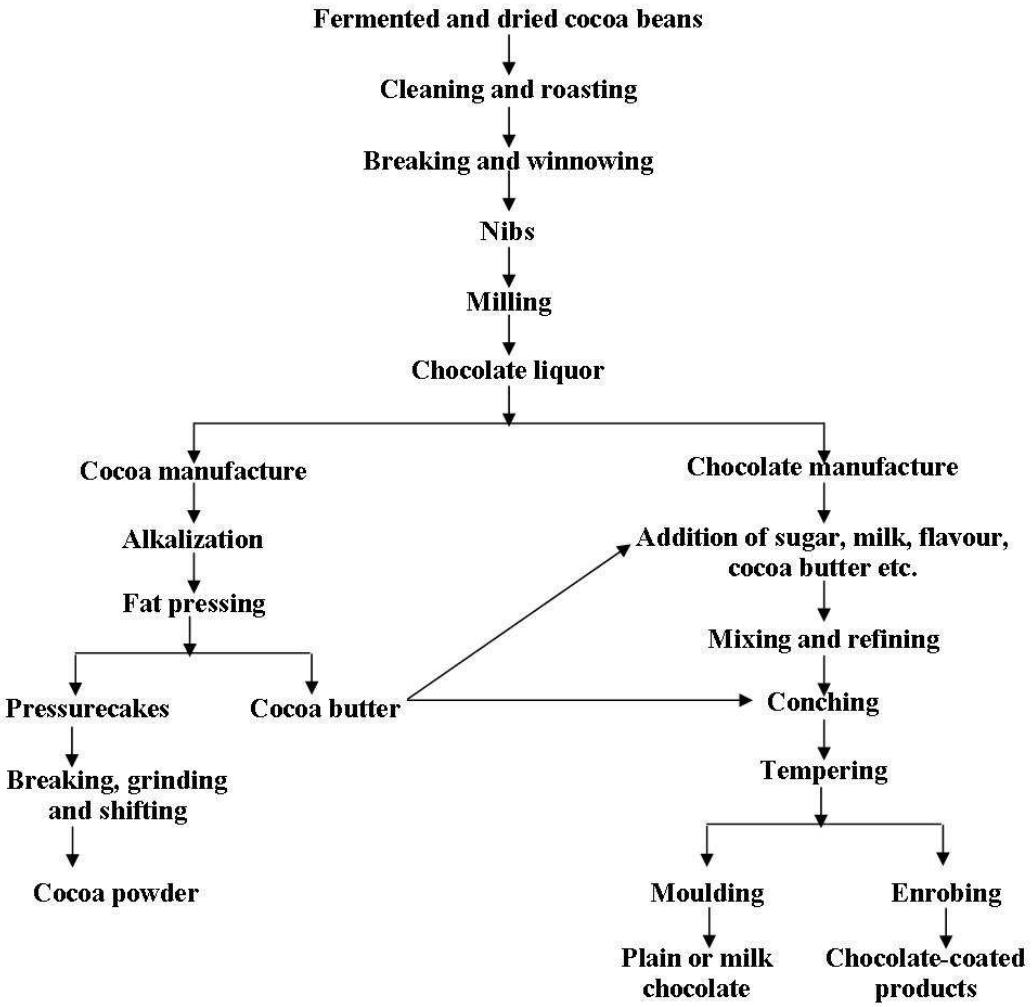
Processing: The harvested pods are opened typically with a curved knife the pulp and cocoa seeds are removed and the rind is discarded. The pulp and seeds are then piled in heaps, placed in bins, or laid out on grates for several days. During this time, the seeds and pulp undergo sweating, where the thick pulp liquefies as it ferments. The fermented pulp trickles away, leaving cocoa seeds behind to be collected. Sweating is important for the quality of the beans, which originally have a strong bitter taste. The fermented beans are dried by spreading them out over a large surface and constantly raking them which can be done on huge trays under the sun or by using artificial heat. Finally, the beans are trodden and shuffled about (often using bare human feet) and sometimes, during this process, red clay mixed with water is sprinkled over the beans to obtain a finer color, polish, and protection against molds during shipment to factories.

Chocolate production : Chocolate is a range of products derived from cocoa (cacao), mixed with fat (i.e. cocoa butter and / or plant oils) and finely powdered sugar to produce a solid confection. There are several types according to the proportion of cocoa used in a particular formulation.



To make 1 kg (2.2 pounds) of chocolate, about 30 to 60 healthy beans are processed, depending on the desired cocoa content. In a factory, the beans are roasted and then cracked and de –shelled by a winnower. The resulting pieces of beans are called *nibs,* which are ground, using various methods where the heat produced during this procedure melts the cocoa butter releasing *chocolate liquor or cocoa paste*, which is removed by being pressed out. This liquoris then further processed into chocolate by mixing in (more) cocoa butter and sugar (and sometimes vanilla and lecithin as an emulsifier), and then refined, *conched* and tempered. The cocoa solids will now be formed into a dry cake and used as the base ingredient in the production of chocolate or processed into a fine cocoa powder using a hydraulic press or the *Broma* process. This process produces around 50% cocoa butter and 50% cocoa powder. Standard

cocoa powder has a fat content of approximately 10 –12 %.



PROCESSING OF COCOA BEANS

Summary of the Process of Transforming Cocoa beans into Chocolate

Step 1. The cocoa beans are cleaned to remove all extraneous material.

Step 2. To bring out the chocolate flavour and colour the beans are roasted. The temperature, time and degree of moisture involved in roasting depend on the type of beans used and the sort of chocolate or product required from the process.

Step 3. A winnowing machine is used to remove the shells from the beans to leave just the cocoa nibs.

Step 4. The cocoa nibs undergo alkalisation, usually with potassium carbonate, to develop the flavour and colour.

Step 5. The nibs are then milled to create cocoa liquor (cocoa particles suspended in cocoa butter). The temperature and degree of milling varies according to the type of nib used and the product required.

Step 6. Manufacturers generally use more than one type of bean in their products and therefore the different beans have to be blended together to the required formula.

Step 7. The cocoa liquor is pressed to extract the cocoa butter leaving a solid mass called cocoa presscake. The amount of butter extracted from the liquor is controlled by the manufacturer to produce presscake with different proportions of fat.

Step 8. The processing now takes two different directions. The cocoa butter is used in the manufacture of chocolate. The cocoa presscake is broken into small pieces to form kibbled presscake which is then pulverized to form cocoa powder.

Step 9. Cocoa liquor is used to produce chocolate through the addition of cocoa butter. Other ingredients such as sugar, milk, emulsifying agents and cocoa butter equivalents are also added and mixed. The proportions of the different ingredients depends on the type of chocolate being made.

Step 10. The mixture then undergoes a refining process by travelling through a series of rollers until a smooth paste is formed. Refining improves the texture of the chocolate.

Step 11. The next process, conching, further develops flavour and texture. Conching is a kneading or smoothing process. The speed, duration and temperature of the kneading affect the flavour. An alternative to conching is an emulsifying process using a machine that works like an egg beater.

Step 12. The mixture is then tempered or passed through a heating, cooling and reheating process. This prevents discolouration and fat bloom in the product by preventing certain crystalline formations of cocoa butter developing.

Step 13. The mixture is then put into moulds or used for enrobing fillings and cooled in a cooling chamber.

Step 14. The chocolate is then packaged for distribution to retail outlets

Cocoa producing countries of the world:

Conching – here the cocoa solids are mixed together with cocoa butter slowly for few days, when they develop a smooth subtle texture and flavour. Then it is fortified with other ingredients like cocoa butter, sugar, vanilla, soya lethicinetc to impart a particular texture and taste.

Types of Cocoa powders – There are two types of cocoa powder a)natural (non –

alkalized) and b)Dutch process (alkalized).

a) ***Dutch*** –process cocoa has been treated with a chemical, such as potassium carbonate, to reduce the natural acidity of the cocoa beans. Dutching also darkens the cocoa to an appetizing rich, deep reddish –brown color; extreme Dutching results in the distinctively flavored charcoal – black cocoa used to make Oreo cookies. Dutch –process cocoa may or may not be labeled as such, but cocoa processed with alkali should appear on the ingredient statement.

b) ***Natural*cocoa** is typically labeled cocoa. – Generally, higher fat content improves the flavor and quality of cocoa. Natural cocoas contain 1to 12 percent fat, although superior –quality, high – fat natural cocoa is available with 22 to 24 percent fat. The flavour is fruiter and mellow.

Types of chocolate –

a) ***Semi –Sweet Chocolate*** **–**Made from unsweetened chocolate (chocolate liquor), but with the addition of sugar, cocoa butter, lecithin and vanilla mixed in. Semi –sweet chocolate must contain at least 35% unsweetened chocolate, and typically is less than 50%.

b) ***Dark Chocolate*** **–**The rules regarding classification of chocolate in this category vary throughout the world. However, the one constant is that this type of chocolate contains no milk solids, but has sweeteners and cocoa butter added to the mix. In Europe, dark chocolate must consist of at least 35% cocoa solids while in the U.S., it must have a 15% concentration of chocolate liquor.

Milk Chocolate **–**Like you'd guess from the name, milk chocolate is made with condensed or powdered milk. In Europe, milk chocolate must consist of at least 25% cocoa solids, while in the US, it must have10% concentration of chocolate liqueur and a minimum of 12% milk solids. Milk chocolate is primarily used for eating and is the most popular form of chocolate in the U.S.

c) ***White Chocolate*** **–**The name given to white chocolate is a misnomer because it isn't really chocolate at all. Strictly speaking, chocolate is defined as any product 100% based on cocoa solid. White chocolate doesn't contain any cocoa solids and is made from cocoa butter, milk solids and sugar.

Couverture Chocolate –Chocolates under this classification are true gourmet chocolates that are rich in cocoa butter (upwards of 35%) which creates an extremely high fat content. Cocoa butter is the fat extracted from chocolate liquor. These chocolates contain a very high percentage of cocoa which is the solid powder left after the cocoa butter is extracted from the chocolate liquor. . In family or bakers' chocolate the cocoa fat content is replaced by a vegetable –based fat. This has a detrimental effect on the texture and hardness of the chocolate but makes the product cheaper to purchase and easier to use. When used for making chocolates, decorations or moulded chocolates, couverture first has to go through a process of tempering called 'pre –crystallization'.

Self –life and storage of chocolates: The ideals temperature for storing chocolate is 12 – 200C, and the temperature should not fluctuate. At higher temperature the chocolate becomes soft and will lose its sheen, and at lower temperature it may be affected by condensation. Chocolate that has been stored at a lower temperature should, when required for use, be left to acclimatize in its original packaging for a few hours until it reaches ambient temperature.

Chocolate is sensitive to humidity and easily absorbs smells and flavours. It is also liable to oxidization if it is exposed to light, direct sunlight and air for too long. Therefore, chocolate should be stored in a cool, dry place, completely sealed from light and air. Always ensure that the packaging is resealed after using.

Finished products are also very sensitive to temperature, foreign smells, flavours, light, air and humidity and to the effects of time and transportation. Typical changes that can occur during storage of chocolate products include –

- ***Fat bloom* –** a thin layer of fat crystals on the surface of the chocolate. The chocolate loses its sheen and a soft, milky white bloom appears on the surface, giving the finished chocolate an unattractive appearance. Fat bloom is caused when fats in the chocolate crystallize or when the fats in the ganache/filling migrate to the chocolate layer. The appearance of fat bloom can be delayed by storing the chocolate at a constant temperature of 10 – 150C.

- ***Sugar bloom* –** in contrast to fat bloom, sugar bloom creates a rough, coarse layer on top of the chocolate. Sugar bloom is mainly caused by condensation, which can form on the surface of chocolate if storage temperatures are too low or if the chocolate is left in a refrigerator for too long. This moisture will dissolve the sugar within the chocolate and when the moisture evaporates, the sugar re –crystallizes on the surface. Avoid rapid changes of temperature to help prevent this occurrence.

If the storage time for chocolate can be kept short, the quality of the product will be much better. Each type of chocolate will have a different shelf life, which is measured from the initial production date and is shown on the packaging. Because of the milk fat solids present in white and milk chocolate, these have shorter shelf lives than dark chocolate. Chocolates that contain a filling need special consideration. Chocolates made with cream or butter filling have a very short storage life (the recipes shown in this chapter have a shelf life of one week), provided they are stored in ideal conditions. The substitution of cream or butter with alternative ingredients (such as light sugar solutions) will help to increase shelf life.

Functions of Chocolate:

It provides structure. Baked goods are a careful balance of rough, load bearing structural ingredients (think of flour and egg white like concrete and steel beams) and tenderizers (such as sugar, fat, and egg yolks) that keep cake softer than bread. Chocolate has a lot of fat, but it winds up adding more structure than tenderness to

baked goods. Cakes or cookies with cocoa powder need less flour than those without, and a sweet made with dark chocolate will be tougher than one made with milk.

It adds texture: What makes mousse, frosting, glaze, and ganache so addictive? Fat! And the more fat you add, the smoother and creamier those sweets will be. High-fat chocolate enhances those creamy textures in dairy-based chocolate sweets like mousse.

It provides flavour and colour to the product: When used alone in cakes, cocoa powder imparts a full rich chocolate flavor and dark color. Cocoa powder can also be used in recipes with other chocolates (unsweetened or dark) and this combination produces a cake with a more intense chocolate flavor than if the cocoa wasn't present. Most recipes call for sifting the cocoa powder with the flour but to bring out its full flavor it can be combined with a small amount of boiling water.

It absorbs moisture. Flour soaks up the water in eggs, butter, and milk, which you need for a solid baked good. Cocoa powder does the same, and pound for pound it can absorb more liquid than flour. So if you're adding cocoa to a cookie or cake you can decrease the flour.

CHECK YOUR PROGRESS-XI

1. What are functions of chocolate in baking?

2. Write a note on Chocolate Production.

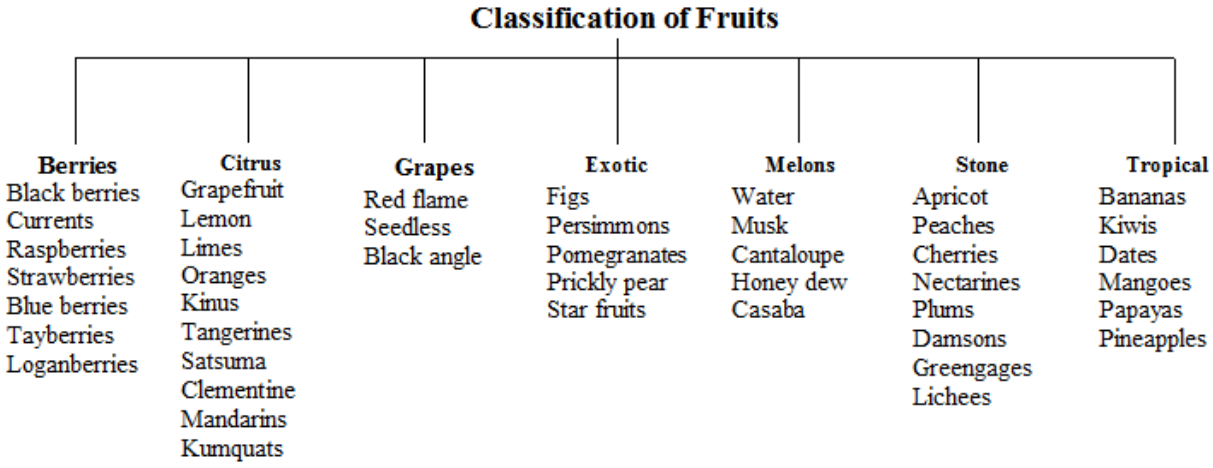
1.14 FRUITS AND NUTS

Fruits and nuts play an important role in Bakery and confectionary products. Fruits which may be fresh ones or dried ones and different kinds of nuts increases the flavour and taste of the products and furthermore provide a definite volume of the product. They impart the essential nutrients and acids and thus increase the nutritional value of the products. Fruits and nuts should be used carefully while making any bakery or confectionary item and for that one has to know the characteristic of each of them. Fresh fruits or canned fruits contain lots of moisture and sugar and thus the recipe must be adjusted accordingly.

Fruit provides a ready source of energy because it is rich in sugar (fructose), minerals and vitamin. It is also a good source of dietary fiber, both in the edible skin and in the water – soluble fiber called *pectin* found in certain fruits such as apples and quinces. Almost all fruit has a low calorie count.

Fruits: These are usually edible reproductive body having sweet pulp of a seed –bearing part of aflowering plant or tree that can be eaten as food.

Classification of fruits –



1. Berries– They are single fleshy fruits without stone, and they have a lot of seeds. Berries may be used fresh or dried.

a. ***Black berries*** – belong to the *Rosaceae* family and is composed of a group of small berries or druplets. The soft fruit is popular for use in desserts, jams, and seedless jellies and sometimes wine. It is often mixed with apples for pies and crumbles.

b. ***Currants*** – are small round berries obtained from shrub like plants form *Grossulariaceae*family. Currants are of two types – red and black and the pulp and juices are used in variety of bakery and confectionary products like muffins, jam and jellies. They are basically used as flavouring and colouring purposes.

c. ***Rasp berries*** – Straw berries –are bright red elongated berries obtained from vine like climbers of *Rosaceae* family. It is cross between a loganberry and the black

raspberry developed in Scotland. The juices and the pulps and slices of it may be used as flavouring, stuffing, decorating and spreading of muffins, cakes, pastries, pies, ice creams and toffees.

d. ***Blue berries*** – are fruits from a perennial plant of *Ericaceae* family. It is native of North America and Europe. The pulp and the juices are used to make jams, jellies and fillings for cakes and pies. It can be mixed with cream and used to decorate cakes and pastries.

e. ***Tay berries*** – is a cultivated shrub from *Rosaceae* family. Most cranberries are processed into products such as juice, sauce, jam and sweetened dried cranberries. It is cross between a loganberry and the black raspberry developed in Scotland. The fruit is elongated inform and is much sweeter and aromatic than loganberries. They are used similarly as raspberries and loganberries.

f. ***Logan berries*** – is a hybrid of rasp berries and black berries. It is smaller in size with tan brownish red in colour. The juices and pulps are extensively used in making pies, candies, syrups and flavouring of cakes and muffins. fruit of perennial plant grown in moist temperate regions. is a cultivated shrub from *Rosaceae* family. The fruit is elongated inform and is much sweeter and aromatic than loganberries. They are used similarly as raspberries and loganberries.They are used to prepare juices, jams and jellies and are used as garnishes for cakes and pies. The color of raspberries may extend from light pink to darker ones or they may be yellowish.

g. ***Cranberries*** – are a group of evergreen dwarf shrubs or trailing vines from *Ericaceae* family grown in America and Canada. Usually cranberries as fruit are cooked into a compote or jelly, known as cranberry sauce. It is used in baking to prepare muffins, scones and cakes.

2. Citrus fruits– these are sour in nature, basically round or oval in shape containing high concentration of vitamin C.

a. ***Grape fruit*** – is a subtropical citrous fruit, known for its sweet bitter taste. It looks similar to oranges, but is juicier. It is used in preparation of toffees, candies, jellies, marmalade etc.

b. ***Lemon*** – These are the natives of Asia. The plant is native to south Asia and the Asia –Pacific. Culinary uses include candying and kumquat preserves, marmalade, and jelly. The juices are used in cooking and baking. These are very rich source of citric acids. Even the rind is used as flavouring agent for bakery items.

c. ***Lime*** – are fruits that grow all the year round. They are smaller than lemons and are highly acidic. They are found in all over the world and are incredibly used in making jellies, juices, marmaldes, cordials etc.

d. ***Orange*** – One of the distinguishing features of the satsuma is the distinctive thin, leathery skin dotted with large and prominent oil glands, which is lightly attached around the fruit, enabling it to be peeled very easily in comparison to other citrus fruits.

e. ***Tangerines*** – Tangerines can be added to cakes and pies. They can also be used in breads. Tangerines are thought to have originated in China. Tangerines reached Europe in the early 19th century and came to the United States in the mid –19th century. They are smaller than oranges, with easy –to –peel skin.

f. ***Satsuna*** – is a seedless and easy –peeling citrus mutant of Japanese origin introduced to the West. The fruit is sweet and usually seedless, about the size of other mandarin oranges, smaller than an orange. It is the most commonly grown in the tropical region of the world. These citrous, sweet fruit finds its use in bakery and confectionary in the preparation of jam, jellies, marmalades and juices used in confections.

g. ***Clementine*** – these belong to orange family with deep orange coloured and smooth, glossy exterior appearance. They have their origination from China, but later names in Algeria after Clément Rodier. The fruit separate easily into seven to fourteen fat –juicy segments , which are very easy to peel. They are typically juicy and sweet, with less acid than oranges.

h. ***Mandarin*** – The Mandarin orange, also known as the mandarin or mandarine , is a small citrus tree with fruit resembling other oranges. Mandarin oranges are usually eaten plain or in fruit salads or may used as oranges.

i. ***Kumquat – or Cumquats*** are a group of small fruit –bearing shrubs in the flowering plant family *Rutaceae*. The plant is native to south Asia and the Asia – Pacific. Culinary uses include candying and kumquat preserves, marmalade, and jelly.

3. Grapes – A grape is a non –climacteric fruit, specifically a berry that grows on the perennial and deciduous woody vines of the genus *Vitis*. Grapes can be eaten raw or they can be used for making jam, juice, jelly, vinegar, wine, grape seed extracts, raisins, molasses and grape seed oil. Grapes are also used in some kinds of confectionery. They can be used fresh or dried. Grapes are of different varieties viz –

a. ***Red flame grapes*** – These grapes are bright red in colour and their juices are used in many of the culinary preparations including colouring and flavouring of creams for cakes and Gateaus.

b. ***Seedless grapes*** – these varieties do not have seeds in them and are basically used in dried forms like kishmish.

4. Exotic fruits

a. ***Figs–*** The fruit has ridges down its sides, resembling a star in cross section. It is a citrus fruit usually used in decoration purposes.

b. ***Persimmons*** –is a of perennial plant from the family *Ebenaceae*, grown abundantly in United states of America. Persimmons are generally light yellow –orange to dark red –orange in color, and depending on the species, vary in size from 1.5 to 9 cm (0.5 to 4 in) in diameter, and may be spherical, acorn –, or pumpkin –shaped. They are used for decoration and garnishing of bakery and confectionary products, making of puddings and pies.

c. ***Pickly pear*** – is also known as Opuntia or Nopales, is the native of North America and India, where it is called cactus. It is round oval shaped fruit with large number of spines. The skin is removed and sweet fleshy is seen, which is used for making pies, puddings, jellies and candies. It is a shrub that is grown in tropical and Mediterranean region of the world. Figs are mostly used in dried form in cake, pastry and bread mixture.

d. ***Star fruits*** – or Carambola is the native of South and south east Asian countries as well as of the Caribbean countries. The fruit has ridges down its sides, resembling a star in cross section. It is a citrus fruit usually used in decoration purposes.

5. Melons

a. ***Water melon*** – is grown in Asian and African countries. These fruits are grown in vine like trailer plants near the water bodies. The fruit is entirely fleshy with lots of seeds .the flesh contains almost 75% water , so juice is the main product of water melon. The seeds are also used in preparation of fondants, carvings and other decorations.

b. ***Musk melon*** – belongs to the species of melon. Muskmelon is native to Persia (Iran), Armenia, and adjacent areas on the west and the east. In addition to their consumption when fresh, melons are sometimes dried.

c. ***Honey dew***– they also belong to the group of musk melons with whiter smooth surface. They are the locals of North America and France. They have similar uses as of musk melons.

d. ***Casaba*** – these yellow coloured tipped melon do not have much of flavour, but can be stored for a longer time. They form attractive center pieces, so they can be used in decorating, pastries, pies and even as fillers in cakes.

6. Stone fruits

a. ***Peaches*** – are edible juicy fruits obtained from peach tree which is the native of China. It is a deciduous small tree of the family *Rosaceae.* The fruit has yellow or whitish flesh, a delicate aroma, and velvety skin. It is used for preparation of sauce, juice, jellies and many of the bakery products.

b. ***Apricots*** – It is a sweet and sour fruit obtained from a small tree of the family *Rosaceae.* The fruit is a drupe similar to a small peach, 1.5–2.5 cm diameter, from yellow to orange, often tinged red; its surface can be smooth or with very short hairs. They have smother stone than other stone fruits and the skin has waxy coating. The single seed is enclosed in a hard stony shell, often called a "stone", with a grainy, smooth texture except for three ridges running down one side. It is native of Europe and Asia. Used in garnishing and decoration, pies and puddings

c. ***Cherries*** – are flesh stone fruits of the family of *Prunus*. These dark red coloured round fruits grown in bunch. They are of immense use in bakery and confectionary for garnishing and decoration. They are used in preparation of certain tarts and pies.

d. ***Nectarines*** – these are peach like identical fruits only exception that its skin is smooth, rather than furry. Moreover they are smaller than peaches and have spicier taste. They are the native of China. Their use is similar to that of peaches.

e. ***Plum*** – these are tan reddish pink fruits obtained from small plants of the family of *Rosacea.* Damsons – The damson or damson plum is an edible drupaceous fruit, a subspecies of the plum tree. They are commonly used in the preparation of jams and jellies. They are grown in Europe. Because of its acidic, tart flavour, damsons are commercially grown for preparation in jellies, jams, pies and puddings.

f. ***Greenages*** – are the fruits from France. These are plum like green coloured fruits sometimes changes into light yellow. The flesh is very juicy and sweet. They are found in tropical –temperate regions of the earth. They are used to make sauce, jam and jellies and sometimes as fillers of certain type of cakes. They are known for its rich confectionary flavor. They are considered as the finest dessert plum. They are used as sauces, juices, and find place in cakes pies and candies.

g. ***Lichees –*** these are fruits from *Soapberry* family plant grown widely in Southern Asia. The fresh fruit has delicate white flesh with a big smooth round stone in it. They are used in preparation of jams, jellies, syrup and juices.

7. Tropical fruits

a. ***Bananas –*** Bananas – are common plant from the family of *Musaceae.* They may be yellow, purple or red in colour and mostly found in south Asian countries. Due to its sweety and mushy nature, they find their use in variety of ways in the house.

They are used as fillers, as decorating agents' binders, find place in pies, puddings, cakes etc.

b. ***Kiwis*** –The kiwifruit, often shortened to kiwi in many parts of the world, is the edible berry from the family of *Actinidiaceae*, about the size of a large hen's egg (5–8 cm / 2–3 in long and 4.5–5.5 cm / 1¾–2 in diameter). It has a fibrous, dull brown –green skin and bright green or golden flesh with rows of tiny, black, edible seeds. The fruit has a soft texture and a sweet but unique flavour, and today is a commercial crop in several countries, mainly in Italy, New Zealand, Brazil and Chile. This fruit has original native of America, but nowadays grown all over the world. The tree like plant from the family *Caricaceae,* bears oval shaped fruits like avocado, but bears large number of black coloured seeds when ripe. Dates – is an edible sweet fruit obtained from date palm (family Arecaceae), has its origination in and around Persian gulf. Dates are oval –cylindrical, 3–7 cm long, and 2–3 cm diameter. They are used in dried form in the preparation of breads, pies and candies.

c. ***Mangoes*** – The mango is a fleshy stone fruit from the family Anacardiaceae. They are grown in in the Indian sub –continent. Mangoes are used in the preparation of juices, pulp,puddings, pastries and cakes .they are also used in preparation of candies and toffees.

d. ***Papayas***– It is primarily used in decoration, but can also be used in preparation of muffins, cakes and gateaus.It is used in preparation of jellies, pulp, pies and puddings.

e. ***Pineapples*** – are common tropical fruits from the family of *Bromeliaceae.* This herbaceous and perennial plant is made of a number of coalesced berries. Pineapples are used as fresh or tinned in a number of bakery and confectionary products like cakes, gateaus, pastries, candies, and toffees. Sometimes they are also used in garnishing and decoration of baked products.

Cooking of fruits for bakery and confectionary: The use of fruits in cooking dated back hundreds of years. While fruits are most commonly used in desserts in foods such as cookies, muffins, yoghurt, ice cream and cakes. Not only are fruits used in preparing a variety of dishes, but they also help keep certain foods fresh and help preserve their colour. There are various ways to cook fruit, and certain consideration should be made beforehand as fruit tends to delicate, and can disintegrate easily.

Generally, boiling is too harsh a method for most fruits; gentle simmering preserves the texture and shape of fruits. When cooking soft and stone fruits, simply warm them by placing them in a pan of boiled water and then used accordingly. Poaching fruit is a similar method, and is a common way to cook fruits such as pears. Bring the water to a simmer and then gently lower the fruit into the pan with a spoon. Immediately reduce the heat so the liquid is barely bubbling, and cook until the fruit is tender. You could also stew fruit, where the saucepan is covered and the fruit is cooked in just enough liquid to cover it. This

method helps keep it moist. Fruit poaches well in most liquids, from plain water to dense sugar syrup to wine poached pears in red wine with ginger sauce.

It is important to make sure that while stewing a fruit, the water ratio is not too high or else all the nutrients will get expelled in the water and the fruit will be left only with fibrous part. Use just enough moisture to cook the fruit. Fruit such as apples and pears can be grilled or stewed to make them soft and palatable so that they can be incorporated in the recipe. This is because they are able to hold their shape and texture while cooking. Softer fruits such as peaches, nectarines, plums and mangoes may become soft if overcooked. Peeled fruits should not be stored in open, as the enzymes and minerals come in contact with the air and oxidize, becoming brown to dark tan in colour. So, once the fruits are peeled and cut, they should be soaked in water, or sugar syrup. Adding 1tsp of lemon juice to the water will help the fruit preserve its colour. Some fruits like oranges, apples, bananas, grapefruits may be pureed and stored for future use. Fruit jams, jellies and marmalades are widely used in kitchens.

Dried fruits like apples, guavas, cherries, plums, dates, prunes, apricot, figs, bananas etc are also widely used in bakery and confectionary. As they are dry, so they can be used as it is, or may be soaked in sugar syrup and then used.

Drying is also a good way for preserving fruits and it intensifies their flavours. Most fruits can be dried effectively.

Dried fruits: A fruit dried to loose most of its moisture, accumulates natural sugars, and keeps almost indefinitely is called as dried fruit. This has been practiced in the Middle Eastern people for over 5000 years. They have preserved dates, figs and apricots by sun drying.

Commonly used dried fruits –

Apples – Apples attract moisture and so have shorter shelf life than other dried fruit. They can be eaten alone or used in baking or as toppings for breakfast cereals

Apricots and Peaches – They can be eaten on their own and are used with meats.

Currants, sultanas and raisins – Currant is a tiny berry related to the gooseberry. There are black, red and white currants. A raisin is simply a dried grape. Grapes are either sun –dried or dehydrated mechanically. Sultanas are large, succulent and often –seedless grapes.

Prunes– These are whole dried plums. They can be canned or preserved in brandy or vinegar. They are sold pitted and un –pitted. Prunes are very popular as a stewed breakfast fruit.

Bananas – Drying concentrates the elusive taste of the banana to produce delicious chewy texture.

Figs– are generally used dry. They are chopped or sliced for use in cakes, pies etc.

Fruits used in Bakery

Fruits used in Bakery

Uses of fruits –

1. Dried fruit is sweeter and richer than fresh fruit, which makes it invaluable in baking and desserts.

2. It is most often used in fruitcakes, puddings and mousse and occasionally in making various stuffing.
3. It can be eaten on its own, candied or used as a confectionery item.
4. Fruits can be pureed to make jam, jelly and marmalades used as fillings, toppings and piping of cakes and biscuits.
5. They can also be used as toppings for cereals, creams, yoghurt and custards.

Nuts: Nuts are single seeded dry hard –shelled fruits that have to be cracked to open.Nuts can also be described as any seed or fruit with an edible kernel in a hard or brittle shell.

Varieties of nuts –

1. **Almonds** – They have a crunchy texture and a rich, delicate flavour that's especially good in desserts, like candy, ice cream, tortes, and coffee cake. Almonds can be bought shelled or unshelled, blanched, sliced, slivered, ground, or chopped.

2. **Pistachios** – These Middle Eastern nuts are crunchy and delicately sweet and can be used in almost everything, from ice cream to pilaffs. They are encased in shells, which are sometimes dyed red.

3. **Pecans**– This nut is a popular baking ingredient in the South America, and for good reason! Pecans develop a rich flavor, and brittle, crunchy texture when baked. Use pecan halves in pies and cookies, or grind them up with butter and sugar to create a decadent gluten –free pie crust!

4. **Cashew Nuts** – These rich, sweet nuts have a toxic shell, so they're almost always sold shelled. Used in dessert, toppings, for garnish etc.,

5. **Chestnut –** These sweet, starchy, low –fat nuts are quite common in southern Europe. Chestnuts are used as stuffing for turkeys. Chestnut puree is used in pastries and gateaux.

6. **Peanut –** These are not nuts, but legumes that grow underground. They are cheaper than most nuts, and are often eaten by hand. They are incorporated into candies, stir –fries, or used in pastes to make certain gravies in Indian cuisine and in making pie fillings.

7. **Coconut –** The coconut is a very useful and versatile food ingredient. The flesh used to make many pastes and fish curries especially, the water used to make drinks and coconut milk is used to finish many soups and curries. The desiccated dry variety is also used in cakes and confectionery.

8. **Walnuts–** have a mild, buttery flavor that makes them perfect for baking into cookies and cakes. They have a high oil content, so they tend to toast much faster than other varieties.Because of this, it’s best to use raw walnuts to prevent them from burning during the baking process.

9. **Brazil nut–** As the name suggests, this nut is native to brazil and an attempt to cultivate this in any other country has failed. The Brazil nut tree is around 150 ft tall and 6 ft in diameter. The size of the fruit of this tree is 3kg and contains 15 –20 seeds from which the nuts are obtained.

10. **Beech nut**– These are native to temperate Europe, Asia and North America. The fruit is a small, sharply three–angled nut 10–15 mm long, borne singly or in pairs in soft –spine husks 1.5–2.5 cm long, known as cupules. The nuts are edible, though bitter (though not nearly as bitter as acorns) with high tannin content, and are called *beechnuts* or *beechmast*.

11. **Macadamias –** It is the nut of a small evergreen tree, and is very common in Australia and Hawaii. It is similar to hazelnut in looks; the only difference is that it is probably 3 times bigger than a hazelnut. This nut is most commonly used with light, tropical flavors like pineapple or white chocolate. They are high in oil, so they take on a deep buttery flavor and texture when baked.

12. **Charoli** –are tiny almond –flavoured dried seeds of a bush called *Buchananialanzan*, which is cultivated across India, primarily in the northwestern India. After the hard shell is cracked, the stubby seed within is as soft as a pine nut.

13. **Pine nut –** Pine nuts are the edible seeds of pines, which are grown at higher altitudes of Asia and America. They are used as toppings and pastes for cakes and pies.

14. **Candle nut –** Candlenut trees are native to the tropical northern rainforests of Australia, the Moluccas Islands, Malaysia, and are found on many islands in the South Pacific. Candle nuts are cream –colored, soft, oily seeds within a hard –shelled nut with flavour of macadamia nut. Roasted slivers or shavings of candle nut have a pleasing, nutty, almond –like flavor without the background bitterness characteristic of almonds.

15. **Hazel nut –** The hazelnut looks like as chickpea and is a enclosed in a brown shell. It often resembles as heart shape and is mostly grown in Europe and China. These are used in making nut butters and marzipan, in cakes and ice creams. It also adds flavor to all baked goods.

16. **Kola nut –** The kola is a star –shaped fruit of the kola tree, indigenous to West Africa. Each fruit contains between two and five kola nuts. About the size of a chestnut, this little fruit is packed with caffeine.Kola nuts have a bitter taste when chewed fresh. When they're dried, the taste becomes milder and they reportedly smell of nutmeg and are used with chocolate.

Nuts used in Bakery

Handling nuts: Nuts can be used in variety of ways as seen table15.3. Generally nuts can be processed in the following ways.

- Nuts can easily chop if they are warm and moist as most of the nuts contain oil and hence they become more pliable if warmed.
- Roasting or toasting nuts brings out their flavor and once shelled and skinned they can be placed in a medium oven (175^0C).
- Nuts can be blanched in hot water for a couple of minutes to remove the skin. This is usually done for pistachio nuts as blanching deepens the colour and also for almonds to make it into a paste for making marzipans etc.

Selection and storage of nuts: Unshelled nuts keep well almost anywhere if they are protected from heat, air, light and moisture. Shelled nuts on the other hand, do not keep as well, and should be stored tightly covered in a cool dark and dry place. Fresh nuts available are with their shell and are best for long storage. Nuts in their shell should be heavy for their size, and intact with no cracks or holes. The larger the size of the nut, the better will be the taste. Unshelled nuts are sold in bulk and may be roasted or raw, left whole, slivered, sliced or broken into large pieces. Any nut with visible mould should be avoided. All these forms have specific used in the kitchen.

Certain factors to be kept in mind while storing nuts are given below.

- As nuts contain substantial amounts of oil and easily turn rancid, exposure to light, moisture, or heat will reduce their shelf life.
- Nuts are best kept in their original packaging, airtight containers, refrigerators or freezers if kept longer than a month.
- For short periods nuts can be stored in an air tight container in a dark cool place.
- Nuts in their shells keep longer than any form of processed nuts. Freezing nuts with their shell in is best.
- Nuts that are soft or stale may be partially restored by roasting in the oven.
- Salted nuts have a freezer storage life if six months as compared to plain ones, which can keep up to 12 months.
- Toasting and roasting reduce the freezer storage life, so delay toasting and roasting rill required.
- Nuts and seed should be used directly from the freezer without thawing.

Packaged nuts may be processed with preservatives and dyes, and are often heavily seasoned with salt. Dry roasted nuts usually so not have any additional fat but may be roasted with different types of fat. To ensure storage, nuts dipped in chocolate, spiced nuts, sugared or yogurt coated nuts are also available.

CHECK YOUR PROGRESS-XII

1. Write a note on Classification of fruits.

2. Write a note on Uses of nuts in baking.

1.15 PROFESSIONAL BAKERY EQUIPMENTS AND TOOLS

Having the proper tools and equipment for a Particular task may mean the difference between a job well done and one done carelessly, incorrectly or even dangerously. Listing of various essential pieces of bakery equipment for small or hotel kitchen is the most important task to do during bakery setup. Without proper bakery equipment and tools the bakery will not be able to produce good product. Hence knowledge of bakery equipment is very important during any kind of bakery set up.
Bakery equipments and tools can be classified into 7 categories, they are –

1. OVENS

- ***Convection oven*** – A convection oven (also known as a fan –assisted oven or simply a fan oven) is an oven that has fans to circulate hot air around food,reducing hot and cool spots and helping dishes on every rack cook more evenly.

- ***Rotary oven*** – Designed with a turntable, industrial electric rotary ovens move materials in circular motions inside the heat chamber. As the process picks up pace, the hearth can be rotated on a continuous basis, manually and with the help of an indicator.

- ***Deck or cabinet oven*** – Deck ovens are so called because the items to be baked—either on sheet pans or, in the case of some breads, freestanding—are placed directly on the bottom, or deck, of the oven. There are no racks for holding pans in deck ovens. Deck ovens are also called stack ovens because several bread doughs may be stacked on top of one another.

- ***Rack Oven*** – A rack oven is a large oven into which entire racks full of sheet pans can be wheeled for baking. Normal baker's racks hold 8 to 24 full –size sheet pans, but racks made specifically to go into rack ovens usually hold 15 to 20 pans. Rack ovens hold 1 to 4 of these racks at once. The ovens are also equipped with steam injectors.

- ***Microwave oven*** – Microwave ovens are electrically powered ovens used to cook or reheat foods. They are available in a range of sizes and power settings. Microwave ovens do not brown foods unless fitted with special browning elements, however. In the bakeshop, microwave ovens are useful as a convenience device for melting chocolate or butter.

2. OTHER BAKING EQUIPMENTS

- ***Double boiler*** – A double boiler is a set of two pans nested together, with enough room in the bottom pan for 1 or 2 inches of water. Double boilers are used to cook or heat foods that need gentle heat, such as melting chocolate. The water in the bottom pan is brought to a simmer, and the second pan is set on top.

- ***Proving chamber or Proofer*** – is a special box in which the ideal conditions for fermenting yeast doughs can be created. The box maintains a preset warm temperature and humidity level appropriate to the specific dough.

- ***Dough sheeter*** – The dough sheeter is an electric appliance that mechanically rolls dough and pastry to a uniform thickness. The device consists of a cloth conveyor belt that moves beneath a stationary rolling pin. The height of the pin is adjusted to change the thickness of the product.

3. PREPARATORY EQUIPMENTS

- ***Strainers and Sieves*** – Strainers and sieves are used primarily to aerate and remove impurities from dry ingredients and drain or purée cooked foods. Strainers, colanders, drum sieves and china caps (chinois) are non –mechanical devices with a stainless steel mesh or screen through which food passes. The size of the mesh or screen varies from extremely fine to several millimeters wide; select the fineness best suited for the task at hand.

- ***Icing comb*** – A small plastic tool, usually triangular, with serrated edges in various patterns, for decorating icings and other pastry and decorative items.

- ***Pastry brush*** – Soft bristle bakery equipment or a brush, useful for coating the tops of pastries and pie crusts with an egg wash or milk, or for greasing baking pans

with melted butter or shortening. Once upon a time, brushes were made of animal hair, but these days, a better option is one with silicone bristles, which don't fall out and are heat – and bacteria – resistant as well.

- ***Pastry blender*** – This is a cooking utensil used to mix a hard (solid) fat into flour in order to make pastries.The tool is usually made of narrow metal strips or a wire attached to a handle, and is used by pressing down on the items to be mixed (known as "cutting in"). It is also used to break these fats (shortening, butter, lard) into smaller pieces.

- ***Spoons and ladle*** – Long –handled ladles are useful for portioning liquids such as sauces, custards and syrups. The capacity, in ounces or milliliters, is stamped on the handle.

- ***Portion scoops*** – (also known as dishers) resemble ice cream scoops. They come in a range of standardized sizes and have a lever –operated blade for releasing their contents. Scoops are useful for portioning muffin batters and cookie dough or other soft foods.

- ***Rubber spatula*** – A broad flexible rubber or plastic tip on a long handle, used to scrape bowls and pans and also in folding of egg foams or whipped cream.

- ***Rolling pins*** – These are cylindrical food preparation utensil used to shape and flatten dough. Two styles of rolling pin are found– rollers and rods. Roller types consists of a thick cylinder are mounted on ball bearings with handles at either end. Rod type rolling pins are usually thin tapered batons.

- ***Pastry cloth*** – Usually made of durable cotton canvas, a pastry cloth makes an excellent work surface for rolling out pie crusts, biscuits, cookies, and other doughs. Rubbing a little flour into the cloth prevents sticking without adding excess flour to the dough, keeping the pastry light and flaky.

- ***Hand gloves*** – An oven glove, or oven mitt, is an insulated glove or mitten usually worn in the kitchen to easily protect the wearer's hand from hot objects such as ovens, stoves, cookware, etc.

- ***Rotating cake stand*** – A rotating cake stand is a structuralstool in which a round, flat disk that swivels freely on a pedestal base.It is used for decorating cakes and pastries. Cake stands are a form of tableware; they come in different materials like wood, pottery, metal, etc.

- ***Pastry bag and nozzles–*** Cone shape cloth or plastic bag with open end that can be fitted with nozzles of various shapes and sizes. Used to pipe icing on cakes, desserts, dough etc.

- ***Offset Spatula*** – Offset spatulas, sometimes called cake spatulas or decorating spatulas, feature a narrow metal blade with a wooden handle. The metal has a pair of bends in it so that the blade sits about half an inch lower than the handle. This makes it easier to frost the center of a cake without your knuckles bumping into the edges.

4. MEASURING TOOLS – While many aspects of bread baking are creative and artistic, baking is first and foremost a science. Accurately measuring the ingredients is a critical part of artisan bread baking.

- ***Volume measurers*** – Ingredients may be measured by volume using measuring spoons and measuring cups, though most professional bakeshops use scales to measure all but the smallest quantities. Measuring spoons sold as a set usually include ¼ tsp, ½ tsp, 1tsp and 1 tbsp units.Liquid measuring cups are available in capacities from 1 cup to 1 gallon. They are also sold in sets of ¼ cup, 1/3 –cup, ½ cup and 1 cup units.

- ***Weighing machine*** – The balance scale works by comparing the ingredient to be weighed against a known mass. The ingredient to be weighed is placed on one side of the scale, and weights are either placed on the opposite side or moved along a beam until the two sides are in balance.Compression scales use a platform mounted on a spring to measure weight– As the platform is compressed from the weight of the ingredient, the spring compresses proportionally to the force being applied to it. They are available calibrated in gms, ounces or pounds. Digital scales, the preferred equipment for these formulas, are easy to use and very accurate in the kitchen. Inside the scale is a small computer that calculates the weight based on the resistance measured on the strain gauge, a small electrical component.

- ***Thermometer*** – Various types of thermometers and gauges are used in the bakeshop to determine when foods are fully cooked and when working with yeast dough, chocolate, sugar and other ingredients. Stem –type or probe thermometers, including instant –read models, are inserted into foods to obtain temperature readings. Temperatures are shown on either a dial noted by an arrow or a digital readout. An instant –read thermometer is a small stem –type model, designed to be carried in a pocket and used to provide quick temperature readings.

- ***Timer –*** Portable kitchen timers are useful for any busy chef. Small digital timers can be carried in a pocket; some even time three functions at once. Select a timer with a loud alarm signal and long timing capability.

5. MIXING TOOLS

- ***Mixing bowls*** – These are a deep bowl of different sizes that is particularly well suited for mixingingredientstogether in.

- ***Wooden spoon*** – Wooden spoons are strong and durable, withstand heat, won't scratch nonstick pans, and perfect for stirring almost anything, including hot liquids like sugar on the stovetop.

- ***Bench scrapper/dough scrapper*** – A broad stiff piece of metal with a wooden handle on one edge, used to cut pieces of dough and to scrape workbenches. It is used for working with sticky bread doughs, dividing and lifting portions, and scraping extra bits off your work surface. Dough scrapers are also handy for pulling up delicate pastry dough and transferring it to a pie pan without breaking.

- ***Planetary mixer –*** this vertical mixer is the most common type used in baking, used in mixing dough and preparation of batters. It has three attachments – The paddle is a flat blade used for general mixing. The wire whip is used for such tasks as beating egg foams and cream. The dough arm or hook is used for mixing and kneading yeast doughs. Dough hooks may be standard J –hooks or spiral hooks.

- ***Hand blender*** – is a simple –to –use kitchen gadget that is used for blending eggs, creaming, pureeing soups, making single drinks, or blending milkshakes in small quantities.

- ***Whisker*** – Loops of stainless steel wire fasten to a handle. Heavy whisks are straight/stiff and have relatively few wires. Used for general mixing and beating of heavy liquids. Balloon whisks or piano wire whisks have many flexible wires used to whip eggs, cream, hollandaise and mixing thinner liquids.

6. CUTTING TOOLS

- ***Kitchen knives*** – various types and sizes like plain, one side serrated, both side serrated.

- ***Pastry wheel/cutter*** – A round rotating blade on a handle used for cutting rolled out doughs and pastry or baked pizza.

- ***Biscuit and doughnut cutter*** – various cutters of different shapes and sizes are used to cut cookie and biscuit doughs and doughnut.

- ***Chopping boards*** – boards made of acrylic fibre are used as cutting base.

- ***Graters*** – Four sided metal box with different sized grids, used to shred vegetables, cheese, citrus rinds and other foods.

- ***Zester –*** Small hand bakery equipment to remove the zest of citrus fruits in thin strips.

7. BAKING PANS

- ***Bundt pan or Tube center pan*** – Pan with a hollow tube in the center.The tube is used to conduct heat through the center of a cake, ensuring that the cake bakes evenly.

- ***Bread moulds/Loaf pan*** – these are rectangular or square metallic pan moulds with or without lid, used in baking brads and loaf. They are available in different shapes and sizes. The most useful sizes are a 9¼ x 5¼ x 2 ½ inch loaf pans for larger loaves and 8 ½ x 4 ½ x 2 ½ inch loaf pans for smaller loaves

- ***Muffin pan*** – are a rectangular metal baking pan with six or twelve cup, used to bake both muffins and cupcakes.A standard muffin pan has 12 cups, each measuring about 2¾ inches at the top and 1 –3/8 inches deep. Mini muffin pans normally have either 12 or 24 cups and measure about 1¾ inch across the top and ¾ inch deep

- ***Baking cups*** – Baking cups are paper or foil cups used to line muffin or cupcake pans. Muffin pan sizes are typically mini, standard, and jumbo sized.

- ***Popover Pans***– Popover pans have deep, narrow cups, which force the popover batter to rise up and out, producing the typical tall popover shape.

- ***Cake pans*** – Many basic cake recipes use traditional round layer cake pans that are either 8 or 9 inches in diameter. The pans should be at least 2 or 2 ½ inches deep so that the batter doesn't overflow.

- ***Jelly roll pan*** – These are the same as a baking sheet. They have a raised edge allaround, usually ½ to 1 inchhigh.

- ***Brioche Molds*** – A brioche mold is a deep, beautifully fluted round mold, made of tinned steel. They are specifically made for baking the traditional French knot – shaped brioche loaf. A small brioche mold can also be used for baking small cakes, muffins, and individual sweet breads.

- ***Flan Rings*** – A flan ring is a metal ring with no fluting around the sides, and no bottom. The ring is set on a baking sheet that is lined with parchment paper or a non –stick baking mat, and then filled. The baking sheet serves as the bottom of the pan.

- ***Baking trays*** – These are very important bakery equipment mostly aluminum or non –stick and about 2” deep. They come in a variety of shapes and sizes.

- ***Tart Pans*** – Tart pans normally have a fluted edge and 1 inch deep and may come in round, square, or rectangular shapes. They often have a removable bottom which makes is easy to remove the tart without damaging the delicate crust.

- ***Baba Molds*** – Baba molds are tall straight –sided, cylindrical shaped molds about 1 ½ to 3 inches in diameter, and 1 ½ to 4 inches in height. They are specifically designed for the classic yeast –raised sweet cakes called Babas.

- ***Custard cup*** – These are 6 ounce cups for baking custards. Their small size are also good for holding cooked puddings or other desserts, and are also useful for holding pre –measured ingredients when prepping ingredients for cookies or cakes.

- ***Baking sheets*** – have raised edges all around, and are normally the choice for professional bakers. They are a good, all –purpose pan and can be used for everything from baking cookies to toasting nuts.

- ***Cookie sheets*** – These are rimless, flat metal sheets, perfectly designed for placing rows of cookies. They normally have a small rim on the short sides for easy gripping. The long flat edges allow you to slide cookies off the sheet after baking.

- ***Pie moulds*** – different shapes and sizes are used.

8. COOLING EQUIPMENTS

- ***Cooling rack*** –This are racks with wire mesh on which hot fresh bakery products are kept, so that vapours escape from the below also and the product gets cooled.

- ***Refrigerators*** **–** these cooling equipments are of three types – domestic refrigerators – the common one that can be seen in every household. Walk –in – large, room –sized box where you can walk in and is capable of holding hundreds of pounds of food on adjustable shelves. Reach –ins may be individual units or show case with several shelves and covered by glass from one side for view.

CHECK YOUR PROGRESS-XIII

1. Write a note on various equipments used in bakery?

1.16 PRODUCTION FACTORS

The baking industry can be divided into four segments– retail, in store, restaurant/food service and wholesale. The largest volume of business is conducted by wholesale bakeries, but still many bakers have their own preferences. Entrepreneurs may choose to open their own bake shops, whereas bakers more comfortable to opt for a career in wholesale or in –store facilities.

Retail bakeries have relatively low –volume of businesses that produce and sell items directly to consumers. A retail bakery may make a wide variety of breads, cakes, cookies, pastries and desserts, or it may specialize in one or two items, such as cupcakes, bagels, wedding cakes or doughnuts.

In –store bakeries found in groceries and club stores offer a range of locally popular breads, cakes, cookies and pies. Some may be made entirely from scratch; others may be assembled from pre –made icings, frozen cakes or simple mixes.

Restaurant bakeshops produce items for the restaurant's dessert menu and for use in other areas. For example, a hotel bakeshop will produce individual plated desserts for each restaurant at the property, but may also make puff pastry and pâté dough for use in the garde manger, chocolates for room service and grand display pieces for elegant buffets.

Upscale restaurants may prepare all dessert and bread items in –house, whereas a less ambitious restaurant with a small staff may purchase its items directly from a wholesale bakery.

Wholesale bakeries produce foods that reach the final consumer through grocery stores, restaurants and hotels, or the wholesaler's own retail outlets. A large wholesale bakery may have sophisticated production equipment capable of producing hundreds, even thousands of items hourly. It may produce a range of breads, desserts, cookies and crackers, or it may specialize in one type of product, such as doughnuts.

Being a baker is a lot more than just knowing how to bake bread. Bakery and confectionery as a career is both an art and science. A baker makes various kinds of loaves, bread rolls, croissants, buns, pastries, cakes and savories by adding his own innovation to his basic knowledge of baking. In large establishment the bakery and confectionary is managed by a brigade of chefs who according to Sir Augustus Escoffier is as follows –

1. ***Executive Pastry Chef or Master baker*** – who is responsible for the entire Operation of all the kitchen.

2. ***Pastry Sous chef*** – he works as assistant to the Executive chef.

3. ***Station Chef or Chef de partie*** – he controls individual section of the bakery and confectionary.

4. ***Bread baker*** – responsible for baking different types of breads, sponges, rolls and baked dough containers used for other menu items (for example, bouchées and feuilletés).

5. ***Confectioner*** – who makes candies and petit fours.

6. ***Ice cream maker (Fr. glacier***), who makes all chilled and frozen desserts;

7. ***Decorator (Fr. décorateur***), who makes showpieces and special cakes.

8. ***Apprentices and helper*** – to assist the above.

Attributes of a baker –

- ***Passion –*** A good baker needs to have a high degree of passion to bring out the best for providing the utmost delight to the customers. The baker should be fond of making quality food that can bring pride to the bakery.

- ***Knowledge*** – Pastry chefs and bakers must be able to identify, purchase, use and prepare a wide variety of foods. They should be able to train and supervise a safe, skilled and efficient staff. To do all this successfully, professional pastry chefs and bakers must possess detailed knowledge of the products and understand and apply certain scientific and business principles.

- ***Excellent numerical skills*** – A good baker need to measure the ingredients and also order and plan the cooking times perfectly to bring out the best products with the best recipe.

- ***Excellent creativity*** – To stand out in the competition, a baker should have excellent creative ability and should be able something unique that can differentiate from the competitors.Creativity in baking can also be expressed through cake decoration, which can involve anything from brainstorming physics –defying cake structures to crafting elaborate sugar fondant flowers. Many cake decorators are also handy with a paintbrush and use edible paints to create wonderful details.

- ***Attention to detail*** – As we mentioned, baking is a science that relies on precise measurements and temperature conditions. All ingredients must be weighed and measured accurately. A few extra gms or an oven that's 25 degrees hotter than the recipe dictates and the baking will suffer. The best bakers in the world have a keen eye for detail while creating consistent pastry art.

- ***Patience*** – Many of us are guilty of wanting to skip to the next step when undertaking the more tedious elements of a baking recipe. It takes patience to ensure that things are done to a high standard in baking, the most common examples being whisking, creaming and mixing.

- ***The baker should be able to work under pressure*** – Providing quality baked food to the customers at the right time calls for excellent time management. It is important to understand and maintain the right time to produce the right result at the right time that can relive the stress.

- ***Good organizational skills –*** It is essential to maintain the kitchen area in perfect shape and to keep the ingredients in order. It requires a great organization skill to maintain the inventory rightly and to manage the show correctly.

- ***Awareness of safety and hygiene rules*** – Not only should your baking creations taste good; they should also reach strict hygiene standards. You want the people who consume your food to stay safe too. Some countries (especially Singapore) have stringent rules on food safety and hygiene that you should be aware of.

- ***Tidiness*** – Bakers should always strive to keep their workstation clean and organized. It is not only good in terms of food preparation, but it is important in terms of general kitchen management as customers want to be confident that the food they are eating is safe to eat and was prepared in a clean and sanitary environment.

- ***Reasonable level of physical fitness*** – As per every job, you need to be physically fit to carry out the job tasks. Baking also consists of carrying heavy trays laden with baking goods and sacks of flour and sugar etc. All these carrying require a fit body to carry out.

- ***The ability to work in a team*** – Teamwork is extremely important in a kitchen. You need to be able to work with other people to make beautiful creations on a large –scale. Communication with your team members ensures that things are done efficiently and quickly as well.

- ***Professional Pride*** – Professionals take pride in their work, and want to make sure it is something they can be proud of. A professional cook maintains a positive attitude, works efficiently, neatly, and safely, and always aims for high quality. A professional who takes pride in his or her work recognizes the talent of others in the field and is inspired and stimulated by their achievements.

- ***Hygiene and sanitation***
  - Each establishment should ensure that they follow the standard norms of Hygiene and sanitation to the utmost level.
  - Only healthy workers are to be allowed to carry on production work.
  - Uniforms should be always clean and tidy and proper.
  - Avoid cross contamination techniques.
  - Wash hands frequently.
  - Dis –infect every work area , tools and equipments before the start of work.
  - The work area should be properly lightened and ventilated.
  - Follow safe food handling process.

- To prevent bacterial growth – keep hot food hot and cold food cold.
- Ensure efficient pest control techniques.
- Ensure proper packing and storing techniques.
- Ensure Safety to the workers.

CHECK YOUR PROGRESS-XIV

1. What is the various level of work position in bakery?

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2. Write a note on Attributes of a good baker.

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1.17 STALING AND SPOILAGE

Bread is a perishable commodity, which is at its best when consumed 'fresh'. Unfortunately, bread remains 'fresh' for only a few hours after it leaves the oven. During storage it is subjected to a number of changes which lead to the loss of its natural freshness. The factors that govern the rate of freshness loss in bread during storage are mainly divided into two groups; those attributed to microbial attack, and those that are result of a series of slow chemical or physical changes which lead to the progressive firming up of the crumb, commonly referred to as 'staling'.

Bread staling is a complicated process that involves loss of aroma, changes in mouth feel, loss of crumb softness and development of crumbliness, toughening of the crust, firming of the crumb, loss of moisture and flavor and loss in product freshness.It is a term which

indicates decreasing consumer acceptance of bakery products caused by changes in crumb other than those resulting from spoilage organisms.
Some of the changes which occur in bread as a result of staling are –

- Increase of crumb firmness
- Increase in crumbliness of the crumb
- Deterioration in flavour and aroma
- Loss of crust crispiness

ANTI –STALING INGREDIENTS

1. ***Emulsifiers.*** For the past several years bakers used emulsifiers called bread softeners to produce bread that will remain soft for a longer period of time. It is added to the dough during mixing. Some of the more common ones are monoglycrides, calcium steroyllactylate, and sodium steroyllactylate. The softening action takes place after the bread is baked. Also, Potato bread will resist staling because potatoes act as anti –staling ingredients to some degree. Some anti –staling ingredients also perform as dough conditioners or dough strengtheners.

2. ***Enzymes.*** Enzyme manufacturers are hard at work on generic engineering and protein engineering producing enzymes to extend the shelf life of bread many fold. In a paper presented at the 1999 American Society of Baking's Annual Convention, it was stated that some of these enzymes are available now. However, since every baker wants to have one better, enzyme manufacturers will continue to work on developing better ones. It was also stated that there is a lag time of between 2 and 3 years between the time a specific enzyme is identified and actually having it available for the baker to use.Advantages of Using Enzymes instead of Chemicals. Since enzymes are produced from natural ingredients, they will find greater acceptance by the housewife than when chemicals are used.

3. ***Mold and Mold Inhibitors***. Sanitation plays a very important role in preventing mold in bread. Mold spores do not survive baking temperatures. The interior of the loaf, when it comes out of the oven is about 210 to 212 degrees F. which will destroy any mold spores which may be present in the dough. Therefore, bread and other bakery products can only be contaminated after they leave the oven.

Microbiological spoilage: Although the ideal temperature of bread for delaying the process of staling is 110^0F, there are chances of microbial growth as they may find adaptable moisture and temperature. The most common microbial spoilage occurs by two agents– Moulds and bacteria and the least common of all types of microbial spoilage in bread are that caused by certain types of yeast.

Mould spoilage: Mould spoilage of bread is due to post –processing contamination. Bread loaves fresh out of the oven are free of moulds or mould spores due to their thermal inactivation during the baking process. Bread becomes contaminated after baking from the mould spores present in the atmosphere surrounding loaves during cooling, slicing,

packaging and storage. They usually form.Mould infestation can be identified by bluish green/ green or pinky coloured velvety spots on bread producing musty odour.

Prevention of mould infestation : To prevent formation of moulds in breads, it is extremely important to follow strict hygiene and sanitation in the bakery, like –

- Proper ventilation and circulation of air.
- Area should be absolutely dry and moisture free.
- Area should be well illuminated.
- Handling bread hygienically.
- Keep on stock rotation every 24 hours. Overstocking may lead to spoilage.
- Maintaining proper room temperature.
- Follow HACCP plan.

Bacterial Spoilage: Rope is a germ disease caused by bacteria (*bacillus mesentericus or bacillus pulmilus*). The germs are most likely to develop during hot weather in bread that is not sufficiently fermented or not well baked. This disease breaks down the cells of the bread and leaves a sticky, pasty mass. When the crumb is pressed together, and pulled apart, it will stretch into long, sticky, web –like strands. The product will have the odor of over –ripe cantaloupe, very repelling. The bacteria may be present in the ingredients, especially flour and yeast. Unlike mold, rope spores are not destroyed by baking temperatures.

Symptom of roppines –

- Repelling odour, something like over –ripe cantaloupe.
- Soury and bitterly taste
- Sticky and web –like crumb
- Reddish brown coloured crust.

Prevention of Rope disease –

- Regulate the acidity of the bread –add vinegar or acetic acid or reduce the pH
- Proper ventilation and circulation of air.
- Area should be absolutely dry and moisture free.
- Area should be well illuminated.
- Handling bread hygienically.
- Keep on stock rotation every 24 hours. Overstocking may lead to spoilage.
- Maintaining proper room temperature.
- Follow HACCP plan.

CHECK YOUR PROGRESS-XV

1. Write short note on anti-spoilage ingredients used in bakery?

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2. Write a note on Microbial spoilage of baked products.

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1.18 SUMMARY

In this unit we have discussed about various ingredients used in bakery like Sugar, Shortenings, Eggs, Wheat and flours, Milk and milk products, Yeast, Chemical leavening agents, Salt, Spices, Flavorings, Cocoa and Chocolate and Fruits and Nuts. Further we have learnt about Professional bakery equipment and tools, Production Factors and Staling and Spoilage of baked products.

Sugar or as it is chemically called Sucrose is a building blocks of carbohydrates and it is naturally found in many food such as fruit, milk, vegetables and grain, another kind of sugar is added sugar which can be founded in flavored yogurt, sweetened beverages, baked goods and cereals, and it is used widely in industry. Sugar is one of the major ingredients in the bakery industry and plays an important role. Sugars vary in their sweetening quality and are the soul of all desserts. Sugar is natural and non –toxic, sweet testing, water soluble concentrated form or crystalline carbohydrate.

Shortening seems to get its name from the fact that it shortens gluten strands in wheat by adding fat. In other words it is used to prevent the formation of a gluten matrix by interfering with gluten formation in a dough's and batters to impart crisp, flaky and

crumbly texture to baked products such as pie crusts and to increase the plasticity, or workability of dough's. However, some vegetable shortenings have artificial butter flavor added and are used as an inexpensive replacement for butter.

The egg is a biological structure intended by nature for reproduction. It protects and provides a complete diet for the developing embryo, and serves as the principal source of food for the first few days of the chick's life. The egg is also one of the most nutritious and versatile of human foods. The various role that egg plays in baking has been discussed.

Milk most often means the nutrient fluid produced by the mammary glands of female mammals. The female ability to produce milk is one of the defining characteristics of mammals and provides the primary source of nutrition for newborns before they are able to digest more diverse foods.

It is also processed into dairy products such as Cream (food) cream, butter, yogurt, ice-cream, gelato, cheese, casein, whey protein, lactose, condensed milk, powdered milk, and many other food –additive and industrial products. Other than cows and buffalo, milk can also be obtained from sheep, goats, horses, donkeys, camels, yaks, water buffalo and reindeer.

1.19 GLOSSARY

Agave syrup is produced from starches extracted from. It has a neutral flavor about 25% sweeter than sugar, and a consistency that is thinner than honey. It may be used in baking and cooking, as well as for sweetening beverages.

Brown Sugar – It is simple refined sugar with some molasses returned to it or it is the residual sugar obtained during the process of refining sugar. It is brown in color and has distinctive color and flavor.

Butter – is the fat of milk, separated from milk or cream by churning and contains also a small amount of other milk constituents. Fresh butter consists of about 80% fat, about 15% water, and about 5% milk solids. There are different types of butter available :

Castor sugar – This is superfine sugar (A Grade) and is also called breakfast sugar –made by crushing and sieving fine granulated sugar. It dissolves quickly and easily in liquids and can be creamed easily.

Cell membrane – It is found in the inner lining of the shell. It forms an air cell at the large end, and two white strands called chalazae on the either side hold the yolk at the center of the white.

Chalazae – These thick, twisted strands of egg white anchor the yolk in place. They are neither imperfections nor embryos. The more prominent the chalazae, the fresher the egg. Chalazae do not interfere with cooking or with whipping egg whites.

Clarified butter – It is butter in which water and milk solids have been removed by a process called clarification. It is although rarely used in bakery only when sometimes a more stable and consistent product is required to be achieved by using clarified butter.

Cleaning: Cleaning begins with screening to remove coarse and fine materials and the grain is separated by size, shape and weight. The finished product, whole pure wheat, is then passed into conditioning bins.

Conditioning: Conditioning takes place before milling to produce uniform moisture content throughout the grain. Moistening helps to prevent break – up of the bran (hard outer layer) during milling and improves separation from the floury endosperm (the mass that forms the white flour of the grain).

Corn Syrup – It is very sweet and contains high amount of fructose and glucose or dextrose. It is chemically refined clear syrup made from corn kernels and is prepared by converting corn starch into simple sugar compound by the use of enzymes.

Date sugar – It is obtained from drying and pulverizing dates. It is very sweet and although it does not dissolve very well it is used in many baked products.

Egg white – It consists 2/3rd portion of the egg and is called Albumen. It is clear translucent liquid and contains sulfur and more than half of the albumin protein and riboflavin. The protein, which is clear and soluble when raw but coagulates and becomes firm and opaque at temperatures between 144°F and 149°F (62°C and 65°C) when coagulated.

European –style butter or cultured butter – contains more milk fat than regular butter, usually from 82 to 86 percent with very little or no salt. It is often churned from cultured cream, giving it a more intense, buttery flavor.

Fondant – sugar syrup beaten with cream of tartar to form thick white paste. Used for decorating pastry or confectionary.

Glucose – It is present in body and in fruits in natural form. Commercially it is sold as

Dextrose- It is less sweet than sucrose, but it is use because of its waster holding capacity. It has ability to control the size of the crystals in candies and as a food for yeast, during the fermentation.

Golden Syrups – It is thick amber coloured liquid obtained from sugar during the refining process. It is treated with acid to cut down on the sharp taste. It looks similar to honey and is used in making confectionery products and to add flavour to the food products.

Granulated/ white sugar/sandy sugar –This is the regular white sugar which in used in homes. Usage of this sugar will find its place in any preparation which has sufficient liquid

to dissolve it. For example, whipping eggs, making sugar syrups, cooking sabayon over double boilers, etc. It contains 99.7% sucrose.

Gristing: After conditioning, different batches of wheat are blended together (gristed) to make a mix capable of producing the required flour quality.

Heavy syrups – boil equal part of water and sugar for 1 minute. This concentration would measure 28 –30c on the Baume scale, and the solution should be at 220f (104c) heavy syrups are a basic, all – purpose syrup kept on hand in many bakeshops.

Honey –It is natural sugar consisting of glucose and fructose. It is a natural sugar obtained from bee hives. The colour and flavor of honey will vary with its source.

Icing sugar – Granulated sugar is crushed into fine powder and has a small percentage of corn starch added to keep it smooth and free flowing.

Invert sugar –When a sucrose solution is heated with an acid, some of the sucrose breaks down into equal parts of two simple sugars, dextrose and levulose. A mixture of equal parts of dextrose and levulose is called. It is about 30% sweeter than regular sucrose.

Isomalt – It is a natural sugar substitute and in reality it is sugar alcohol. It is available in crystalline forms and is used for preparing sugar garnishes as it is more stable than sugar and does not caramelize thereby giving an appearance of thin glass sheets.

Lactose– It is commercially extracted solution of whey formed by crystallization. It is usually added to bakery products because its presence adds to the brewing of food products.

Lard – is produced from selected fat of the hog through a process known as 'rendering'. It is a solid white product of almost 100 percent pure fat; it contains only a small amount of water.

Light syrups – boil 2 parts water which 1 part sugar for one minute. This concentration would measure – 17 –20c on the Baume scale. Light syrups can be used for making sorbet or moistening sponge cake.

Liquid caramel – liquid sugar in which caramel colour is added to give it dark brown colour. It is a thick free –flowing liquid and may be used in preparation of puddings and some types of confectionary.

Liquid glucose – Liquid glucose is obtained by treating the corn slurry by acid – a process known as hydrolysis.

Maltose – It is use as a flavoring and coloring agent in the brewing of beer.

Maple syrup – It is natural sweetener and is a sap of maple tree. It is boiled down to thick syrup. Pure maple syrup is very expensive, as to obtain 1 liter of maple one has to boil down at least 10 liters of maple sap. For easy processing, commercial maple syrup added to them. It could be added in the range of 2 –6 percent. The percentage of the maple is always mentioned on the bottle and this decides the price of the product.

Medium syrup – boil 1 part sugar with 1 – ½ part water for 1 minute. This concentration would measure 21 –24c on the Baume scale. Medium syrups can be used for candying citrus peel.

Muscovado sugar – is an unrefined or partially refined cane sugar with a strong molasses flavor and high moisture content. It has a slightly coarse texture and feels sticky to the touch. It is popularly used in chocolate sweets and other baked goods. It is also called Barbados sugar, molasses sugar, kandasari, khand, and moist sugar.

Palm sugar – Palm sugar is traditionally made from the sap of Palmyra palm or the date palm. It is extensively used in Asian cooking.

Pearl sugar – is a type of decorating sugar made by polishing large crystals until they resemble pearls.

Powder Sugar or confectioners' sugar – It is obtained from granulated sugar by pulverization (refining of granulated sugar to get more fine form). It is available in various degree of fineness, use for different purposes in confectionary.

Salted butter – It is butter with up to 2.5 percent salt added, which not only changes the butter's flavor, it also extends its keeping qualities. When salted butter is used, the salt content must be considered in the total recipe.

Sugar cubes – are formed by pressing moistened granulated sugar into molds and allowing it to dry. Most cubes are used for beverage service.

The shell – The shell, composed of calcium carbonateis not only fragile but also porous, is the outermost covering of the egg. It prevents microbes from entering and moisture from escaping, and also protects the egg during handling and transport. The breed of the hen determines shell color; for chickens, it can range from bright white to brown. Shell color has no effect on quality, flavor or nutrition.

The Yolk – It is the yellow portion of the egg. It constitutes just over one –third of the egg and contains three –fourths of the calories, most of the minerals and vitamins and all the fat. The yolk also contains lecithin, the compound responsible for emulsification in products such as hollandaise sauce and mayonnaise. Egg yolk solidifies (coagulates) at temperatures between 149°F and 158°F (65°C and 70°C). Although the color of a yolk may vary depending on the hen's feed, color does not affect quality or nutritional content.

Treacle/Molasses – are products of refined sugar. When the sugarcane juice undergoes refining, it undergoes many stages. In the first stage the white sugar or the raw sugar is removed. The remaining sugar syrup is used to make treacle which is stronger than golden syrup but less than molasses. Used in the preparation of certain beverages and sauces.

Unsalted butter – It is more perishable, but it has a fresher, sweeter taste and is thus preferred in baking.

Vergeoise sugar or Sucre vergeoise (French) – solid residue from refining beet giving a product of soft consistency, golden or brown with pronounced color.v Sucre vergeoise is available in blonde (light) or brune (dark).

Whipped butter – It is made by incorporating air into the butter. This increases its volume and spreadability but also increases the speed with which the butter will become rancid. Because of the change in density, whipped butter should not be substituted in recipes calling for regular butter.

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1.21 SUGGESTED READINGS

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- Baking by Marha Dey , www.hermehouse.com
- The Golden Book of Baking by barronsduc www.barronseduc.com

1.22 TERMINAL QUESTIONS

1. What are the various forms of sugars used in baking? Explain five in detail
2. What role does sugar plays in baking? Explain.
3. Classify sugar?
4. Write a note on manufacturing process of sugar.
5. Write a note on Artificial sweetening agents.
6. List the uses of sugar in bakery.
7. Write a note on cooking of sugars.
8. How sugar syrup is made? Explain.
9. What are the functional properties of sugar in food?
10. Define shortening? List the characteristics of shortening agents.
11. Write a detailed note on Classification of shortening agents.
12. Explain the structure of egg with suitable illustration.
13. List the role of egg in baking.
14. What are the different forms of egg available in market? Explain each
15. What points one should keep in mind while purchasing eggs?
16. Write a note on storage of eggs.
17. Classify wheat? Explain the uses of each type of wheat in baking.
18. Explain flour milling process with suitable diagram.
19. Explain structure of wheat with suitable diagram.
20. Write a note on milk and milk product.
21. Classify cheese? Explain various types of cheese with examples of each.
22. What are the characteristics of Yeast?
23. Write a note on Types of Yeast.
24. List the various chemical raising agents used in baking?
25. Write a note on Storage of Chemical leaveners.
26. What are the different types of salt used in bakery?
27. What are the different types of salt used in bakery?
28. What are the different types of salt used in bakery?
29. Classify favoring agents? Explain each with example
30. Write a note on flavoring agents.
31. What are functions of chocolate in baking?
32. Write a note on Chocolate Production.
33. Write a note on Classification of fruits.
34. Write a note on Uses of nuts in baking.
35. Write a note on various equipments used in bakery?
36. What is the various level of work position in bakery?
37. Write a note on Attributes of a good baker.
38. Write short note on anti-spoilage ingredients used in bakery?
39. Write a note on Microbial spoilage of baked products.

UNIT: 02
BREAD AND ROLLS

STRUCTURE

2.1 INTRODUCTION

In the previous unit you have learned about the basic ingredients and their role in baking, now in this unit we will be learning about making various types of bread and bread rolls. We will be learning about the various methods of making bread and various types of bread like White Pan Bread; Pullman, Split-top, and Round Split Breads; French and Italian Breads and Rolls; Vienna Bread; Bolillos; Pan de Agua; Egg Bread and Rolls; Hard Roll Varieties; Soft Roll Varieties; Pan de Sal; Rye Bread Varieties; Cornmeal Bread; Whole Wheat Bread; Raisin Bread; Cheese Bread; Indigenous Breads of India; and Middle Eastern Pita Bread.

2.2 OBJECTIVE

After reading this unit the learner will be able to:

- Explain about different methods if bread making like straight dough method and sponge dough method.
- Bake Prominent types of breads and rolls prepared around the world
- Understand methods of preparation of different types of breads
- Identify and resolve the problems associated with preparation of breads

2.3 OVERVIEW OF PRODUCTION

The Baking Process: The basic process of baking yeast bread starts with measuring and mixing the various ingredients to make the dough and adding yeast so that it rises. The dough is then kneaded to develop the gluten and is again allowed to rise. The kneading and rising steps may be repeated several times. Next, the dough is shaped into a loaf and baked. Baking cooks the dough, firms the loaf and forms a crust on it, and improves the flavor. Finally, the loaf of bread may be sliced before being wrapped. Commercial bakeries have machines that do the work of measuring, mixing, kneading, baking, slicing, and wrapping. Skilled bakers run the machines, and nothing is left to chance. The ingredients are weighed precisely, the temperature and humidity are closely monitored, and the individual steps of the baking process are carefully timed.

Every bakery uses a special blend of flour, produced by mixing the wheat before or after it has been milled. In most large bakeries the manufacturing process begins in bins on a high floor so that gravity can draw the flour or dough from one machine down to the next. After a final sifting, the flour is fed into a scale that automatically weighs the right amount and pours it into a mixer on the floor below. Water or another liquid is poured into form dough, and yeast and other ingredients are added. The amount of flour used to make the dough can be affected by the temperature and humidity in the bakery. In addition, the temperature of the water must be exactly correct to dissolve the yeast. The yeast will be killed if the water is even slightly overheated. On the other hand its growth will be stunted by water that is too cold.

In the next step of the manufacturing process, the dough flows into huge troughs that are taken into a fermentation room. It is left there to rise for a set amount of time, usually several hours. Next, a divider scales the dough into pieces of just the right weight for the baking pans. The rounder shapes the pieces into balls, which then move through the overhead proofer. There the dough rests for a few minutes to recover from the rough dividing and rounding processes, thus ensuring tender loaves. The balls of dough drop from the overhead proofer into a molder, which shapes them to fit the baking pans exactly. The filled pans are placed in the proof box, where the final rising takes place. The proof box has a slightly warmer and moister atmosphere than that of the fermentation room. The pans then go into an oven, where they are baked at a temperature of more than 400^0F

(204^0C) for about 30 minutes. Low –pressure steam is injected into the oven to prevent the crust from forming too quickly.

Most large bakeries use reel ovens or traveling ovens. A reel oven looks like an enclosed Ferris wheel, with the pans of bread on rolling racks. In a traveling oven the pans move slowly on a conveyor belt through a long baking chamber, and the bread comes out the other end.

Some traveling ovens measure more than 100 feet (30 meters) in length, and they can bake more than 5,000 loaves of bread per hour. After the loaves have been slowly cooled, a slicer cuts them into uniform slices. Finally, a wrapping machine places moisture –proof paper around each loaf and seals the paper to keep the bread fresh and protect its flavor. The loaves are then packed into trucks and taken to stores. The process of making unleavened bread, which is sometimes called no –yeast bread or quick bread, is much simpler than that used for yeast bread. Since the dough contains no yeast, kneading and rising are not involved. The procedure consists merely of measuring and mixing the ingredients and then shaping the dough and baking it.

Bakeries make many products in addition to bread, including rolls, crackers, biscuits, and such pastries as cookies, cakes, pies, and doughnuts. Machines do much of the work in baking these products, as in making bread. Bakers use a variety of devices for molding and cutting and for such operations as making and applying frosting and icing. There are two general kinds of cakes butter cakes and sponge cakes. Butter cakes contain butter or some other fat, plus flour, sugar, eggs, leavening, milk, salt, and flavoring. Bakers make many varieties of these cakes by adding chocolate, molasses, spices, nuts, coconut, or other ingredients. Sponge cakes, such as angel food cakes and similar products, have no fat. They usually consist of flour, eggs, sugar, salt, and flavoring. The eggs provide the liquid, and the air for rising as well, and cream of tartar is added for lightness and tenderness.

1. **STRAIGHT DOUGH METHOD:** In this method all the ingredients are mixed together, and the dough is fermented for a predetermined time. The fermentation time of straight dough depends on the strength of flour. Strong flours require more fermentation time to mature adequately. Flours which require 2 to 3 hours for maturing should be used for making bread by straight method. Flours that take very long period for maturing should not be used in straight method because during prolonged fermentation periods it is very difficult to control the temperature of dough and rise in temperature will invariably cause acid taste and flavour in bread. As temperature rise has immediate effect on fermentation speed, it is very necessary to control the temperature of straight dough by;

- Using shorter fermentation periods
- Adjusting the temperature of doughing water
- By fermenting the dough at optimum (room) temperature i.e. between 78 to 80^0F.

When it is desired to ferment straight dough for longer period, it should be remembered that gluten will soften up to a greater extent and is likely to become sticky; therefore the

dough should be made tighter. Yeast content should be reduced but sugar content should be increased in order to provide food during prolonged fermentation. Salt content is increased as it provides stability to the dough and keeps the fermentation speed under control which is necessary during long fermentation period.

Salt–Delayed Method: This is a slight variation of straight method, where all the ingredients are mixed except salt and fat. As the salt has a controlling effect on enzymatic action of yeast, the speed of fermentation of a salt less dough will be faster, and a reduction in total fermentation time could be affected. The salt is added at the knock –back stage. The method of adding salt at the later stage may be according to the convenience of individual baker. It may be sifted (dry) on the dough and mixed. It may be creamed with fat and mixed. Whatever way is chosen for mixing the salt, only three –fourth (of the actual mixing time) mixing should be given initially and one – fourth mixing at the time of adding salt. The method is especially suitable if strong flours are to be used for bread making by straight method. Due to absence of salt, the fermentation speed enhanced and gluten is matured in a reasonably shorter time.

No Time Dough Method: In this method, dough is not fermented in a usual manner. It is just allowed a brief period (about 30 min), for it to recover from the strains of mixing. Since dough is not fermented the twin functions of fermentation (i.e. production of gas and conditioning of gluten) are achieved to some extent by increasing the quantity of yeast (2 to 3 times of original quantity) and by making the dough little slacker and warmer. Although it is possible to make fairly acceptable bread (during emergency) by using this method the product has poor keeping quality and lacks in aroma. Due to absence of fermentation the gluten and starch are not conditioned sufficiently to retain the moisture and there is no flavour because flavour producing bi –products of fermentation are absent. As there is increased quantity of yeast present, the bread may have a strong yeast flavour.

2. **Sponge and dough method:** Previously, in this chapter it has been mentioned that strong flours take too long for conditioning and should not be used for making bread by straight dough method. For such flours sponge and dough method is more suitable where the problem of controlling the dough temperature is not so acute as the total fermentation time is divided in two separate segments. For the sake of convenience and proper identification, sponge dough is indicated at 60/40 sponge –dough, or 70/30 sponge –dough, where the first numbers i.e. 60 or 70 indicate the percentage of flour used in sponge and the second numbers i.e. 40 or 30 indicate the percentage of flour mixed at the time of dough making.

In this method, as a first step, a part of flour, proportionate amount of water, all the formula yeast and yeast food are mixed together. Longer fermenting sponges may contain some amount of salt also. Mixing operation is carried out just sufficiently to incorporate all the ingredients evenly. This sponge is fermented for predetermined time. Sponge fermentation time depends on the amount of flour in the sponge and flour quality. The quantity of flour in sponge depends on the strength of flour. If the flour is too strong, more quantity should be used in sponge and in turn the sponge should be fermented for longer duration.

It is advisable to test the sponge physically for its readiness before mixing it into dough. The following methods of sponge testing could be used;

Take a small piece of sponge and try to break it with both hands. If the piece breaks with a clean fracture the sponge is ready for mixing. If sponge is not ready, the piece will stretch to some extent and will break in unevenly stretched shreds. In such case sponge should be allowed more fermentation time.

Tear the sponge apart from the center with both hands and examine the web structure. If the web structure is very fine, the sponge is ready. An adequately fermented sponge feels dry to touch without any stickiness present. When the sponge is ready, it should be broken down properly with formula water, so that its even mixing in the dough is assured. Uneven mixing of sponge in the dough should be avoided as it produces uneven results in the bread. Broken down sponge is mixed with the remaining flour, sugar, salt, fat etc. Mixing operation should be carried out to the right degree. If two different kinds of flour are at hand, the weaker flour should be used at the time of dough making.

After the dough is mixed, it is rested for 30 to 45 min. during which time it relaxes from the stress of mixing operation. Pre –conditioned gluten of the sponge hastens the conditioning process of the gluten of fresh flour during this period and the dough is in perfect state for further manipulation i.e. cutting, moulding etc.

Ferment and Dough Process: This is a variation of sponge and dough method. Very often a (bread product) formula may contain milk, eggs, substantial quantity of fat and sugar as in the case of sweetbread, Danish pastry and other sweet fermented products. All these formula ingredients will have a retarding effect on yeast activity. If all the formula yeasts, part of flour, yeast food and sufficient water (to make a fluid batter as in case of flying ferment) are mixed together, the yeast gets initially an environment which is conducive to vigorous activity and the end of fermentation time (of ferment) it is in a fit condition to take on the extra load of fermentation in the presence of milk, eggs, excessive fat etc. Fermentation time of ferment depends on the formulation of the product desired to be made and the flavor desired in the product but very often it becomes a matter of individual preference eg. some bakers may take the ferment (for mixing) after it is dropped by itself , while others may take it just prior to dropping and some may allow time even after it has been dropped. A ferment containing milk should be guarded against over fermentation as it will develop more than desirable quantity of lactic acid which in turn will affect the flavour, taste and texture of the product.

When ferment is ready, it is mixed into dough, along with the remaining ingredients and allowed to ferment for the second stage of fermentation before the dough is taken up for makeup. This method is used for making enriched bread, buns, Danish pastry, sweet dough, doughnuts etc. where the speed is very necessary.

Characteristics of a quality bread and bread roll: Every type of bread has its own requirements and quality characteristics. The quality of bread is a function of its ingredients, yeast activity and processing conditions. The soft and resilient texture and fine

cell structure (grain) of a slice of white pan or whole wheat bread, are features that consumers expect when purchasing these breads. An "ideal" or high –quality loaf of white pan bread should have the following characteristics –

Internal

- ***Grain***– small (tight) cells, very thin cell walls, fine and uniform cell size distribution in center, elongated and fine cells around perimeter.
- ***Crumb color***– bright white or slightly creamy.
- ***Flavor***– slightly sweet, yeasty and aromatic flavor of baker's yeast mixed in flour –and –water dough. Strong and sharp fermentation flavors are not desired.
- ***Aroma***– when bread is smelled, close to the nose, while inhaling deeply, the aromatic sensation experienced is described as bread aroma.
- ***Tactile crumb texture***– smooth and silky feel. Crumb should be resilient when pressing lightly with the fingers.
- ***Mouth feel–*** moist and soft (dry or gummy mouth feel are not desired).

External

- ***Loaf volume***– good loaf volume with optimum oven spring. Sufficient rise renders proper break and shred.
- ***Break and shred***– break and shred should be high and fairly smooth, not excessive or rough or bulging.
- ***Uniformity of shape***– symmetrical with a rounded top (flat top and irregular shapes are not desired). Loaf should retain a straight and upright position. Keyholing, collapsing, flat top and uneven shape are considered defects.
- ***Crust color***– well –developed golden –brown color, smooth and even.
- ***Crust surface***– side walls and top crust should be smooth and should not contain holes or pits.

CHECK YOUR PROGRESS-I

1. Explain Straight dough method of making bread.

2. Write a note on Characteristics of a quality bread and bread roll.

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2.4 COMMON PROBLEMS

Common bread problems are described in table below:

Sl.No	Faults	Causes
		SHAPE
1	Poor volume	• Too much salt • Alkaline water used • Too little yeast and poor quality yeast • Under proofing • Dough too chilled • Too little liquid • Under fermentation of dough • Dough too small for the pan • Excess of salt, sugar and fat • Weak / poor quality flour • Flour contains high bran • Too tight dough • Under or over mixing • Oven too hot
2	Too much volume	• Too little salt • Over fermentation • Too much yeast • Excess of dough weight for the pan • Loose molding • Too much dough scaled • Too slack a dough • To low oven temperature • Over –proofed

3	Poor shape	• Too much liquid • Loose molding • To low oven temperature • Under or over mixing • Flour too weak • Too little yeast and poor quality yeast • Improper molding or makeup • Improper fermentation or proofing • Too much oven steam
4	Irregular shape	• Over ripened dough • Rough handling of the dough • Use of alkaline water • Excess of dough for the pan size • Improper fermentation or proofing • Over loading in the oven • Too strong or too weak flour • Too slack or stiff dough • Improper mixing • Loose molding
TEXTURE AND CRUMB		
1	Too dense or close – grained	• Too much salt • Too little liquid • Too little yeast • Under fermented • Under proofed
2	Holes and tunnels	• Too salt • Very hot oven • Too weak or strong flour • Too slack dough • Too much yeast • Uneven mixing of ingredients • High amount of chemicals used • Too much dusting flour • Improper knock –back, scaling, molding etc. • Too little salt • Very hard and granular fat

3	Too coarse or open	• Too much yeast • Too much liquid • Incorrect mixing time • Improper fermentation • Over proofed • Pan too large
4	Streaked crumb	• Improper mixing procedure • Poor molding or make –up techniques • Too much flour used for dusting
5	Poor texture or crumbly	• Flour too weak • Too little salt • Dough too slack • Less quantity of yeast • Improper molding • Fermentation time too long or too short • Over/under proofed • Improper knock back given • Too much improvers used • Too much dusting flour used • Excess of fat or water • Slicing hot bread • Use of alkaline water • Baking temperature too low
6	Gray crumb	• Fermentation time or temperature too high
CRUST		
1	Too dark	• Too much sugar, salt or milk • Under fermented dough • Lack of humidity in oven • Under –fermented or over mixed dough • Oven temperature too long • Dough temperature too low • Too much diastatic activity in the dough • Baking time too long • Too much steam in oven
2	Too pale	• Under baking • Too much yeast • Under mixing of dough • Low diastatic capacity of the flour • Too slack a dough • Too much dusting flour used • Hot proofing chamber

		• Fermentation temperature high • Over proofing
3	Too thick	• Too little sugar or fat • Less diastatic activity of flour • Improper/over fermentation • Poor quality or too strong flour • Baked too long or at wrong temperature • Too little steam
4	Blister on crust	• Too much liquid • Skinning of dough before baking • Improper fermentation • Improper shaping of loaf • Over proofing • Uneven baking temperature
5	Top crust shelling	• Too stiff dough • Under proofing • Too high baking temperature • Low diastatic activity of flour • Under –fermented dough • Insufficient sugar
6	Leathery crust	• Insufficient cooling before packing • Uneven fermentation • Too strong flour used • Excessive humidity during proofing and baking
7	Hard crust	• Excess of water used • Use of less fat • Improper fermentation • Too strong flour used • Low temperature of oven • Baking time long • Excess of dusting flour • Excess of sugar
8	Split or burst crust	• Over mixing • Under fermented dough • Improper molding • Uneven heat in oven • Oven too hot

		• Insufficient steam
FLAVOR		
1	Flat taste	• Too little salt
2	Poor flavor	• Inferior, spoiled, or rancidingredients • Poor bake shop sanitation • Under or over fermented
STORAGE AND PACKING		
1	Poor keeping quality	• Insufficient salt, sugar or fat • Poor quality of flour • Insufficient fermentation • Over proofing • Too high dough temperature • Too stiff dough • Too slack dough • Improper molding • bread not cooled before packed • Over chilling of bread • Slicing hot bread • Improper ventilation in store room • Improper cutting style • Poor storage condition • Humid store room • Improper sanitation in store room

CHECK YOUR PROGRESS-II

1. Explain various causes of bread related to crust.

2. Explain various causes of bread related to texture and crumb.

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2.5 WHITE PAN BREAD

White bread typically refers to breads made from wheat flour from which the bran and the germ layers have been removed (and set aside) from the whole wheat seed as part of the flour grinding or milling process, producing a light –colored flour. This milling process can give white flour a longer shelf life by removing the natural oils from the whole grain. Removing the oil allows products made with the flour, like white bread, to be stored for longer periods of time avoiding potential rancidity. In the United States, consumers sometimes refer to white bread as sandwich bread and sandwich loaf.

Recipe
Ingredients –

- Instant yeast – 4 ½ tsp
- Warm water(divided) – ¾cup+ 2⅔ cups
- Granulated sugar – ¼cup
- Salt – 1 tbsp
- Unsalted butter 3 tbsp
- All –purpose white flour 9 to 10cups
- Unsalted butter(melted, for brushing) – 3tbsps

Method –

- In the bowl of a mixer, stir to dissolve the yeast in ¾ cup of the warm water, and let sit for 5 minutes. Add the remaining 2⅔ cups water, sugar, salt, room temperature butter, and 5 cups of the flour and stir to combine.
- Using a dough hook, mix on low speed and gradually add the remaining flour until the dough is soft and tacky, but not sticky (you may not need to use all of the flour). Continue to knead until a soft ball of dough forms and clears the sides of the bowl, about 7 to 10 minutes.
- Place the dough in a lightly greased bowl and turn it over so it is completely coated. Cover with plastic wrap and set in a draft –free place to rise until doubled in size, about 45 minutes to 1 hour.
- Turn the dough out onto a clean, lightly floured surface. Gently press it all over to remove any air pockets. Divide the dough in two and, working with one piece at a

time, gently pat it into a 9x12 –inch rectangle. Roll up the rectangle, starting on the short end, into a very tight cylinder. Pinch to seal the seams and the ends, tuck the ends of the roll until the bread, and place into greased 9 –inch loaf pans. Cover the loaves loosely and place in a draft –free area until doubled in size, 30 to 45 minutes.

- Position an oven rack on the lowest setting and preheat the oven to 400 degrees F.
- Brush the loaves with some of the melted butter. Bake the loaves for 30 to 35 minutes, rotating halfway through, until golden brown (an instant –read thermometer inserted into the center should read 195 degrees F).
- Remove from the oven and immediately brush with more of the melted butter. Allow to cool for 10 minutes, then remove from the pans and cool completely before slicing. The bread can be stored in an airtight bread bag or wrapped tightly in plastic wrap at room temperature for up to 4 days. It can also be frozen for up to 1 month.

2.6 PULLMAN

The pullman loaf, sometimes called the "sandwich loaf" or "pan bread", is a type of bread made with white flour and baked in a long, narrow, lidded pan. It is frequently squarein shape, with four straight crusts. The French term for this style of loaf is *pain de mie*, or less commonly, *pain anglais*. The name "Pullman" was derived from its use in the compact kitchens of the Pullman railway cars in United states.

Recipe

Ingredients –

- Warm milk – 1 ½ cup
- Butter – 3 tbsp
- Honey – 2 tbsp
- Instant yeast – 1 ½ tsp
- while refined flour – 3 cups
- dry milk powder – 3 tbsp
- Salt1 – ½ tsp

Method –

- Combine all of the bread ingredients in the bowl of a stand mixer (can also be done by hand)
- Mix until combined, then knead by hand until you have a smooth dough
- Place dough in an oiled bowl, cover and let rise 30 minutes (may take longer if your room is cold) dough should be puffy but not doubled in volume
- Gently deflate dough, form into a log, and place in a well greased pullman loaf pan, then place lid on pan
- Let rise until dough is about ½inch from the rim of the pan (30 –40 minutes)
- Pre –heat oven to 350° F
- Bake loaf covered for 40 minutes

- Remove bread from pan and cool on a rack
- Cool completely before wrapping and storing (bread will last at room temperature for 3 days)

2.7 SPLIT –TOP

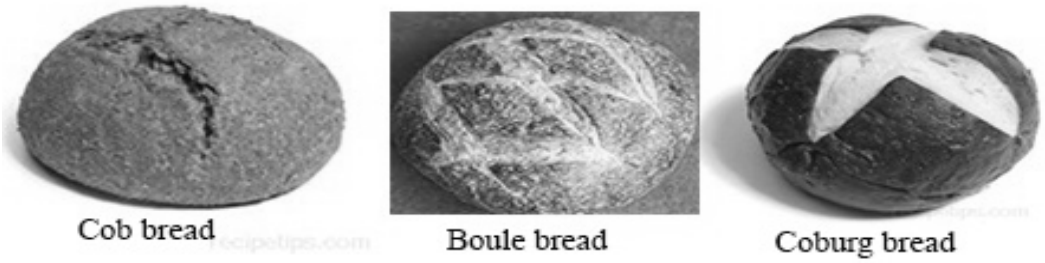
Split –top pan bread –When the dough has been put in the loaf pan, but before it goes into the oven, a knife has been used to make a shallow cut into the top of the loaf. This cut releases the tension on the bread and lets it rise higher, giving it a lighter texture and a softer crumb. Example Bloomers and Vienna bread. Bloomer refers to a bread shape that is cylindrical, but flat on the bottom with several diagonal slashes across the top. The term most often describes a bread shape popular throughout Britain. Bloomers are made with many types of flour, although various types of wheat flour are the most popular. The Vienna shape describes an Oval loaf that is tapered at the ends

Bloomer bread Vienna bread Banana bread

https – //www.recipetips.com/kitchen –tips/t – –1130/bread –shapes.asp

2.8 ROUND SPLIT BREADS

These breads are round shaped breads in which cross splits in the upper side is done while panning. Cob is a term that refers to a large, rounded, top split plain loaf that can be made with various types of flour. Cob is a term that usually describes rounded loaves in Britain, while boule is a term that describes similar bread with criss –cross split in France. A Coburg is similar to a cob except that it has a cross slashed into the top. The method of preparation is similar to Vienna bread.



Cob bread Boule bread Coburg bread

CHECK YOUR PROGRESS-III

1. Write a short note on 'The Pullman loaf'.

2. Write a note on 'Round Split Bread'.

2.9 FRENCH AND ITALIAN BREADS AND ROLLS

Italy and France specialize in the making of bread, but one will find it difficult to find any differences between the two. Anything from the bread's baking method down to its shape and size is usually done in a different way on either side of the French –Italian border. Some of the most common variations to look out for include the differences in bread dough and the ingredients used. The common difference between the breads and rolls of these countries are –

Factors	French breads and rolls	Italian breads and rolls
Ingredients	French bread is typically made from wheat flour, water, yeast and salt. By law in France, the long loaves and boules (round loaves) cannot have added oil or fat. Brioche, a soft loaf with a high egg and butter content, is considered a pastry.	Italian bread often contains a bit of milk or olive oil, and sometimes a bit of sugar.

Shape and size	French bread tends to be often long in shape with rounded edges	Italian bread loaves tend to be circular, shorter, flat and plumper.
Texture	French bread tends to be hard and crusty on the outside, with a light and soft crumb.	Italian bread can also have a hard crust, but the crumb tends to be denser and a lot chewier.
Taste	Though they don't use sugar in their ingredients, French bread often has sweet taste.	They value more savory taste for their loaves. Italy's finest savory bread often topped with something to hone the savory flavor such as salt, olive oil, or herbs.
Baking Method	French bread can be cooked in any oven.	Italian bread is traditionally baked in a flat stone oven. This can imbues the bread with a tiny amount of smoky flavor.
Service	Commonly served as a starter with butter and perhaps soup if the diner is eating an entrée.	Served as an accompaniment to the pasta and main courses.
Example	Baguettes, Brioche Couronne bread,Ficelle	Piadina, Focaccia, Pizza Bianca, Ciabatta

2.10 VIENNA BREAD

Vienna bread or pain Viennois is a type of bread that is produced from a process developed in Vienna, Austria, in the 19th century. It is normally made in the shape of a baguette, though the crust is softer than a baguette, the texture is finer, and the taste is sweeter. Viennese bakers use either brewers' yeast or a ferment, prepared by themselves, of which the basis is an infusion of hops.The loaves have horizontal slashes on top and glazed with egg wash and topped with sesame seeds or poppy seeds before baking. The ideal bread for toast and all sandwiches from hot dog to the top notch sandwich such as beer –braised pulled pork with orange barbeque sauce and coleslaw sandwich. Initially it was bread was made only from beer yeast, but nowadays brewer's yeast is used.

Recipe

Ingredients –

- Lukewarm water – 325 ml
- Active dry yeast – 14 gms
- Sugar – 2 tbsps

- Milk powder – 30 gms
- Refined white flour – 500 gms
- Salt 1 – tbsp or to taste
- Butter (unsalted) – 3 tbsps
- Egg white – for brushing (or milk)

Method –

- To begin making Pain Viennois or Vienna Bread Recipe, in a bowl, combine water, sugar, yeast and milk powder in a big mixing bowl. Allow it to stand for 10 minutes until bubbly and frothy.
- Add the flours, salt and butter to the yeast mixture and knead them to a dough.
- Later transfer it over a work surface and continue kneading until smooth and pliable for about 10 minutes. Do not use any extra flour while kneading or shaping.
- Place the dough in a greased bowl and cover the container with a plastic wrap. Set aside in a warm place until almost tripled in volume.
- Transfer the proofed dough on to a flat working surface and knead the dough for a minute or two to release the trapped air. Divide the dough into 9 equal pieces and shape them into tight round balls. Place them on a baking sheet and rest them for about 15 minutes.
- Flatten each dough ball to remove the air bubbles and shape them into tight 8 inch logs. Place 4 to 5 logs over each baking tray lined with parchment paper.
- Brush their tops with milk or beaten egg. Carefully score each log horizontally 12 to 15 times with a sharp blade or razor. Allow them proof for about an hour until doubled.
- Bake them in a preheated oven at 450 degree fahrenheit for about 15 minutes rotating the trays half way through to ensure equal baking.
- Remove the baked buns and cool them on a wire rack to room temperature. Vienna bread stays good for upto 2 days at room temperature and can be freezed for upto 3 weeks.

2.11 BOLILLOS

A bolillo or pan francés (meaning "French bread") is a type of savory or sweet bread traditionally made in Mexico, but also made in Central America. It is a variation of the baguette, but it is ovoid shaped and shorter in length and is often baked in a stone oven.It is also known as *birote* and *pan blanco* in some areas of the country.

Recipe

Ingredients –

- Warm water – 2 cups
- Active dry yeast – 1 (¼ –ounce) packet
- Bread flour – 4 cups
- Salt – 1 tsp
- Sugar – 1 tsp
- Egg white (whisked) – 1

Method –

- Pour water into a large mixing bowl, and sprinkle yeast onto the surface of the water.
- In a separate mixing bowl, mix flour, salt, and sugar.
- Add flour mixture to water a little at a time, mixing until a dough forms.
- Place dough in a greased bowl, cover with a towel or cloth and leave in a warm place for about an hour.
- Remove dough from bowl, punch it down and knead for about 10 minutes.
- Divide dough into 10 balls.
- For oval –shaped rolls (the usual bolillo shape), roll the balls between your palms for about 5 seconds to make a cylindrical shape, tapering slightly at the ends. Place pieces on one or more baking sheets.
- Cover and let loaves rise again for about 30 minutes.
- Preheat oven to 375^0F / 190^0 C.
- Brush each dough ball with egg white. Score each roll with two, 2 –inch lines along the top, about ¼ –inch deep.
- Bake loaves for about 30 minutes. Remove from oven; cool slightly and eat warm, or let cool completely and store tightly covered.

2.12 PAN DE AGUA

This Puerto Rican water bread **(*pan de agua*)** is similar to French, Italian bread or Cuban bread because it's made from the same basic ingredients, but the baking process is different. It is made in entire Spanish Caribbean. The dough is placed in a cold oven and is set above a pan of boiling water. The bread continues to rise as the oven heats, causing light colour crust to become deliciously thin and crisp and slightly sweeter in taste.This bread is first kept in a cold oven with a cup of hot water below it for ten minutes. Thereafter the oven is switched on and the bread is baked.The bread can be eaten as is or with butter or even used to make sandwiches.

Recipe

Ingredients –

- Flour – 5 cups
- Salt – 1 tbsp
- Sugar – 1 tbsp
- warm water – 2 cups
- yeast (rapid rising) – 1 tbsp
- egg white – 1
- water – 1 tbsp
- cornmeal or flour – to dust the pan

Method –

- Lightly whisked together 1 egg white and 1 tbs of water, keep aside.
- Mix flour and salt together and set aside.

- In a separate bowl mix sugar, water and yeast, and let stand for 20 min (with a towel over the top of the bowl).
- Start adding your dry ingredients one cup at a time. Stir it together each time you add more.
- When about ¾ of a cup left, dust the counter with a little flour (and start kneading the dough for about 8 –10 minutes. Slowly add the rest of the flour mixture to the counter and/or the actual dough while you are kneading, until all the flour is used up and 10 min has passed.
- Place the kneaded dough in a very deep greased bowl. Cover it damp cloth and put to rest for 2 hours.
- When it's done, sprinkle just a bit of fresh flour on the counter and dump your dough on it. The part that was touching the bowl should be a bit sticky which means that the dough is perfect.
- Next, take a knife and cut the dough in half. Form two long loaves and place in a non –stick –sprayed baking sheet with cornmeal (or flour) sprinkled on it. Take a sharp knife, and cut slits all across the top of the loaves.
- Brush the dough with egg white and water mixture.
- Once all this is done, boil a little over a cup of water (about 1¼ cup).
- Place loaves the middle of the oven. On the bottom rack place a shallow pan with the boiling water.
- Turn your oven on 400^0f and bake for 35 min. Do not pre –heat your oven. Just turn it on once all it in there.

CHECK YOUR PROGRESS-IV

1. Write the recipe of pan de agua.

2. Write the recipe of bolillo.

2.13 EGG BREAD AND ROLLS

Fluffy, soft, enriched with both eggs and butter and slightly sweeter in taste. These are great for breakfast with butter and jam or accompanying a comforting meal at dinner time. Example is Challah, which is a special bread in Jewish cuisine,

Recipe

Ingredients –

- Lukewarm water – ½ cup
- Lukewarm whole milk – 1 cup
- Instant yeast – 2 tbsp
- Sugar – 1 tsp
- Beaten egg – 1 large
- For brushing – 1 egg
- Butter – 30 gms
- All –purpose flour – 4 + ½ cups
- Salt – 3/4 tbsp

Method –

- In the bowl of a stand mixer fitted with the dough hook, stir together the water, milk, butter, sugar, and dry yeast. Let stand for approximately 10 minutes, or until the yeast starts to bubble. Add in the egg and stir to combine well.
- Add in the salt and mix with the flour. Keep adding flour a bit at the time, still stirring until absorbed. Then, with the mixer on low speed, gradually add in the remaining flour until combined. Increase speed to medium and knead until the dough is smooth and elastic. Rest for about 10 minutes.
- Shape the dough into a ball and place inside a greased mixing bowl. Cover with plastic wrap, keep it into warm place and allow to rise until doubled in size, about 1 ½ to 2 hours.
- Punch the dough down. Now the dough is ready to be shaped and used as you wish. You can make bread, differently shaped rolls, pizza or dinner rolls with this all – purpose dough. This amount of dough makes 5 rolls at 90 gms each or 8 smaller ones at 56 gms, 1 pizza, 1 bread loaf. It usually weights just a bit over 1 pound of dough. Double the amount if you wish to make more rolls.

2.14 HARD ROLL VARIETIES

These are made from lean yeast dough which is low in fat and sugar. Only the bare essentials – flour, yeast, salt and water – are used to make it. Its crust is hard and crumbles easily and can be kept for a long time. Spices, herbs, dried nuts, and fruit may be added, but very little (if any) sugar and fat is included. These are prepared by straight dough method and are mostly used in French and Italian cuisines.

Recipe

Ingredients –

- Sugar – 2 tbsp

- Active dry yeast – 1 tbsp
- Salt – 2 tsp
- Warm water – 1 ½ cup
- Butter (soft) – 3 tbsp
- Egg white – 1
- Bread flour – 4 ½ to 5 ½cups
- Cornflour – ¼ tsp
- Water – ½ cup
- Cornstarch – 1 tsp

Method –

- In a large bowl, mix sugar, yeast, salt, and water until yeast is dissolved. Add butter, egg white, and 3 cups of flour. Mix until well blended.
- Slowly add flour, about a ¼ cup at a time, until dough is formed.
- Turn dough out onto floured board and knead for 8 minutes, adding small amounts of flour to the dough as necessary.
- Place dough in greased bowl. Turn dough over in a bowl to grease dough top. Cover and let rise for 45 minutes or until double in size.
- Punch down dough. Turn out onto lightly floured board, cover dough and let sit for another 10 minutes.
- Prepare two large baking sheets by greasing the sheets and sprinkling cornflour on them.
- Divide dough into two equal parts. Divide each half into 9 equal pieces for a total of 18 rolls. Form each dough piece into round ball and place on baking sheet, leaving about 3 inches space between rolls.Cover rolls and let rise for about 30 minutes or until double in size.
- Mix water and cornflour in small saucepan. Bring to boil and then set aside to cool to warm until rolls are finished rising.Brush rolls with cornstarch mix and cut an X on roll tops.
- If desired, sprinkle rolls with sesame or poppy seeds.
- Bake rolls at 450 F for about 15 minutes or until done.Remove from baking sheets and let cool on wire racks.
- Let rolls cool completely before bagging and freezing for later.

2.15 SOFT ROLL VARIETIES

These are made from lean yeast dough which is fairly high in fat and sugar and have soft crust.The amounts of fat and sugar vary from 6 percent to 9 percent.They're pillow soft with the most delicious flaky and buttery texture. They are commonly called dinner rolls. They can be made more sweeter by adding extra sugar. The softer and richer the bread, the more fat in the dough. This is known as rich dough. The method of preparation is straight dough method.

Few varieties of soft rolls include –

1. **Buns** –is a small, sometimes sweet, bread –based item or roll. Though they come in many shapes and sizes, they are most commonly hand –sized or smaller, with a round top and flat bottom. They are usually made from flour, sugar, milk, yeast and butter. Common sweet varieties contain small fruit or nuts, and may topped with icing or caramel, or filled with jam or cream. Some types of buns are filled with various meats, or used to serve meats (such as hotdogs or hamburgers). They are served in every dinner in Great Britain.

2. **Challah** –these are braided buns with 3 –6 braids. It is a Jewish specialty.Challah has a noticeably higher level of eggs than the other doughs on this list, which contributes to its especially golden crust and often yellowish interior crumb.

3. **Monkey Bread** –The origin of the term "monkey bread" comes from the pastry being a finger food; the consumer would pick apart the bread as a monkey would. This American bread recipe is made in a bundt cake pan to create a donut –shaped cake that's easy to pull apart. It is covered with butter and sugar and sometimes with vanilla ice cream. It can be taken as breakfast, brunch, or dessert.

4. **Brioche** –is classic French yeast very 'rich' bread. Whereas standard breads can be made only with water, flour, salt and yeast, a brioche will contain plenty eggs, milk and butter. The high fat and protein contents of these ingredients are what make the bread so special. Fresh brioche can be served with jelly or other preserves to accompany tea or coffee, or with pate or hors d'oeuvre.

5. **Croissant** –or crescent rolls are French buttery, flaky, *Viennoiserie* pastry of Austrian origin, named for its historical crescent shape. The yeast –leavened dough is layered with butter, rolled and folded several times in succession, then rolled into a sheet, in a technique called laminating. The process results in a layered, flaky texture, similar to a puff pastry. They are a common part of a continental breakfast in many European countries.

6. **Cinnamon Rolls** –are made up of flattened rich dough that has been spread with cinnamon and sugar, then rolled and sliced into glorious swirls of buttery pastry and gooey filling. They are served commonly in Northern Europe and North America. In Sweden it is called *kanelbulle*, in Denmark it is known as *kanelsnegl*, in Norway it is known as *Skillingsboller*, It is commonly eaten in breakfast or coffee break or as dessert.

7. **Sticky Buns** –These are a type of dessert or breakfast sweet roll that generally consist of rolled pieces of leavened dough — sometimes containing brown sugar or cinnamon — compressed together to form a kind of flat loaf corresponding to the size of the pan in which they are to be baked. Before the dough is placed in the baking –pan, the latter is lined with the "sticky" ingredients, such as brown sugar, honey (or both), as well as nuts and raisins and perhaps more sugar and sometimes butter. After the buns are

baked, they are inverted so that the pan lining then becomes a topping.They originated in Pennsylvania with German settlers.

Recipe of bun

Ingredients –

- Bread flour – 725 gm
- Milk/water – 400 ml
- Instant yeast – 10 gm
- Salt – 2 tsp
- Sugar – 80 gm
- Nonfat milk solids – 40 gm
- Soft butter – 40 gm
- Melted butter – 30 gm

Method –

- Combine ½ flour, yeast, sugar, salt, milk, butter, in the bowl of a stand mixer.
- Attach the dough hook and turn the mixer on to the lowest speed and mix until flour is incorporated, scraping down the sides of the bowl as necessary. Increase speed to medium and beat for 2 minutes.
- Add ½ flour and blend with the dough hook until incorporated. And another ½ flour and repeat, mixing at medium speed for another 2 minutes until a ball of dough is formed.
- Add additional flour as necessary. The dough should be slightly sticky and soft and pulling away from the edge of the bowl.
- Transfer the dough to a lightly greased bowl and cover with a towel or plastic wrap. Let rise for 30 minutes at room temperature.
- Remove the towel or plastic wrap and deflate the dough by punching down lightly.
- Pinch off pieces of the dough and form 24 rolls. Transfer the rolls to a lightly greased quarter baking sheet or 9 x 13 baking dish. Cover with a towel or plastic wrap and let rise for an additional 30 minutes at room temperature.
- Preheat oven to 375^0F. Bake the rolls for 12 to 15 minutes or until golden brown and cooked through. If the rolls are getting too brown, just tent the rolls with foil.
- Remove rolls and brush hot rolls with the melted butter. Serve immediately or store cooled rolls in a plastic bag for up to 3 days.

CHECK YOUR PROGRESS-V

1. Write a note on Hard Roll Varieties.

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2. Write a note on Soft Roll Varieties.

2.16 PAN DE SAL

It is a type of Filipino yeast –raised bread that is slightly sweet and baked as small, oval loaves. The name comes from the Spanish pan de sal, which literally means *'bread of salt*'. Pandesal is the most popular bread in the Philippines. In the sixteenth century, it was also called *"the bread of the poor"* because it was an alternative to rice during the Philippines revolution. According to the story, pan de sal was originally to be modeled on French bread, the ancestor of French baguette, made from wheat flour, baker's yeast, sugar, water and salt. It is most commonly served hot and may be eaten as is, or dipped in coffee, hot chocolate or milk. It can also be complemented with butter, margarine, cheese, jam, peanut butter, chocolate spread, or other fillings like eggs, sardines and meat.

Recipe

Ingredients –

- All –purpose flour – 4 + ½ cups
- Active dry yeast – 2 ¼ tsp
- Warm milk – 1 ¼ cup
- Salt – 1 tsp
- Sugar – ½ cup
- Canola oil – 1/3 cup
- Eggs lightly beaten – 2 large
- Bread crumbs – dusting the pandesal dough

Method –

- Stir together the warm milk, yeast and about a tbsp of the sugar in the bowl of a stand mixer. Let this mixture stand until it is foamy. In another bowl, combine 4 cups of flour and salt.
- Once the yeast mixture is foamy, add in the eggs, sugar and oil to the bowl of stand mixer. Gradually add the flour mixture, about a cup at a time while stirring with a wooden spatula or spoon. Briefly mix everything together until a shaggy dough forms.
- Attach the dough hook to the stand mixer and run the mixer on medium speed to start kneading the dough. After ten minutes of mixing, gradually sprinkle little

amounts of flour to the dough (about a tbsp at a time) to help in the kneading process. Continue to knead until the dough gathers in the center and is cleaning the sides and bottom of the bowl. This should take about 20 minutes or so and you should only have used up to ½ cup of flour. Gather the dough into a ball. Place it inside a bowl, cover with a kitchen towel and let stand in room temperature to rise for an hour, or until size is doubled. Meanwhile, line a large baking sheet with parchment paper.

- Gently deflate the dough. Divide it into 30 equal sized portions. Smooth and shape each portion into an imperfect ball, about 2 and ½ to 3 inches in size. Roll each portion of dough in the bread crumbs and place in the baking sheet. Allow little spaces in between portions. Cover the rolls with kitchen towel and let rise for 30 minutes. Preheat oven to 350 F. Bake the pandesal for 20 –25 minutes or until the top is lightly golden. Serve warm. Store leftovers in a tightly closed container at room temperature.

2.17 RYE BREAD VARIETIES

Rye, like wheat, has bread making potential and rye dough can develop; however, rye bread does not have the potential for expansion that wheat bread does. It is higher in fiber than white bread and is often darker in color and stronger in flavor.

Rye flour is also high in pentosan gums—about four times as much as wheat flour. The gums give some structure to rye breads, but they also interfere with gluten development and make rye doughs stickier than wheat doughs. Rye flour is milled much like wheat flour. The lightest rye flours, from the inner part of the kernel, have a low extraction rate, corresponding to patent flour. The following grades and types are generally available –

Light rye – The lightest is nearly white. It has a very fine texture and a high percentage of starch, with little protein.

Medium rye – This is straight flour, milled from the whole rye grain after the bran is removed. Thus, it is darker than light rye and has higher protein content.

Dark rye – Like clear flour milled from wheat, dark rye comes from the part of the rye grain closest to the bran. Thus, it is darker than other rye flours and has a lower percentage of fine starch particles.

Whole rye flour – This product is made from the whole rye kernel, including the bran and germ.

Rye meal or pumpernickel flour – Rye meal is a dark, coarse meal made from the entire ryegrain, including the bran and germ. Products labeled pumpernickel are sometimes cut intoflakes rather than ground into coarse meal. Rye meal is used for pumpernickel bread andsimilar specialty products.

Rye blend – This is a mixture of rye flour (generally 25 to 40%) and strong wheat flour,such as clear flour.

Rye will grow under much harsher conditions than wheat. In Germany and Scandinavia rye breads, either wholly rye or mixed with other grains, are eaten. In the UK, rye is little used and the somewhat bitter flavour that it imparts is in general not appreciated. The small amount of rye used is deployed in health food products, crisp breads and in making rye products to satisfy foreign tastes.Pure rye bread contains only rye flour, without any wheat, like German –style *Pumpernickel*, a dark, dense, and close –textured loaf, is made from crushed or ground whole rye grains, usually without wheat flour, baked for long periods at a low temperature in a covered tin. German *Schwarzbrot* or *black bread* and Danish *rugbrød* is made using sour dough starter. The German *Vollkornbrot* (whole –grain bread) contains both rye meal and cracked whole rye grains (which are generally soaked overnight before incorporating into the dough). There are three different types of rye crispbread– yeast fermented, sourdough fermented and cold bread crispbread. Most of the crispbread produced in Scandinavia is baked following three to four hours of fermentation. Sourdough crispbreads are used in Finland, Estonia, Latvia,[9] Lithuania, Poland, Germany and India. Jewish rye bread refers to a type of rye bread commonly made in Jewish communities and is called *sissel bread* or *cissel bread*. In Scandinavia, similar bread is made, called *limpa* also include sweeteners and/or citrus peel, as well as spices such as anise, fennel or cardamom, sometimes reserved for festive occasions.

Recipe of Pumpernickel
Ingredients –

- Warm milk – 2 cups
- Vegetable oil – 2 tbsps
- Molasses – 4 tbsps
- Bread flour – 3 ¼ cups
- Rye flour –1 ⅓ cups
- Cornmeal – ½ cup
- Salt –1 ⅓ tsps
- Active dry yeast – 2 ⅔ tsps
- Unsweetened cocoa powder – 4 tbsps
- Brown sugar –2 ⅔ tbsps

Method –

- Mix well bread flour, rye flour, cornmeal, salt, yeast, cocoa, and brown sugar. Add milk, oil, and molasses. Mix thoroughly. When mixed well enough that the dough holds together, knead by hand 15 –20 minutes.
- Cover, let rise in bowl 30 minutes. Punch down, form, and place into 9 1/2x5 inch pan. Cover with damp cloth and let rise about 1 hour.
- Bake in preheated 375 degree F (190 degrees C) oven 25 to 30 minutes, covering top with aluminum foil last 10 minutes.

2.18 CORNMEAL BREAD

Corn is perhaps the most important grain flours and meals after wheat and rye. (In Great Britain, corn is referred to as *maize*, while the word *corn* simply means "grain"). Corn contains no gluten –forming proteins, although it does contain significant quantities of other proteins, and is therefore important in vegetarian diets. Because this ingredient lacks gluten, it does not expand upon baking and often results in dense structure. Corn is most often used by the baker in the form ofblue, purple, yellow and white cornmeal (depending on the corn color itself). Blue cornmeal is also available. Most cornmeal is made from only the endosperm, because the oil in the germ becomes rancid quickly. However, whole –grain cornmeal is also available. Cornmeal is available in grinds from fine, medium, and coarse grains. Coarse cornmeal produces a crumbly, somewhat gritty texture in cornbreads, a quality that is desirable in some products. In India it is caked *"Makke ka atta"*.
Cornbreadscan be made in two types– Rich cornbreads made without flour that use eggs to bind the bread and temper the cornmeal and baking soda to raise it and those that have about equal amounts of cornmeal and flour like in corn yeast breads such as muffins, cakes, spoon bread and for lining the bottom of baking pans when baking bread, pizzas, focaccia, etc. Cornbreads tend to be crumbly in texture and do not keep well. .

Recipe of corn bread
Ingredients –

- Cornmeal –1 cup (120g)
- All –purpose flour –1 cup (125g)
- Baking powder –1 tsp
- Baking soda – ½ tsp
- Salt –1/8 tsp
- Unsalted butter, melted and slightly cooled – ½cup (115g)
- Light or dark brown sugar –1/3 cup (67g)
- Honey –2 tbsps (30ml)
- Egg, at room temperature –1 large
- Buttermilk, at room temperature –1 cup (240ml)

Method –

- Preheat oven to 400°F (204°C). Grease and lightly flour an 8 or 9 –inch square baking pan. Set aside.
- Whisk the cornmeal, flour, baking powder, baking soda, and salt together in a large bowl. Set aside. In a medium bowl, whisk the melted butter, brown sugar, and honey together until completely smooth and thick. Then, whisk in the egg until combined. Finally, whisk in the buttermilk. Pour the wet ingredients into the dry ingredients and whisk until combined. Avoid over –mixing.
- Pour batter into prepared baking pan. Bake for 20 minutes or until golden brown on top and the center is cooked through. Use a toothpick to test. Edges should be crispy at this point. Allow to slightly cool before slicing and serving. Serve cornbread with butter, honey, jam, or whatever you like.

- Wrap leftovers up tightly and store at room temperature for up to 1 week.

Recipe of corn muffin
Ingredients –

- Cornmeal – (150 gms or 5 1/3 ounces) 1 cup
- All –purpose flour – (140 gms or 5 ounces) 1 cup
- Sugar, optional – (50 gms or 1 3/4 ounces) ¼ cup
- Baking powder – 1 tbsp
- Salt – 3/4 tsp
- Milk (whole or 2%) – 1 cup
- Vegetable or canola oil – 1/3 cup
- Large eggs –2

Method –

- Preheat the oven to 425°F. Spray 12 regular –size muffin cups with butter. Set aside.
- In a large bowl, whisk together the cornmeal, flour, sugar, baking powder and salt.
- In a 2 cup measure, measure the milk, then the oil. Add the eggs and whisk to mix.
- Pour the wet ingredients over the dry ingredients and stir just until it is mostly mixed. Some lumps are fine.
- Fill the cups 7/8 full (almost full). Bake for 12 to 14 minutes until lightly
- Can be stored for 1 –2 days at room temperature and for 1 week in refrigerator.

CHECK YOUR PROGRESS-VI

1. Write a note on Rye Bread Varieties.

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2. Write a note on Cornmeal Bread.

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2.19 WHOLE WHEAT BREAD

Whole wheat bread or wholemeal bread or whole grain bread or graham flouris a type of bread made using flour that is partly or entirely milled from whole or almost – whole wheat grains, see whole –wheat flour and whole grain. It is called wheat flour to distinguish it from rye flour, corn flour, oat flour, or rice flour. It is one kind of *brown bread*. The exact composition of products legally marketable as "whole wheat bread" varies from country to country and even within one country. In some cases, the bread is made with whole –grain flour that contains all of the component parts of the grain in the same ratios as they occur in nature, whereas in other cases the bread may include only representative amounts of bran or wheat germ. It is a healthier alternative, because whole wheat flour has a lot more fiber and nutrition than the more processed white flours. In Canada, for example, a proportion of the wheat germ may be removed from the flour to reduce the risk of rancidity, but the term "whole –wheat bread" is still used. Whole wheat is much higher in fiber, vitamins B6 and E, magnesium, zinc, folic acid and chromium with respect to its partner whole white bread which contains fewer nutrients. Whole wheat flour does not keep as long as white flour because of the fat contained in the wheat germwhich easily oxidizes to rancid off flavors. Bread made from whole wheat flour is heavier than bread made with white flour, so most of the time, a combination is used. Whole wheat bread requires a shorter fermentation time due to the enzyme activity in the germ of the wheat grain, and the higher water content in the dough. Whole wheat bread doughs are less cohesive and resilient than those made with bread flour, and 100 percent whole wheat bread is denser and coarser than white bread. It is also darker in color and stronger in flavor.

Recipe

Ingredients –

- Whole wheat flour – 2 ½cups
- Instant dry yeast – 1 tbsp
- Sugar – 2 tbsp
- Salt – 3/4 tsp
- Olive oil – 2 tbsp
- Whole wheat flour – for sprinkling
- Butter – for brushing

Method –

- To make whole wheat bread, combine the yeast, sugar and ¼ cup of warm water in a bowl, cover it with a lid and keep aside for 10 minutes.
- Combine the whole wheat flour, salt and yeast –sugar mixture in a deep bowl, mix well and knead into soft dough using enough warm water.
- Add the olive oil and knead very well till the dough is smooth.
- Shape the dough into a proper round using both your hands while tucking the edges at the bottom.
- Cover it with a dry muslin cloth and keep aside in a warm place for 45 minutes or till the dough is double in size.

- Sprinkle the whole wheat flour over a smooth, flat surface, place the dough over it and knead it very well using both your hands. If the dough is getting sticky while kneading, then sprinkle little whole wheat flour as required.
- Tap the dough with your fingers and spread it to make a 250mm. x 200 mm. (10" x 8") diameter oval shape.
- Roll the dough to make a 200 mm. (8") long cylindrical roll and place it in a greased bread loaf tin. Cover it with a dry muslin cloth and again keep aside in a warm place for 30 minutes.
- Bake it in a pre –heated oven at 200°C (400°F) for 10 minutes.
- Lower the temperature to 180°C (360°F) and bake it for 30 minutes.
- Brush the whole wheat bread loaf with butter and keep aside to cool slightly.
- Once the whole wheat bread loaf is slightly cooled, de –mould it and keep aside to cool completely.
- Once the whole wheat bread loaf has cooled completely, cut it into desired slices.
- Serve or use the whole wheat bread as required.

2.20 RAISIN BREAD

This is a soft roll variety in which is made with straight dough method with raisins and sometimes flavoured with cinnamon. Apart from white flour, this bread can be made with other flours such as all –purpose flour, oat flour, or whole wheat flour. It is said that this particular bread was prepared by appeared in Henry David Thoreau in Concord, Massachusetts and the recipe was published in 1671 and was widely appreciated throughout Europe. *Stollen*of Germany is a Christmas cake, *Kulich* was Easter bread made in Russia and *Panettone*was made in Italy. It has become a popular tea recipe of Europe, particularly England. In the 1920s, raisin bread was advertised as *"The Bread of Iron"*, due to the high iron content of the raisins. It can be also eaten in many forms, including being served toasted for breakfast *"raisin toast"* or made into sandwiches.Some restaurants serve raisin bread with their cheeseboards

Recipe
Ingredients –

- Active dry yeast – 2 ¼ tsp
- Warm water – ¼ cup
- Raisins – 1 cup
- Butter (softened) – ¼ cup
- Granulated sugar – ¼ cup
- Salt – ½ tsps
- Milk (warm) – ½ cup
- All –purpose flour (divided) 3 ¾ cups
- Large eggs (beaten) – 2

Method –

- Dissolve the yeast in the warm water.


Society
90-YEAR-OLD HERMIT OF EAST SIDE RECALLS SHOOTING BEARS AND WOLVES IN PORTLAND
CHANCE TO STUDY GIVEN
The Iron Food for Vitality
The Bread of Iron
Davidson's
Raisin Bread
It's chuck full of raisins—makes delicious toast and fine sandwiches
SUN-MAID RAISINS

- In a large bowl, combine the raisins, butter, sugar, salt, and warm milk; stir to dissolve the sugar. Let the mixture cool to lukewarm.
- Stir 1 ½ cups of the flour into the milk mixture and beat until smooth.
- Add the yeast mixture and the beaten eggs to the milk mixture and mix to blend well.
- Add enough of the remaining flour to make soft but stiff dough.
- Turn the dough out onto a lightly floured surface and knead for about 10 minutes, or until the dough is smooth and elastic.
- Butter or oil a large bowl. Place the dough in the greased bowl. Turn it over to grease the entire surface of the dough.
- Cover the bowl with a clean kitchen towel and let it stand in a warm, draft – free place until it has doubled in bulk, about 1 to 1 ½ hours.
- Punch the dough down and divide it into two equal portions. Cover the dough with a kitchen towel and let it rest for 10 minutes.
- Shape the dough into two loaves and place them in two greased 8 –by –4 – inch loaf pans.
- Cover the pans with a kitchen towel and let the loaves rise for about 45 to 60 minutes, or until the dough has almost doubled in bulk.
- Bake at 375^0F for 25 minutes. Place foil over the loaves for the last 10 minutes if they look overly brown.
- Remove the loaves from the pans and let them cool on racks.

2.21 CHEESE BREAD

Cheese bread or bun may be referred to variety of small, baked, cheese –flavored rolls, a popular snack and breakfast food in U S A and South America. In countries where the snack is popular, it is inexpensive and often sold from street vendors, in snack shops, and in grocery stores. The bread was created by accident when CoraliaHarn of Stella's Bakery simply mixed the *Empanada* (Indian gujia type snacks) filling into bread dough.This bread quickly became an important part of Madison's food culture and quickly spread across the continents. It was named by the Wisconsin state journal as one of 30 plates that define

Madison. Today, the bread is made with brioche –like yeasted dough, mixed with cheese and topped with crushed hot red peppers.It may also contains chives and parsley.The bread is often eaten as snack bread, pulled apart and eaten while walking around the farmers market. It is called *Almojábana* –throughout South America, *Chipa* –Paraguay, *Chipá* –Argentina, *Cuñapé* –Bolivia, Pandebono –Colombia, *Pan de queso* –Colombia, *Pan de yuca* –Colombia and Ecuador, *Pão de queijo* –Brazil.The type of cheese varies according to preference or availability. The most used are mozzarella, cheddar and parmesan.

Recipe

Ingredients –

- All –purpose flour – 1 ¾ cups
- White sugar – ¼ cup
- Baking powder – 2 ½ tsps
- Salt – ¾ tsp
- Shredded cheddar cheese – 1 cup
- Garlic powder – ½ tsp
- Minced herbs – ¼ cup (parsley and chives)
- Egg – 1 beaten
- Milk – ¾ cup
- Vegetable oil – ⅓ cup

Method –

- Preheat oven to 400^0F (200^0C). Lightly grease a 9x5 inch loaf pan.
- In a large bowl, mix together flour, sugar, baking powder, salt and cheese. In another large bowl, beat together egg, milk and oil. Stir the flour/cheese mixture/ garlic/minced herb into the egg mixture, stirring until just moistened. Pour batter into prepared pan.
- Bake in preheated oven for 35 minutes, until a toothpick inserted into center of loaf comes out clean.

CHECK YOUR PROGRESS-VII

1. Write a note on Raisin Bread.

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2. Write a note on Cheese Bread.

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2.22 INDIGENOUS BREADS OF INDIA

Indian breads have found place in history since the Vedic period, thousands of years back. There are mentions of popular "Paratha" which loosely translates to stuffed bread offered to the Devas (Indian Gods) during religious rituals. One of the most famous Hindu epics written by Tulsidas in the 16th century the Ramayana, mentions the word "Roti" in quite a few verses. Even the literature of South India has mentions various types of breads in their various texts. For Indian no meal is complete until these are served along with and in some parts it is the staple food of the people.

When it comes to bread, we immediately tend to imagine French or Italian bakeries or English bakeries with hot loaves baking in the oven. All Indians have accepted these breads as an intrinsic part of our culture albeit in different forms and in their daily food habits.

Indians relish on its own brand of different types of indigenous breads called in different dailects as chapati, roti, phulka, paratha, naan, Kulcha, poori, luchi, appam, bati, bakshalu, adai, bhatoora etc.

- **Roti** – is a flatbread made from wholemeal flour, traditionally known as atta. It is also called *Chapati* or *Phulka*. The beauty of roti's is that they can be eaten with anything.*Thalipeeth* is multi –grain bread flat bread made from roasted tapioca, Rajgira, coriander seeds, cumin seeds, wheat, and rice. *Tandoori roti* is prepared in tandoor. *Joladarotti* is an unleavened Indian bread made out of jowar, originating from state of North Karnataka. It is coarser than a roti and can be either soft or hard in texture. *Sheermal* is a saffron – flavored traditional flatbread made in India. It is one of the special preparations of the cities of Lucknow and Hyderabad in India.*Pathiri* is a soft chapati like bread made of rice flour. • It is part of the local cuisine of coastal Malabar region in Southern India.*Roomali roti* is a thin flatbread originating from the Indian subcontinent, popular in India and in Punjab and Delhi. It is eaten with tandoori dishes.

- **Paratha** – Paratha is a flat, thick piece of unleavened bread fried on a griddle. Parathas come in two primary forms– plain or stuffed. They are famous in North India and

served with butter, pickle and yogurt. Tandoori paratha is prepared in tandoor which has spiral flakes (Lachchha paratha). Bhakri – Hard and crisp, it is unleavened bread made with flour and is popular in Maharashtra, Goa and Gujarat.*Thepla* is a flatbread similar to paratha, made of whole wheat flour, oil and spice powders like turmeric, red chili powder etc.It is soft and has a longer shelf life than most bread.

- **Luchi or poori** – flat deep fried bread made of either whole wheatflour or refined wheat flour (maida). This is widely eaten and can be eaten with any kind of dal or vegetable.*Kachori*is thicker than poori and is stuffed with a variety of ingredients like peas, onion, potato, mawa etc. Its close cousin is Bengali *Radhabalabhi* which is also a type of stuffed poori, but is thinner than kachori.*Bhatura* is Deep fried crispy leavened bread much larger in size than poori served with Chhole.Bedmi – urad dal stuffed poori generally eaten with potato curry in breakfast in Northern India.

- **Baati** – Baati is hard, unleavened bread cooked in state of Rajasthan, and in some parts of state of Madhya Pradesh and Gujarat. Baati is always eaten with dal. Similar to this is *Litti*, which is stuffed with *Sattu* (roasted chana and roasted jowar ground together) and cooked in live charcoal and eaten with *chokha* (spiced mashed brinjal)

- **Puran Poli** – It is stuffed pan fried flat bread with a sweet filling made from skinned split bengal gram /chana dal and jaggery. Sweet filling is puran and bread is called as poli. Similarly *Makuni* is flat bread stuffed with Sattu and pan fried.*Bakshalu* is moong dal stuffed sweet Indian flat bread from Telengana. *Thepla* are flatbreads made from fresh fenugreek leaves, whole wheat flour and gram flour (besan).

- **Taftan** – is leavened flour bread from Iranian origin and popular Mughlai bread made with eggs, flour, saffron, spices and kneaded in milk. *Bakarkhani* is a leavened bread and has a biscuit like texture. It is mildly spiced, is sweet and is flavoured with saffron.*Naan* – oven –baked elongated shaped leavened flat bread made from maida.*Girda or khameeri*is soft leavened bread from Kashmir.

BAKERY BREADS OF INDIA

White Breads: It is the most popular and common bread with 400g or 800g packs.White bread is made up from wheat flour minus the bran and the germ. White breads are the later fortified with minerals and vitamins. These breads are sold as whole uncut packs or sliced into pieces.

Whole wheat grain bread or Brown Bread: Whole wheat bread contains the bran and germ which are not segregated as in white bread hence it has got better nutritional value.It is brownish colour because it contains the outer pericarp and aleurone layers of the wheat grain.

Sandwich bread: It is white bread with larger dimensions .These meant for the commercial use of sandwiches for hotels, restaurants and offices.School children also prefer these types of breads.

Flavoured Breads: Bread Manufacturers with a view to local taste add flavours, spices to match the palate, creating varieties such as daliya,basil, garlic, onion, or cinnamon.

Paav: Indian equivalents to burger buns.Pav or pao are basically a small loaf of bread, introduced by the Portuguese in India. These are very popular in city of Mumbai (vada pav) and pavbhaji. These are breads made with whole –wheat flour instead of refined wheat flour. They are brown in colour outside as well as inside, but as fluffy as the white bread.*Bombay bundt bread* is the specialty of Mumbai. This bread is flower in shape prepared in Bundt pan. The center of this bread is filled with bhaji (curry) and served.

Exotic Breads: Retail bakery chains are promoting exotic breads with chefs brought from Europe or Latin America.Baguettes, rolls, paninis, ciabattas, multi –grain bread, croissants, foccaccias, organic breads and gluten–free breads.

Fruity Bread: Some bread manufacturers attract kids with their own style of breads filled with tutti fruity bits, chocolate chips and soft candies.

Recipe of Bombay Bundt bread

Ingredients –

- Refined flour – 2 cups
- Salt – 1 tsp
- Sugar – 1 tbsp
- Warm milk – 3/4 cup
- Fresh cream – ¼ cup
- Milk powder – 7 tbsps
- Canola oil – 2 tbsp

Yeast mixture

- Yeast – 2 tbsps
- Warm water – 1 tbsp
- Sugar – 1 tsp

Milk and butter mixture for the golden crust

- Milk – 1 tbsp
- Salted butter – 2 tbsps

Method –

- Firstly, in a small bowl, put the yeast with one tbsp warm water and one tsp sugar. Let rest for 5 mins (yeast mixture).
- In a big bowl, put the flour, salt, sugar, and milk powder. Mix well.
- Make a well in the center of the dry ingredients. Add the warm milk, fresh cream, one tbsp of canola oil and the yeast mixture. Mix well.

- Bring the mixture onto a flat surface and knead well for 5 –7 minutes.
- Add the remaining tbsp of oil and knead well (3 –4 mins) until the dough is soft and smooth.
- Cling wrap the dough and keep in a warm place for about an hour. The dough should double in size. Punch the dough and knead for about a minute. Form round balls and place in a greased bundt pan. Make sure the pan is well greased with butter or oil.
- Keep this in a warm place and let it rise again. Once double in size make a mixture of butter and warm milk and apply onto the dough using a brush. This gives the bread a golden brown crust.
- Cover the bundt baking dish with foil and bake in a preheated oven at 400^0F (200^0C) for 25 to 30 minutes.
- Once baked, brush on some butter and serve.

Recipe of Fruit bread
Ingredients –
For The yeast batter:

- Strong white bread flour – 100 gms
- Yeast – 5 gms
- Sugar – 1tsp
- Lukewarm milk – 250ml
- For the dough:
- Strong white bread flour – 350 gms
- Unsalted butter – 50 gms
- Sugar – 50 gms
- Salt – ½tsp
- Cashew nuts – 25 gms
- Pistachio – 25 gms
- Almonds – 25 gms
- Walnuts – 25 gms
- Raisins – 25 gms
- Sultanas – 25 gms
- Sweetened dried apple/cranberries – 25 gms
- Chopped dates – 25 gms
- Cinnamon powder – ½tsp
- Egg – 1 no

Method –

- Chop all nuts and dried fruits (except raisins and sultanas) into same size bits.
- Mix together flour, yeast and sugar under the yeast batter. Now slowly beat in the milk to make a smooth batter.
- Cover with foil and leave for about 20 minutes until frothy.
- In a separate large bowl, mix in flour and salt. Rub in the butter.
- Mix in cinnamon powder, sugar and fruits.

- Beat the eggs. Mix it to the yeast batter. Mix in the flour and fruit mixture. Use a spatula to mix in the dough thoroughly.
- Knead the dough, add if necessary little flour, until it is smooth and no longer sticky.
- Cover with foil and leave it in the bowl, in a warm place for about 50 –60 minutes, until risen and doubled in quantity.
- Butter a 900 gram loaf tin. Spread the dough evenly. Do not press down. Only fill till three –quarters, as it will rise.
- Set the oven temperature to 200^0C/400^0F/Gas Mark 6. Bake in the centre of the oven for 20 minutes.
- Now loosely cover with foil sheet and bake for another 25 minutes. To check if loaf is cooked, take a skewer, pierce it through the middle, and if it comes out dry then it is done. If the skewer returns with moist dough, then it needs at least 10 –15 minutes more.
- Remove from the oven. Allow to cool completely. Slice and serve.
- Serve with tea or coffee.

Recipe of Multi –grain bread

Ingredients –

- Wheat flour–2cups
- Ragi (nachni / red millet) flour –¼ cup
- Jowar (white millet) flour –¼ cup
- Bajra (black millet) flour –¼ cup
- Powdered flaxseeds (alsi) –1 tbsp
- Sesame seeds (til) –1 tsp
- Melon seeds (charmagaz) –1 tsp
- Quick cooking rolled oats –1 tsp
- Gluten powder – ¼ tsp
- Calcium propionate powder – a pinch
- Salt –1 tsp
- Instant dry yeast –1 tbsp
- Castor sugar –1 tbsp

Be mixed into a topping

- Wholeragi (nachni / red millet) – ½tsp
- Bajra (black millet)– ½tsp
- Quick cooking rolled oats –1 tsp
- Flax seeds – ½tsp

Method –

- To make multigrain bread, combine the yeast, sugar and ¼ cup of warm water in a bowl and mix well. Cover it with a lid and keep aside for 10 minutes.
- Combine all the remaining ingredients along with the yeast –sugar mixture in a deep bowl, mix well and knead into loose sticky dough using approx. 1 ½ cups of warm water.

- Place the dough in a greased bread loaf tin of 200 mm. (8”). Wet your fingers and press the dough lightly to spread it evenly.
- Sprinkle the prepared topping evenly over it, cover it with a dry muslin cloth and keep aside in a warm place for 30 minutes.
- Bake it in a pre –heated oven at 210°C (420°F) for 20 minutes.
- Lower the temperature to 160°C (320°F) and bake it for 10 minutes. Keep aside to cool slightly.
- Once the bread loaf has cooled slightly, de –mould it and cut it into 13 mm. (½”) bread slices.
- Serve the multigrain breador use as required.

CHECK YOUR PROGRESS-VIII

1. Write a note on Indian Breads.

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2. Write a note on Indian Baked Breads.

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2.23 MIDDLE EASTERN PITA BREAD

Pita or pitta, is most widely consumed bread belonging to a family of yeast –leavened round flatbreads baked from wheat flour, common in the Mediterranean, Middle East, and neighboring areas. This is referred to inArabic simply as *khubz*, meaning “bread”. It is a soft, moist and light bread that is made from all –purpose flour, whole wheat flour, sugar, warm milk, salt with or without instant yeast. This bread with very little leavening that puffs up spectacularly like an odd –looking balloon after a few minutes in a hot oven over stone or skillet or griddle on stove. It is a one of the prehistoric flatbreads of the Middle

East with evidence from about 14,500 years ago, during the Stone Age in Jordan. Today it isserved with meals whole, or cut or broken into wedges for dipping into local sauces or dips, such as *babaghanoush* or *hummus*. Sometimes the pocket breads are stuffed with meats, *falafel* topped with *tahini* sauce, or as wrap for *kebabs* and *gyros*with ingredients to create a sandwich.It can also be cut and baked into crispy pita chips.Traditional pitta bread is made by a sour dough process but it can bemade using manufactured yeast. If the sour dough process is used, arelatively large portion of sour dough (approximately 20%) is used, giving a more rapid fermentation than most sour dough products.

Recipe
Ingredients –
For sour dough

- Fresh compressed yeast –15 gms or 2tbsp
- Granulated sugar –1 tbsp
- Luke warm water –1 ½ cups (360 ml)
- Bread flour –400 gms

For dough

- Luke warm water –1 ½ cups (360 ml)
- Salt –20 gms or 4 tsp
- Olive oil –1⅓ cup (80 ml)
- Bread flour –570 gms

Method –

- To make the sponge, dissolve the yeast and sugar in the warm water, then add the bread flour. Mix until well blended and smooth, then cover and let stand in a warm place until the sponge has doubled in bulk, approximately 30 minutes.
- To make the dough, add the warm water to the sponge together with the salt, olive oil, and all but a handful of the bread flour. Knead, using the dough hook on low speed, until the dough forms a smooth and elastic ball, about 8 minutes.
- Place the dough on a worktable and knead in as much of the reserved flour by hand as needed to prevent the dough from being sticky.Work the dough into a firm ball and place in a lightly oiled bowl. Turn to coat with oil, then cover and let proof in a warm place for 1 ½ hours.
- Punch down the dough and divide into 16 equal pieces about 4 ounces (115 g) each.
- Shape the pieces into tight round balls. Cover and set aside on a floured surface for 30 minutes to let the dough proof and the gluten relax.
- Before starting to form the breads, preheat the oven to 475°F (246°C). Flatten and roll out each ball of dough to a 7 –inch (17.5 –cm) disk, using flour to prevent it from sticking. There should not be any wrinkles or cuts in the dough that can prevent the pitas from forming pockets as they bake. Lay the dough rounds on floured towels or baking pans after rolling them.
- Let stand at room temperature until they have puffed slightly.

- Starting with the breads rolled out first, use a floured peel to slide 4 pitas at a time directly onto the hearth of the oven. Bake for approximately 4 minutes or until light golden brown on the bottom. The breads should puff up halfway through baking. If the breads become too dark on the bottom before they are firm on the top, lower the heat slightly. Place on wire racks to cool. Cover with a dry towel if you would like to keep the crust soft. Bake the remaining pita breads in the same way.

- Once the breads have cooled, if they are not to be served right away, wrap them in plastic to keep them flexible. Freeze for longer storage.

CHECK YOUR PROGRESS-IX

1. Write the recipe of Pita bread.

2.24 SUMMARY

In this unit we have learnt about the various methods of making bread and various types of bread like White Pan Bread; Pullman, Split-top, and Round Split Breads; French and Italian Breads and Rolls; Vienna Bread; Bolillos; Pan de Agua; Egg Bread and Rolls; Hard

Roll Varieties; Soft Roll Varieties; Pan de Sal; Rye Bread Varieties; Cornmeal Bread; Whole Wheat Bread; Raisin Bread; Cheese Bread; Indigenous Breads of India; and Middle Eastern Pita Bread.

2.25 GLOSSARY

Aroma– when bread is smelled, close to the nose, while inhaling deeply, the aromatic sensation experienced is described as bread aroma.

Baati – Baati is hard, unleavened bread cooked in state of Rajasthan, and in some parts of state of Madhya Pradesh and Gujarat. Baati is always eaten with dal. Similar to this is Litti, which is stuffed with Sattu (roasted chana and roasted jowar ground together) and cooked in live charcoal and eaten with chokha (spiced mashed brinjal)

Break and shred– break and shred should be high and fairly smooth, not excessive or rough or bulging.

Brioche –is classic French yeast very 'rich' bread. Whereas standard breads can be made only with water, flour, salt and yeast, a brioche will contain plenty eggs, milk and butter. The high fat and protein contents of these ingredients are what make the bread so special. Fresh brioche can be served with jelly or other preserves to accompany tea or coffee, or with pate or hors d'oeuvre.

Buns –is a small, sometimes sweet, bread –based item or roll. Though they come in many shapes and sizes, they are most commonly hand –sized or smaller, with a round top and flat bottom. They are usually made from flour, sugar, milk, yeast and butter. Common sweet varieties contain small fruit or nuts, and may topped with icing or caramel, or filled with jam or cream. Some types of buns are filled with various meats, or used to serve meats (such as hotdogs or hamburgers). They are served in every dinner in Great Britain.

Challah –these are braided buns with 3 –6 braids. It is a Jewish specialty.Challah has a noticeably higher level of eggs than the other doughs on this list, which contributes to its especially golden crust and often yellowish interior crumb.

Cinnamon Rolls –are made up of flattened rich dough that has been spread with cinnamon and sugar, then rolled and sliced into glorious swirls of buttery pastry and gooey filling. They are served commonly in Northern Europe and North America. In Sweden it is called kanelbulle, in Denmark it is known as kanelsnegl, in Norway it is known as Skillingsboller, It is commonly eaten in breakfast or coffee break or as dessert.

Croissant –or crescent rolls are French buttery, flaky, Viennoiserie pastry of Austrian origin, named for its historical crescent shape. The yeast –leavened dough is layered with butter, rolled and folded several times in succession, then rolled into a sheet, in a technique called laminating. The process results in a layered, flaky texture, similar to

a puff pastry. They are a common part of a continental breakfast in many European countries.

Crumb color– bright white or slightly creamy.

Crust color– well –developed golden –brown color, smooth and even.

Crust surface– side walls and top crust should be smooth and should not contain holes or pits.

Dark rye – Like clear flour milled from wheat, dark rye comes from the part of the rye grain closest to the bran. Thus, it is darker than other rye flours and has a lower percentage of fine starch particles.

Exotic Breads: Retail bakery chains are promoting exotic breads with chefs brought from Europe or Latin America.Baguettes, rolls, paninis, ciabattas, multi –grain bread, croissants, foccaccias, organic breads and gluten–free breads.

Flavor– slightly sweet, yeasty and aromatic flavor of baker's yeast mixed in flour –and – water dough. Strong and sharp fermentation flavors are not desired.

Flavoured Breads: Bread Manufacturers with a view to local taste add flavours, spices to match the palate, creating varieties such as daliya,basil, garlic, onion, or cinnamon.

Fruity Bread: Some bread manufacturers attract kids with their own style of breads filled with tutti fruity bits, chocolate chips and soft candies.

Grain– small (tight) cells, very thin cell walls, fine and uniform cell size distribution in center, elongated and fine cells around perimeter.

Light rye – The lightest is nearly white. It has a very fine texture and a high percentage of starch, with little protein.

Loaf volume– good loaf volume with optimum oven spring. Sufficient rise renders proper break and shred.

Luchi or poori – flat deep fried bread made of either whole wheatflour or refined wheat flour (maida). This is widely eaten and can be eaten with any kind of dal or vegetable.Kachoriis thicker than poori and is stuffed with a variety of ingredients like peas, onion, potato, mawa etc. Its close cousin is Bengali Radhabalabhi which is also a type of stuffed poori, but is thinner than kachori.Bhatura is Deep fried crispy leavened bread much larger in size than poori served with Chhole.Bedmi – urad dal stuffed poori generally eaten with potato curry in breakfast in Northern India.

Medium rye – This is straight flour, milled from the whole rye grain after the bran is removed. Thus, it is darker than light rye and has higher protein content.

Monkey Bread –The origin of the term "monkey bread" comes from the pastry being a finger food; the consumer would pick apart the bread as a monkey would. This American bread recipe is made in a bundt cake pan to create a donut –shaped cake that's easy to pull apart. It is covered with butter and sugar and sometimes with vanilla ice cream. It can be taken as breakfast, brunch, or dessert.

Mouth feel– moist and soft (dry or gummy mouth feel are not desired).

Paav: Indian equivalents to burger buns.Pav or pao are basically a small loaf of bread, introduced by the Portuguese in India. These are very popular in city of Mumbai (vada pav) and pavbhaji. These are breads made with whole –wheat flour instead of refined wheat flour. They are brown in colour outside as well as inside, but as fluffy as the white bread.Bombay bundt bread is the specialty of Mumbai. This bread is flower in shape prepared in Bundt pan. The center of this bread is filled with bhaji (curry) and served.

Paratha – Paratha is a flat, thick piece of unleavened bread fried on a griddle. Parathas come in two primary forms– plain or stuffed. They are famous in North India and served with butter, pickle and yogurt. Tandoori paratha is prepared in tandoor which has spiral flakes (Lachchha paratha). Bhakri – Hard and crisp, it is unleavened bread made with flour and is popular in Maharashtra, Goa and Gujarat.Thepla is a flatbread similar to paratha, made of whole wheat flour, oil and spice powders like turmeric, red chili powder etc.It is soft and has a longer shelf life than most bread.

Puran Poli – It is stuffed pan fried flat bread with a sweet filling made from skinned split bengal gram /chana dal and jaggery. Sweet filling is puran and bread is called as poli. Similarly Makuni is flat bread stuffed with Sattu and pan fried.Bakshalu is moong dal stuffed sweet Indian flat bread from Telengana. Thepla are flatbreads made from fresh fenugreek leaves, whole wheat flour and gram flour (besan).

Roti – is a flatbread made from wholemeal flour, traditionally known as atta. It is also called Chapati or Phulka. The beauty of roti's is that they can be eaten with anything.Thalipeeth is multi –grain bread flat bread made from roasted tapioca, Rajgira, coriander seeds, cumin seeds, wheat, and rice. Tandoori roti is prepared in tandoor. Joladarotti is an unleavened Indian bread made out of jowar, originating from state of North Karnataka. It is coarser than a roti and can be either soft or hard in texture. Sheermal is a saffron – flavored traditional flatbread made in India. It is one of the special preparations of the cities of Lucknow and Hyderabad in India.Pathiri is a soft chapati like bread made of rice flour. • It is part of the local cuisine of coastal Malabar region in Southern India.Roomali roti is a thin flatbread originating from the Indian subcontinent, popular in India and in Punjab and Delhi. It is eaten with tandoori dishes.

Sandwich bread: It is white bread with larger dimensions .These meant for the commercial use of sandwiches for hotels, restaurants and offices.School children also prefer these types of breads.

Sticky Buns –These are a type of dessert or breakfast sweet roll that generally consist of rolled pieces of leavened dough — sometimes containing brown sugar or cinnamon — compressed together to form a kind of flat loaf corresponding to the size of the pan in which they are to be baked. Before the dough is placed in the baking –pan, the latter is lined with the "sticky" ingredients, such as brown sugar, honey (or both), as well as nuts and raisins and perhaps more sugar and sometimes butter. After the buns are baked, they are inverted so that the pan lining then becomes a topping.They originated in Pennsylvania with German settlers.

Tactile crumb texture– smooth and silky feel. Crumb should be resilient when pressing lightly with the fingers.

Taftan – is leavened flour bread from Iranian origin and popular Mughlai bread made with eggs, flour, saffron, spices and kneaded in milk. Bakarkhani is a leavened bread and has a biscuit like texture. It is mildly spiced, is sweet and is flavoured with saffron.Naan – oven –baked elongated shaped leavened flat bread made from maida.Girda or khameeriis soft leavened bread from Kashmir.

Uniformity of shape– symmetrical with a rounded top (flat top and irregular shapes are not desired). Loaf should retain a straight and upright position. Keyholing, collapsing, flat top and uneven shape are considered defects.

White Breads: It is the most popular and common bread with 400g or 800g packs.White bread is made up from wheat flour minus the bran and the germ. White breads are the later fortified with minerals and vitamins. These breads are sold as whole uncut packs or sliced into pieces.

Whole rye flour – This product is made from the whole rye kernel, including the bran and germ.

Whole wheat grain bread or Brown Bread: Whole wheat bread contains the bran and germ which are not segregated as in white bread hence it has got better nutritional value.It is brownish colour because it contains the outer pericarp and aleurone layers of the wheat grain.

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2.28 TERMINAL QUESTIONS

1. Explain Straight dough method of making bread.
2. Write a note on Characteristics of a quality bread and bread roll.
3. Explain various causes of bread related to crust.
4. Explain various causes of bread related to texture and crumb.
5. Explain various causes of bread related to shape of bread.
6. Explain various causes of bread related to texture and crumb.
7. Explain various causes of bread related to flavor of bread.
8. Explain various causes of bread related to storage of bread.
9. Write a short note on ‘The Pullman loaf’.
10. Write a note on ‘Round Split Bread’.
11. Write the recipe of pan de agua.
12. Write the recipe of bolillo.
13. Write a note on Hard Roll Varieties.
14. Write a note on Soft Roll Varieties.
15. Write a note on Rye Bread Varieties.
16. Write a note on Cornmeal Bread.
17. Write a note on Raisin Bread.
18. Write a note on Cheese Bread.
19. Write a note on Indian Breads.
20. Write a note on Indian Baked Breads.
21. Write the recipe of Pita bread.

UNIT: 03
SWEET YEAST DOUGH PRODUCTS

STRUCTURE

3.1 INTRODUCTION

Dough is a thick, malleable, sometimes elastic paste made out of any grains, leguminous or chestnut crops. Dough is typically made by mixing flour with a small amount of water and/or other liquid, and sometimes includes yeast or other leavening agents as well as other ingredients such as various fats or flavorings.

The process of making and shaping dough is a precursor to making a wide variety of foodstuffs, particularly breads and bread –based items, but also including biscuits, cakes, cookies, dumplings, flatbreads, noodles, pasta, pastry, pizza, piecrusts, and similar items. Doughs are made from a wide variety of flours, commonly wheat but also flours made from maize, rice, rye, legumes, almonds, and other cereals and crops used around the world.

3.2 OBJECTIVE

After reading this unit the learner will be able to:

- Write recipe of Danish Pastry
- Define rich dough products
- Explain Coffee cake dough products
- Know about Specialty rolls and yeast –raised cakes
- Identify and resolve Common problems with doughnuts and crullers

3.3 RECIPE FOR RICH DOUGH

Basic sweet yeast dough is enriched dough, also known as rich dough. This means that the dough is made with fat, sugar, and sometimes eggs, as opposed to lean doughs that do not have any fat present. The addition of fat to yeast dough creates bread that tends to have a softer crust and less chewy crumb and is more flavorful in general. Danish, croissant, cinnamon roll or a Jewish challah, Baba, Hot cross buns, Brioche are some of the sweet yeast dough products.

Common recipes that create rich dough: Adding in different amounts and ingredients, like eggs and butter, can turn rich dough into a variety of breads: Add oil and you have challah or cinnamon roll; add butter and swap the water for milk, and you are on your way to glorious brioche; add a touch more sugar and a sweet filling or glaze and you've got sticky buns or sugary breakfast rolls; fold in butter results in laminated dough for making different products. Sometimes using the same base dough and simply filling or shaping it differently can result in an entirely different product. The basic sweet yeast dough recipe uses the Modified Straight Dough Method, which is a method for mixing rich yeast dough.

This method ensures even distribution of the fat and sugar present in the dough.Generally sweet yeast doughs take longer time to ferment and rise, this is because of the following reasons:

Sugar: Whereas lean doughs only have at most 5 percent sugar, rich doughs can have up to 10 percent. The hydroscopic nature of sugar attracts the moisture making the gluten harder for the yeast to hydrate. This tussle of attracting of water by the sugar and the yeast results in delayed fermentation of the dough.

Salt: Salt is important for developing flavor and taste. It helps in strengthening the gluten and hinders the growth of yeast, thus regulates the yeast's activity, making sure it does not go overboard and expand uncontrollably. Too much salt, however, will slow down fermentation.

Fat: The extra fat (butter, oil, and eggs) that makes rich dough regulated the reproduction of yeast and also has less capability of holding the air pockets in the dough.
However, no dough the process of fermentation of the dough is very slow, but the final product is more flavorful, soft and of supple texture.

Recipe of basic sweet yeast dough
Ingredients –

- Whole milk – 2/3 cup
- Sugar– 5 tbsp, divided
- Active dry yeast – 1 3/4tsp
- Large eggs, room temperature – 2 nos
- Unbleached all –purpose flour –3/4 cups
- Salt –1 tsp
- unsalted solid butter, cut into 1 –inch pieces, room temperature – ½ cup

- Melted butter – ½ tbsp

Method –

- Heat milk in a small saucepan over medium heat.
- Transfer milk to a 2 –cup measuring cup; stir in 1 tbsp. sugar. Sprinkle yeast over milk and whisk to blend. Let sit until yeast is foamy, about 5 minutes.
- Add eggs and whisk until smooth.
- Combine remaining 4 tbsp. sugar, flour and salt in the bowl , add the flavour if any in very small quantity.
- Add milk mixture. Stir in cut and fold method, add ½cup room –temperature butter, 1 piece at a time, blending well between additions. Mix for 1 minute and then knead at medium –high speed until dough is soft and silky, about 5 – 10 minutes.
- Brush a medium bowl with some melted butter; place dough in bowl. Brush top of dough with remaining melted butter; cover with plastic wrap. Can be made 1 day ahead. Cover with plastic; chill.
- Let dough rise in a warm, moisture –free area until doubled in size, 1–1 ½ hours (or 2–2 ½ hours if dough has been refrigerated).
- Use it as required with baking temperature of the products – 190^0C.

3.4 DANISH PASTRY

A Danish pastry, sometimes also known as just Danish, is a multilayered, laminated sweet pastry in the viennoiserie tradition. This pastry type is named Danish because it originates from Denmark. The concept was brought to Denmark by Austrian bakers, and has since developed into a Danish specialty. Like other Viennoiserie pastries, such as croissants, it is a variant of puff pastry made of laminated yeast –leavened dough that creates a layered texture. It consists out of yeast –leavened dough and a type of fat; mostly butter or margarine. The fat can be included in the dough or it can be attached into the dough by laminating. The dough is rolled out thinly, then folded with a layer of butter to form multiple layers.Multilayered dough (dough –fat –dough) in most cases builds up in between 16 to 36 layers.Butter is the traditional fat used in Danish pastry, but in industrial production, less expensive fats are often used, such as hydrogenated fat called margarine. In Danish, Norwegian, and Swedish, the term for Danish pastry is wienerbrød (or wienerbröd), meaning "Viennese bread".

In the United Kingdom, various ingredients such as jam, custard, apricots, cherries, raisins, flaked almonds, cashews, pecans, or caramelized toffees are placed on or within sections of divided dough, which is then baked. In the United States, these are typically given a topping of fruit or sweetened cream cheese prior to baking. In Sweden, chocolate spritzing and powdered sugar are also often added above the product prior to baking. Cardamom is often added to increase the aromatic sense of sweetness.

Danish pastries as consumed in Denmark have different shapes and names. Some are topped with chocolate, pearl sugar, glacé icing, and/or slivered nuts and they may be stuffed with a variety of ingredients such as jam or preserves (usually apple or prune), remonce, marzipan, and/or custard. Shapes are numerous, including circles with filling in the middle (known in Denmark as Spandauers), figure –eights, spirals (known as snails), and the pretzel –like kringles.

Note: *Remonce is a creamy combination made from mixing creamed butter, flavored paste and sugar. It is used as a filling in various traditional Danish pastries and is baked along with the pastry. Remonce spread is sometimes flavored with cinnamon, cardamom, marzipan or marzipan or almond paste.

How Danish is different from Puff pastry

There are two differences between Danish pastry and puff pastry. First of all Danish pastries contain a high level of fat of about 40%. The second difference is that Danish dough contains yeast and that isn't the case for puff pastry. This is the reason that after baking, puff pastries contain a more airy structure and a more crispy bite.

Recipe of Danish pastry

Ingredients –

- Unsalted butter, softened –2 cups
- All –purpose flour –⅔ cup
- Milk –2 ½cups
- White sugar – ½ cup
- Salt –2 tsp
- Active dry yeast –4 ½ tsp
- All –purpose flour –8 cups
- Eggs –2 nos
- Lemon extract –1 tsp
- Almond extract –1 tsp

Method

- In a medium bowl, cream together the butter and 2/3 cup of flour. Divide into 2 equal parts, and roll each half between 2 pieces of waxed paper into a 6 x12 inch sheet. Refrigerate.
- In a large bowl, mix together the dry yeast and 3 cups of the remaining flour. In a small saucepan over medium heat, combine the milk, sugar and salt. Heat to 115 degrees F (43 degrees C), or just warm, but not hot to the touch. Mix the warm milk mixture into the flour and yeast along with the eggs, and lemon and almond extracts. Stir for 3 minutes. Knead in the remaining flour ½cup at a time until the dough is firm and pliable. Set aside to rest until double in size.
- Cut the dough in half, and roll each half out to a 14 inch square. Place one sheet of the cold butter onto each piece of dough, and fold the dough over it like the cover of a book. Seal edges by pressing with fingers. Roll each piece out to a 20x 12 inch rectangle, and then fold into thirds by folding the long sides in over the center.

Repeat rolling into a large rectangle and folding into thirds. Wrap in plastic and refrigerate for at least 30 minutes.

- Remove from the refrigerator one at a time, and roll and fold each piece two more times. Return to the refrigerator to chill again before shaping. If the butter gets too warm, the dough will become difficult to manage.
- To make Danishes, roll the dough out to ¼ inch thickness. The dough can be cut into squares, with a filling placed in the center. Fold 2 of the corners over the center to form a filled diamond shape. Or, fold the piece in half, cut into 1 inch strips, stretch, twist and roll into a spiral. Place a dollop of preserves or other filling in the center. Place Danishes on an ungreased baking sheet, and let rise until doubled. Preheat the oven to 450 degrees F (220 degrees C). Danishes can be brushed with egg white for a shiny finish.
- Bake for 8 to 10 minutes in the preheated oven, or until the bottoms are golden brown.

CHECK YOUR PROGRESS-I

1. Write the recipe of Danish Pastry.

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2. Write short note on 'Rich Dough'.

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3.5 CROISSANTS

Croissants are a style of crescent shaped Viennoiserie pastries of Austria.Viennoiseries in French comes from the word "Viennois" for people and things from Vienna. The legend takes place during the Ottoman Turk siege of the city; a baker apparently heard the Turks tunneling under the walls of the city as he lit his ovens to bake the morning bread. He

quickly sounded an alarm, and the military collapsed the tunnel, saving the city. To celebrate, the baker baked crescent –shaped bread'kipferl', in the shape of the crescent moon of the Turkish flag.For Austrians, eating a kipferl was a culinary re –enactment of victory over the Turks – eating their enemy.The kipferl was believed to be the spiritual ancestor of the croissant. Austrian based, the kipferl is a crescent –shaped morning sweet made plain, with nuts or other fillings. It is a denser and less flaky bread, made with a softer dough. The history of the kipferl dates back to the 13th century where it is referenced as a "sweet" and wasn't until the mid –16th century that the Austrian treat became part of the 'morning pastry' category.

The kipferl made its way to France in 1770 when Austrian –born Marie –Antoinette was offered in marriage to the future Louis XVI. Marie –Antoinette felt homesick when she arrived in France and missed Austrian cuisine. The royal bakers decided to make kipferl in her honor, which they subsequently named, "croissant." Wherever the croissant originally came from, it is firmly ensconced in French bakery tradition today.It is not to be confused with the British croissant, which is straight. The French have remained faithful to the original Austrian crescent shape.In the first half of the 20th century, the croissant was baked and beloved by adoring French bakers and all who enjoyed it. After World War 2, the rise of mass –produced food only boosted the pastry's popularity in France, Europe and the world over. By the end of the 20th century, the croissant took the foodservice industry by storm thanks to the introduction of flash freeze technologies, with take away 'croissanteries' and fast –food chains now able to sell croissant breakfast sandwiches and savoury pastries.Croissants fall into that category of "laminated pastry". This means the dough gets folded over and over again, with cold butter in between each tissue –thin layer. Today, the reach of the croissant goes far and wide with France, Austria, Argentina, Italy, Poland, America, Australia and many other countries having notable and delicious variants.

Recipe

Ingredients –

- Active dry yeast – 1 ¼ tsp
- Warm water (110^0F/45^0C)– 3 tbsps
- White sugar – 1 tsp
- All –purpose flour –1 ¾ cups
- White sugar –2 tsp
- Salt –1 ½ tsp
- Warm milk –⅔ cup

- Vegetable oil –2 tbsp
- Unsalted butter, chilled –⅔ cup
- Egg –1no
- Water – 1 tbsp

Method –

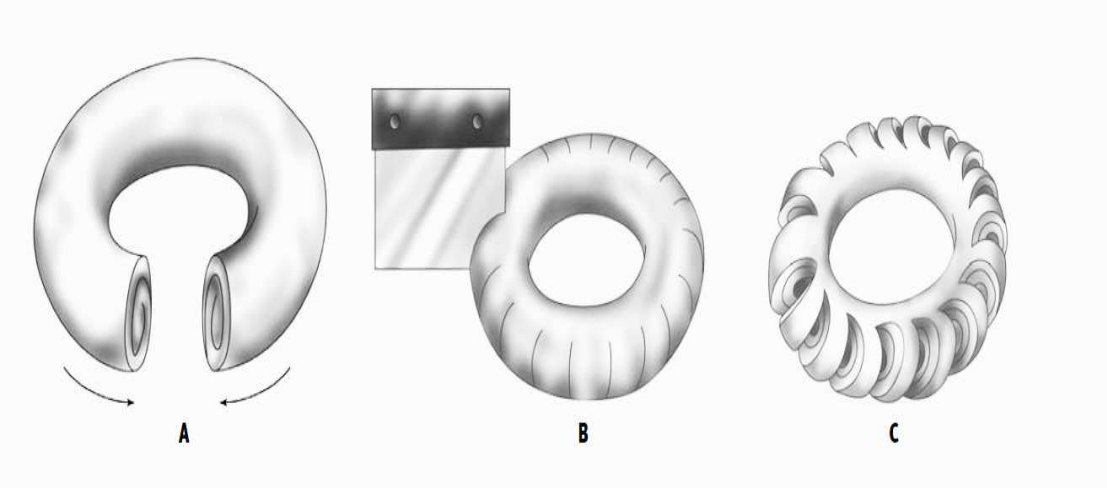
- Combine yeast, warm water, and 1 tsp sugar. Allow to stand until creamy and frothy.
- Measure flour into a mixing bowl. Dissolve 2 tsps sugar and salt in warm milk. Blend into flour along with yeast and oil. Mix well; knead until smooth. Cover, and let rise until over triple in volume, about 3 hours. Deflate gently, and let rise again until doubled, about another 3 hours. Deflate and chill 20 minutes.
- Massage butter until pliable, but not soft and oily. Pat dough into a 14x8 –inch rectangle. Smear butter over top two thirds, leaving ¼ –inch margin all around. Fold unbuttered third over middle third, and buttered top third down over that. Turn 90 degrees, so that folds are to left and right. Roll out to a 14x6 –inch rectangle. Fold in three again. Sprinkle lightly with flour, and put dough in a plastic bag. Refrigerate 2 hours. Unwrap, sprinkle with flour, and deflate gently. Roll to a 14x6 –inch rectangle, and fold again. Turn 90 degrees, and repeat. Wrap, and chill 2 hours.
- To shape, roll dough out to a 20x5 –inch rectangle. Cut in half crosswise, and chill half while shaping the other half. Roll out to a 15 x 5 inch rectangle. Cut into three 5 x 5 inch squares. Cut each square in half diagonally. Roll each triangle lightly to elongate the point, and make it 7 inches long. Grab the other 2 points, and stretch them out slightly as you roll it up. Place on a baking sheet, curving slightly into crescent shape. Let shaped croissants rise until puffy and light. In a small bowl, beat together egg and 1 tbsp water. Glaze croissants with egg wash.
- Bake in a preheated 475^0F (245^0C) oven for 12 to 15 minutes.

3.6 COFFEE CAKE DOUGH PRODUCTS

Although a few early coffee cake recipes actually called for coffee as an ingredient, the term "coffee cake" generally refers to a type of simple, usually unfrosted cake that is an accompaniment to coffee, rather than a cake that contains coffee. Coffee cake is something you would serve at breakfast or at an informal occasion such as a gathering of friends over coffee, as opposed to a fancier, gooey, layered, filled, and frosted cake that would be served as a more formal dessert.

Coffee cakes are usually made with either sweet or Danish dough and are filled with a varietyof items such as fruits, nuts, and smears. They can be made up into many sizes and shapes according to the needs of the bakeshop. There are many ways to shape coffee cakes as well:Wreathed, braided, or twisted are common methods seen with these cakes.
Wreath Coffee Cake –

- Using a sweet dough or Danish dough, make a filled dough roll, as for cinnamon rolls, but do not cut into separate pieces. Other fillings, such as prune or date, may be used instead of butter and cinnamon sugar.
- Shape the roll into a circle (a). Place on a greased baking sheet. Cut partway through the dough at 1 –in. (2.5 –cm) intervals (b). Twist each segment outward to open the cuts (c).
- Egg –wash after proofing. Bake at 375°F (190°C).



Filled Coffee Cake –

- Scale sweet dough or Danish dough into 12 –oz (340 –g) units.
- Roll each unit into a rectangle 9 × 18 in. (23 × 46 cm).
- Spread half of each rectangle with about 170 gm desired filling.
- Fold the unspread half over the spread half to make a 9 –in. (23 –cm) square.
- Place in a greased 9 –in. (23 –cm) square pan.
- Sprinkle with streusel topping, about 110 gm per pan.
- Proof
- Bake at 375°F (190°C).

Loaf Coffee Cake –

- Using rich sweet doughdough, make a filled dough roll, as for cinnamon rolls, using desired filling.
- Fold the roll in half, and then twist it up.
- Place the twisted roll in a greased loaf pan, or coil the twist like a snail and place in a round pan.
- Proof, wash with melted butter, and bake at 350°F (175°C).

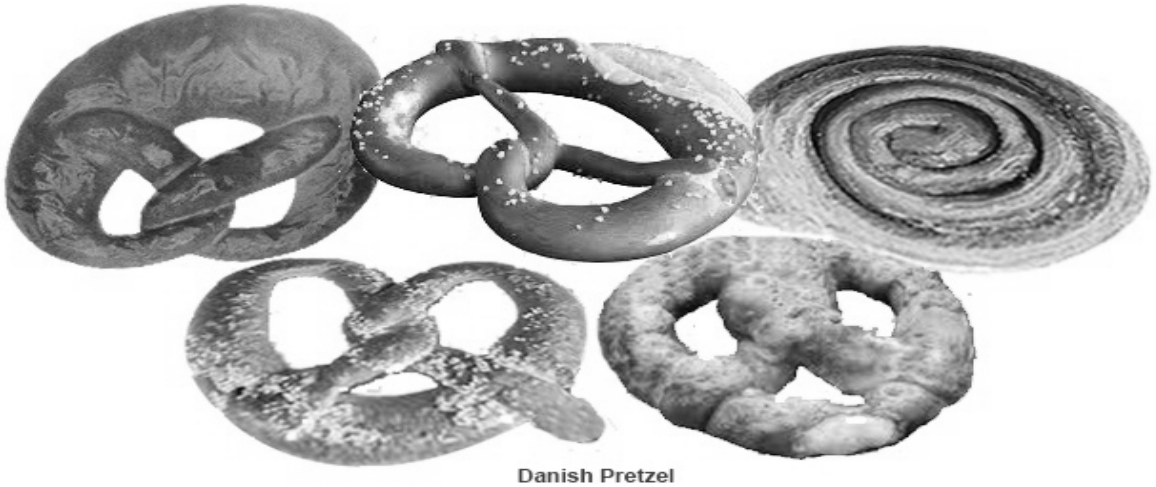
Danish Pretzel –

- Using almond filling, make up Danish dough into a long, thin dough roll, as for cinnamon rolls.
- Twist the roll into a pretzel shape. Place on a sheet pan.

- Proof, egg –wash, and bake at 375°F (190°C).

Strip Coffee Cake or Danish Strip –

- Roll out the Danish dough about ¼ in. (6 mm) thick into a rectangle the length of the desired strip and about twice as wide.



Danish Pretzel

- Spread the desired filling lengthwise down the center of the dough, leaving a ½–in. (1 –cm) margin at both ends.
- Brush both ends and one edge of the rectangle with egg wash, to seal the seams.
- Fold the side of the rectangle without the egg wash over the center of the filling. Fold the other side over the center, overlapping the first side by ½ in. (1 cm).
- Turn the strip over and place it seam side down on a paper –lined pan. Make 5 or 6 diagonal slashes in the top of the dough; cut through to the filling but not to the bottom layer of dough.
- Proof, egg –wash, and bake at 375°F (190°C).

Danish Spiral Coffee Cake –

- Using desired filling, make up Danish dough into a filled dough roll, as for cinnamon rolls, but longer and thinner.
- Flatten the roll slightly with a rolling pin. Make 2 parallel cuts lengthwise through the dough; cut through the bottom layer leaving about 1 in. (2.5 cm) uncut at both ends.
- Twist the strip as for Danish Twists. Coil the twist into a spiral. Tuck the loose end underneath to secure it.
- Proof and egg –wash. If desired, sprinkle with chopped or sliced nuts.
- Bake at 375°F (190°C).

CHECK YOUR PROGRESS-II

1. Write the recipe of Croissants.

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2. Write short note on 'Coffee cake dough products'.

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3.7 SPECIALTY ROLLS AND YEAST –RAISED CAKES

What is cake ? Cake may be explained in one line as "an item of soft sweet food made from a mixture of flour, fat, eggs, sugar, and other ingredients, baked and sometimes iced or decorated."

A sweet baked good with flour, fat, eggs and sugar. But does that mean it can be raised with both baking powder/soda as well as yeast? Here is where disagreements online start popping up.

When does a cake become bread? This is where things start becoming very tricky. As you will see further on, yeast –leavened cakes tend to be less crumbly and have a firmer structure than a basic pound cake which is light and crumbly. When have you changed the structure such that it has turned into bread?

Some that bakes are called breads, but some say a brioche is a bread, others would say this is a cake. Some say a babka is a bread, others say it is a cake.

So exactly what is a cake? A cake to us has to be sweeter than bread and has to contain some sort of flour (doesn't have to be wheat). You can eat a cake without anything else, it doesn't need a topping, but it can be decorated with an icing for instance. A cake is more

of a snack, whereas bread is more part of a meal. You can eat one or two slices of cake, but you can easily eat several slices of bread. Also, a cake is made from a batter, whereas bread is made from dough and requires extensive kneading. We can also think about croissant and doughnuts – croissants are pastry, probably because they use layering to incorporate air, but what about doughnuts. So the definition of cake is not so perfect, but we can go on.

Specialty Rolls: Specialty rolls include bread rolls and cake rolls. A bread roll is a small, usually round or oblong individual loaf of bread served as a meal accompaniment (eaten plain or with butter) found in most cuisines all over the world. A roll can be served and eaten whole or cut transversely and dressed with filling between the two halves. Rolls are also commonly used to make sandwiches similar to those produced using slices of bread. It's believed that the first roll was created in the south east of England in 1581. Bakers in different towns and cities used to name their bread rolls according to how they made the dough, the size of the rolls and how they baked them.

Some of the common bread rolls are as:

- ***Bun*** – A bun is a small, sometimes sweet, bread –based roll. Though they come in many shapes and sizes, they are most commonly hand –sized or smaller, with a round top and flat bottom.Buns are usually made from flour, sugar, milk, yeast and butter. Common sweet varieties contain small fruit or nuts, and may topped with icing or caramel, or filled with jam or cream. Some types of buns are filled with various meats, or used to serve meats (such as hotdogs or hamburgers).

- ***Sweet roll*** – A sweet roll or sweet bun refers to any of a number of sweet, baked, yeast –leavened breakfast or dessert foods. They may contain spices, nuts, candied fruits, etc., and are often glazed or topped with icing. Compared to regular bread dough, sweet roll dough generally has higher levels of sugar, fat, eggs, and yeast. They are often round, and are small enough to comprise a single serving.

- ***Breakfast roll*** – The breakfast roll is a bread roll filled with elements of a traditional fried breakfast. It typically consists of a bread roll or baguette containing one or more fillings such as sausages, bacon, white or black pudding, butter, mushrooms, tomatoes and tomato sauce or brown sauce. In some cases a hash brown, baked beans or fried egg may be added.

- ***Concha*** – are known for their shell –like shape and sugar shell pattern on the top. It is similar to Japanese melon pan. This is one of the most famous Mexican pastries and widely recognized in the United States. It is also referred to as "*pan de huevo*" (egg bread) in other Latin American countries, such as Chile, where they are eaten during tea time or at the beach.They are known as *Cemitas* in Honduras.

- ***Hamburger bun*** – is a sandwich consisting of one or more cooked patties of ground meat, usually beef, placed inside a sliced bread roll or bun. The patty may be pan fried, grilled, smoked or flame broiled. Hamburgers are often served with cheese, lettuce, tomato, onion, pickles, bacon, or chiles; condiments such as

ketchup, mustard, mayonnaise, relish, or a "*special sauce*", often a variation of Thousand Island dressing; and are frequently placed on sesame seed buns. A hamburger topped with cheese is called a cheeseburger.

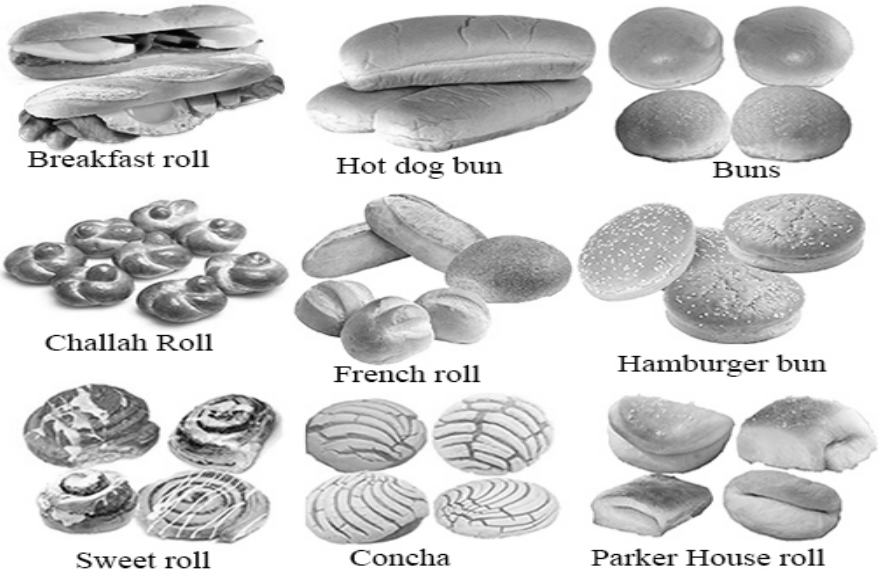
- ***Hot dog bun*** – is a type of soft elongated round bun shaped specifically to contain a hot dog or another type of sausage. The bun allows eaters consume hot dogs without burning their hands.

- ***Challah Roll*** – is a special bread in Jewish cuisine, usually braided and typically eaten on ceremonial occasions such as Shabbat and major Jewish holidays (other than Passover). Ritually –acceptable challah is made of dough from which a small portion has been set aside as an offering.

- ***Parker House roll*** – s a bread roll made by flattening the center of a ball of dough with a rolling pin so that it becomes an oval shape and then folding the oval in half. They are made with milk and are generally quite buttery, soft, and slightly sweet with a crispy shell. They were invented at the Parker House Hotel in Boston, during the 1870s.

- ***Fruit bun*** – Fruit buns are a type of sweet roll made with fruit, fruit peel, spices and sometimes nuts. They are a tradition in Britain and former British colonies including Jamaica, Australia, Singapore and India. They are made with fruit and fruit peel and are similar to bath buns, which are sprinkled and cooked with sugar nibs. One variety is a currant bun.

- ***French roll*** – a circular or oval bread roll having a hard or crispy crust. Also called French twist. Named after a coiffure for women in which the hair is combed back from the face and arranged in a vertical roll on the back of the head.



Specialty rolls

Roll cake: A roll cake is a cake that is rolled. A roll cake is often called a Swiss roll, jelly roll, roll cake, cream roll, or Swiss log. It's a type of sponge cake that is filled with whipped cream, jam or frosting and then rolled into a spiral before serving. A roll cake is similar to a roulade but a roulade can be filled with other things besides sweet fillings and can even be savory. The origins of the term are unclear. In spite of the name "Swiss roll", the cake is believed to have originated in the nineteenth century elsewhere in Central Europe, likely Austria.

Swiss roll variations:

- Swiss roll – This Swedish delicacy rolled cake has layere of egg in combination with chocolate of sweetened butter flavoring. It also has a whipped cream filling.
- In India it is called jam rolls as the inner filling is of varied jams.
- In Indonesia, the Swiss roll cake is called *bolu gulung*. Most bakeries sell Swiss rolls daily, and they are filled with butter cream, cheese or fruit jam.
- In Japan, Swiss rolls are called "roll cake". They are filled with whipped cream and sometimes with fruits like strawberries.
- In Colombia, a Swiss roll is called either *pionono* or *brazo de reina* ("queen's arm"), and it is filled with guava jam.
- In Portugal, desserts called tortas are simply Swiss rolls with jam filling.
- In Spain, the dessert is called *brazo de gitano* and is commonly filled with cream or chocolate truffle.
- In United Kingdom *Jam roly –poly* is a similar dessert, but made as a suet pudding rather than a cake, filled with jam and served hot with custard.

Yeast raised cakes: These types of cakes are not generally referred to as yeast –leavened specifically; instead, they tend to be long –standing traditional recipes (e.g. *Kugelhopf*) from specific countries with their own names. They just happen to use yeast.

Characteristic for yeast raised cakes: As the yeast in the batter reproduces and produces carbon dioxide gas creates the little air bubbles in the cake (fermentation). In doughs this process takes place easily and quickly, but in case of cakes, it tends to contain quite a lot of butter and eggs. This slows down the growth of the yeast even more. In general, baking powder or baking soda is mostly used as they tend to make the cake light and slightly crumbly in texture. Here the aeration occurs at the same time that the proteins denature and the starches cook, which helps the cake hold on to the air. It so happens that gluten is very good at holding onto those air bubbles. But a gluten network also makes the cake less crumbly and more bread like. So gluten and gluten development becomes an important part while baking a cake or bread. However, when you use yeast, it will be slightly less crumbly. This is because the batter is thin and incorporated with lots of butter and egg, resulting in less and tender gluten development, which has less capacity to hold on air.

Since the batter cannot hold on the hot air in between the molecules of the flour batter, so development of natural flavour and moistness is rarely seen. All the flavour come from the flavouring ingredients that are added.

Types

Gugelhopf / Guglhopf / Kugelhopf / Baba

This originally yeast leavened cake various stories about its name and origin. It could have come from Austria, others say from France. It is also called Baba ur Rhum or Rhum Baba in German Some stories mention royal families who liked the cake and moved it to other neighboring countries. Although with varied origin, its shape remained same, shaped in circle with a hole in middle (like a Bundt pan, but with a slightly different design). Nowadays modern bakers simply use baking powder or soda to prepare this variety. A Rum baba or Baba au rhum is a small yeast cake saturated in syrup made with hard liquor, usually rum, and sometimes filled with whipped cream or pastry cream. It is most typically made in individual servings (about a 5 cm tall, slightly tapered cylinder) but sometimes can be made in larger forms similar to those used for Bundt cakes.

Panettone: Has its origin in Italy. It is a dome shaped sweet cake with lots of fruit fillings inside.

Bara brith: This is a typical Welsh cake containing fruits. It is traditionally flavoured with tea, dried fruits and mixed spices, and is served sliced and buttered at tea time.

Savarin: A savarin with its origin in France is somewhat similar to a brioche but ring like shape, but makes a lot drier bake which is why it needs to be soaked in syrup.

Recipe of Baba au Rhum

Ingredients –

For the Cake:

- Dry yeast– 1 tbsp
- Water (warm) – 3 tbsp
- Eggs (beaten) – 3 nos
- All –purpose flour– 2 cups
- Granulated sugar– 2 tbsp
- Orange zest– 1 tsp
- Lemon zest– 1 tsp
- Salt– 1 tsp
- Butter (softened) – ½ cup
- Golden raisins (or dried currants) – 3/4 cup
- Dark rum– 3 tbsp

For the Rum Syrup:

- Water– 3 cups
- Granulated sugar– 2 cups
- Dark rum (to taste) – ½ to 2/3 cup
- Vanilla extract– 1 ½ tsp
- Apricot preserves (heated) – 2/3 cup

Garnish:

- Sweetened whipped cream– as required

Method –

To make the Cake

- Gather the ingredients.
- Stir the yeast and the warm water together in a large bowl and allow the yeast to dissolve for 5 minutes.
- Lightly beat the eggs into the yeast and water.
- In a small bowl, mix the flour, sugar, citrus zests, and salt together.
- Stir the mixture into the yeast and eggs.
- Knead the dough with the softened butter for about 5 minutes, until it turns soft and elastic.
- Cover the dough and allow it to rise for 1 hour until it doubles in size.
- While the dough is rising, soak the raisins or currants in 3 tbsps of rum.
- Once the dough has doubled, beat the rum –soaked fruit into it.
- Grease the baba molds and divide the dough among them.
- Preheat an oven to 400^0F.
- Cover the molds and allow the dough to rise for 30 to 45 minutes, or until the dough has just started to rise above the molds' edges.
- Uncover the babas and bake them for 20 to 25 minutes, until they turn golden brown and begin to pull away from the sides of the molds.
- Immediately remove the babas from the molds and allow them to cool on a wire rack.

To make the Rum Syrup

- Gather the ingredients.
- While the babas are cooling, make the rum soaking syrup. In a medium saucepan set over medium heat, bring the water and sugar to a boil for 5 to 10 minutes, until the syrup has thickened.
- Remove the syrup from the heat and stir the rum and vanilla extract into the mixture.

To assemble the Rum Baba

- Place the babas into the hot rum syrup and turn them several times, allowing them to soak up the syrup. They will swell and absorb most of the syrup.
- Carefully transfer each baba onto a dessert plate and brush with a generous amount of heated apricot preserves.

- Garnish the babas au rhum with vanilla Chantilly cream and serve immediately.

Recipe of Savarin

Ingredients –

For the savarin

- Plain flour–350gm
- Caster sugar–50gm
- Instant yeast–10gm
- Salt– ½ tsp
- Milk–3 tbsp
- Eggs–6 nos
- Unsalted butter –180gm
- Orange, finely grated zest and segmented fruit–1

For the syrup

- Caster sugar –300g
- Lemon juice – 1 tbsp
- Orange liqueur –100 ml

For the chocolate disc

- Plain chocolate, finely chopped –100gm
- White chocolate, melted –50gm

For the caramel chards

- Caster sugar –150gm

For the Chantilly cream

- Double cream – 300ml
- Icing sugar 15gm
- Vanilla essence – ½ tsp

To decorate

- Sliced mixed fruit (such as orange, mango, kiwi, strawberries) pomegranate seeds, blueberries or raspberries

Method –

- Stir together the flour, sugar and yeast in a large bowl. Mix the salt, milk and eggs together in a jug then pour into the flour mixture and beat well using a wooden spoon for about 5 minutes to make a thick, sticky batter.
- Gradually add the butter, beating until the mixture is smooth, elastic and shiny. Finally fold in the orange and lemon zest. Cover the bowl with cling film and leave to rise for 1 hour.
- For the syrup, tip the sugar into a pan, add the lemon juice and 150ml/5fl oz water and bring to a simmer, stirring until the sugar dissolves. Remove from the heat, stir in the orange liqueur and leave to cool.

- For the chocolate disc, temper the plain chocolate by melting three –quarters (75g/2 ½oz) of the chocolate over a pan of simmering water (do not let the bottom of the bowl touch the water). Stir until the chocolate reaches a melting temperature of 50C. Remove the bowl from the heat, add the remaining chocolate and stir until it's cooled to 31C.
- Spoon into a piping bag made out of baking parchment and pipe a 5cm/2in oval disc onto a sheet of baking paper or acetate and leave to set. Spoon the melted white chocolate into another piping bag and pipe the word 'Savarin' onto the plain chocolate disc.
- For the caramel shards, line a baking tray with silicone or baking parchment. Add the sugar to a pan with 4 tbsps water and bring to a simmer, stirring until the sugar dissolves. When all the sugar is dissolved, bring the syrup to a boil without stirring until it reaches 170C on a sugar thermometer (CAUTION: boiling sugar is extremely hot. Handle very carefully). Immediately pour out onto the lined tray and leave to harden. Crack with a spoon or cut into shards using a knife.
- Grease a 23cm/9in bundt tin or savarin mould with butter. When the batter has risen, spoon it into the tin. Cover with oiled clingfilm and leave to rise for 45 minutes to 1 hour, until it reaches three –quarters of the way up the tin.
- Preheat the oven to 180^0C/160^0C.
- Remove the cling film and bake for 20–25 minutes or until the savarin is risen and golden –brown. Remove from the oven and place the tin on a wire rack to cool for 5–10 minutes.
- When cool enough to handle, remove the savarin from the tin and pour half of the syrup into the tin. Gently place the savarin back into the tin to soak up the syrup and cool completely. Pour the remaining syrup into a roasting tin, then place the savarin into the syrup and leave to soak for 5 minutes. Carefully transfer to a serving plate.
- Meanwhile, for the Chantilly cream, whip the cream, icing sugar and vanilla together until soft peaks form when the whisk is removed. Spoon one –third of the Chantilly cream into a piping bag fitted with a star nozzle. Set aside in the fridge until ready to serve.
- Using a sharp knife, segment the zested orange. Carefully slice off the top and bottom of the orange. Using even downward strokes, slice the skin away from the flesh and discard. Remove any remaining white pith.
- Pipe the Chantilly cream around the top of the savarin and arrange the orange slices over the cream. Fill the savarin with the remaining Chantilly cream and decorate with sliced fruit. Top with the chocolate disc and caramel shards.

CHECK YOUR PROGRESS-III

1. Write the recipe of Cake Roll.

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2. Write short note on ‘Common Bread Rolls’.

3.8 BUNS

A bun is a small, sometimes sweet, bread –based item or roll. Though they come in many shapes and sizes, they are most commonly hand –sized or smaller, with a round top and flat bottom. Buns are usually made from flour, sugar, milk, yeast, butterand occasionally egg. Common sweet varieties contain small fruit or nuts, and may topped with icing or caramel, or filled with jam or cream. Some types of buns are filled with various meats, or used to serve meats (such as hotdogs or hamburgers). "Bun" may also refer to particular types of filled dumplings, such as Chinese *baozi*. Some of these types of dumplings may be bread –like in texture. They are also called Dinner roll in England.

Difference between bread and a bun: Without any of the one item mentioned, the dough remains to be 'bread dough' rather than 'bun dough'.Bread is usually baked in a loaf which serves serveral people (or several servings for one person). A bun is a single –serving baked good. The recipes may be identical, but the shape and size determine the difference. The weight of both of the two also matters. As per the bread laws existed in all bread eating cultures and they have defined the permissible weights of loaves of bread. Typically there has been a minimum weight for the smallest legal loaf and anything below that weight is a *bun* (in English), a *petit pain* (in French) or a *Broetchen* (in German). Traditionally the line has been either one or two pounds, which was then later redefined in grams. In the UK Bread Act of 1822 a loaf of bread was required to be 2 or 4 lbs, for example. In France and Germany a bun is still defined as a small bread of up to 250 grams.

Some of the common buns include:

1. **Anpan –** A bun that is filled, usually with red bean paste, or with white beans, sesame, or chestnut

2. **Bakpao** – Indonesian term for steamed bun. The bun is usually filled with pork, but can also be filled with other ingredients, such as chicken, peanuts, or mung beans.

3. **Bánh bao** – Vietnamese meaning "Enveloping Cake", which is a ball –shaped bun containing pork or chicken meat, onions, eggs, mushrooms and vegetables, in the Vietnamese cuisine

4. **Baozi** – A type of steamed, filled bun or bread –like item made with baker's yeast in various Chinese cuisines, as there is much variation as to the fillings and the preparations

5. **Blaa** – A dough –like, white bread bun (roll) speciality particularly associated with Waterford, Ireland; historically, the blaa is also believed to have been made in Kilkenny and Wexford.

6. **Bread roll** – A short, oblong, or round bun served usually before or with meals, often with butter.

7. **Bunuelo** — A fried dough ball popular in Latin America, Greece, Guam, Turkey, Israel and Morocco. It will usually have a filling or a topping.

8. **Cheese bun** – A variety of small, baked, cheese –flavored rolls, a popular snack and breakfast food in Bolivia, Brazil (especially in the state of Minas Gerais), Paraguay, Colombia and northern Argentina.
9. **Chelsea bun** – A currant bun that is first created in the 18th century at the Chelsea Bun House in Chelsea, London, an establishment favoured by Hanoverian royalty which was demolished in 1839.

10. **Cinnamon bun** – A sweet roll served commonly in Northern Europe and North America; its main ingredients are dough, cinnamon, sugar, and butter, which provide a robust and sweet flavor

11. **Cocktail bun** – A Hong Kong –style sweet bun with a filling of shredded coconut; one of several iconic types of baked goods originating from Hong Kong.

12. **Cream bun** – A bun that varies all around the world; typically they are made with an enriched dough bread roll that is baked and cooled, then split and filled with cream.

13. **Curry bread** – Some Japanese curry is wrapped in a piece of dough, which is coated in flaky bread crumbs, and usually deep fried or baked.

14. **Dampfnudel** – A white bread roll or sweet roll eaten as a meal or as a dessert in Germany and in France (Alsace); a typical dish in southern Germany.

15. **Fruit bun** – A sweet roll made with fruit, fruit peel, spices and sometimes nuts; a tradition in Britain and former British colonies including Jamaica, Australia, Singapore, and India.

16. **Hamburger bun** – A round bun designed to encase a hamburger; invented in 1916 by a fry cook named Walter Anderson, who co –founded White Castle in 1992.

17. **Hot cross bun** – A sweet, spiced bun usually made with fruit but with other varieties such as apple –cinnamon or maple syrup and blueberries and marked with a cross on the top, traditionally eaten on Good Friday in the UK, Australia, New Zealand, South Africa, and Canada, but now popular all year round.

18. **Hot dog bun** – A long, soft bun shaped specifically to contain a hot dog or frankfurter.

19. **Mandarin roll** – A steamed bun originating from China; cooked by steaming; a food staple of Chinese cuisine which is similar to white bread in western cuisine.

20. **Piggy bun** – A Hong Kong pastry that is essentially the equivalent of the French baguette; found in Hong Kong bakeries and Cha chaan teng; in Hong Kong, it is often cut in half and served with butter and condensed milk.

21. **Pork chop bun** – famous and popular snack in Macau, the "piggy bun" is crisp outside and soft inside; a freshly fried pork chop is filled into it
22. **Rum roll** – historic Washington D.C. specialty, similar to a cinnamon bun with rum flavored icing.

23. **Sally Lunn bun** – A enriched yeast bread associated with the city of Bath in the West Country of England.

24. **Semla** – A traditional sweet roll made in various forms in Denmark, the Faroe Islands, Iceland, Estonia, Finland, Latvia, Lithuania, Sweden and Norway; associated with Lent and especially Shrove Monday and Shrove Tuesday; the oldest version of the semla was a plain bread bun, eaten in a bowl of warm milk; in Swedish this is known as *Hetvägg*

25. **Shengjian mantou** – A type of small, pan –fried baozi which is a specialty of Shanghai and usually filled with pork and gelatin that melts into soup/liquid when cooked.

26. **Siopao** – Hokkien term for baozi, literally meaning "steamed buns"; it has also been incorporated into Thai cuisine where it is called salapao.

27. **Sufganiyah** – A deep –fried bun, filled with jam or custard, and then topped with powdered sugar. Typically eaten in Israel during Hanukkah.

28. **Sticky bun** – A dessert or breakfast sweet roll that generally consists of rolled pieces of leavened dough, sometimes containing brown sugar or cinnamon, which are then compressed together to form a flat loaf corresponding to the size of the baking pan; they have been consumed since the Middle Ages, at which time cinnamon became more prominent.

29. **Teacake** – A fruited sweet bun usually served toasted and buttered.

30. **Tingmo** – Steamed bread in Tibetan cuisine. It is sometimes described as a steamed bun that is similar to Chinese flower rolls. It does not contain any kind of filling.

31. **Xiaolongbao** – A steamed bun from the Jiangnan region of China; fillings vary by region and usually include some meat and/or a gelatin –gelled aspic that becomes a soup when steamed.

32. **Zeeuwse bolus** – A spiral shaped bun covered in dark brown sugar, lemon zest and cinnamon.

Recipe

Ingredients –

- Active dry yeast –25 gm
- All –purpose flour –1 kg
- Lukewarm water –1 cup
- Large egg –1no
- Melted butter –3 tbsp
- White sugar –3 tbsp
- Salt –1¼ tsps
- Refined oil –1 tsp
- Beaten egg –1 no
- Milk –1 tbsp
- Sesame seeds –1 tsp

Method –

- Line a baking sheet with a silicone mat or parchment paper.
- Place yeast into bowl of a large stand mixer; whisk in ½cup flour and warm water until smooth. Let stand until mixture is foamy, 10 to 15 minutes.
- Whisk 1 egg, melted butter, sugar, and salt thoroughly into yeast mixture. Add remaining flour (about 3 cups).
- Fit a dough hook onto stand mixer and knead the dough on low speed until soft and sticky, 5 to 6 minutes. Scrape sides if needed. Poke and prod the dough with a silicone spatula; if large amounts of dough stick to the spatula, add a little more flour.
- Transfer dough onto a floured work surface; dough will be sticky and elastic but not stick to your fingers. Form the dough lightly into a smooth, round shape, gently tucking loose ends underneath.
- Wipe out stand mixer bowl, drizzle olive oil into the bowl, and turn dough over in the bowl several times to coat surface thinly with oil. Cover bowl with aluminum foil. Let dough rise in a warm place until doubled, about 2 hours.

- Transfer dough to a floured work surface and pat to flatten bubbles and form into a slightly rounded rectangle of dough about 5x10 inches and about ½ inch thick. Dust dough lightly with flour if needed. Cut dough into 8 equal pieces. Form each piece into a round shape, gently tucking ends underneath as before.
- Use your hands to gently pat and stretch the dough rounds into flat disc shapes about ½ inch thick. Arrange buns about ½ inch apart on prepared baking sheet. Dust buns very lightly with flour. Drape a piece of plastic wrap over the baking sheet (do not seal tightly). Let buns rise until doubled, about 1 hour.
- Preheat oven to 375 degrees F (190 degrees C).
- Beat 1 egg with milk in a small bowl, using a fork, until mixture is thoroughly combined. Very gently and lightly brush tops of buns with egg wash without deflating the risen dough. Sprinkle each bun with sesame seeds.
- Bake in the preheated oven until lightly browned on top, 15 to 17 minutes. Buns will stick together slightly where they touch. Let cool completely, tear the buns apart, and slice in half crosswise to serve.

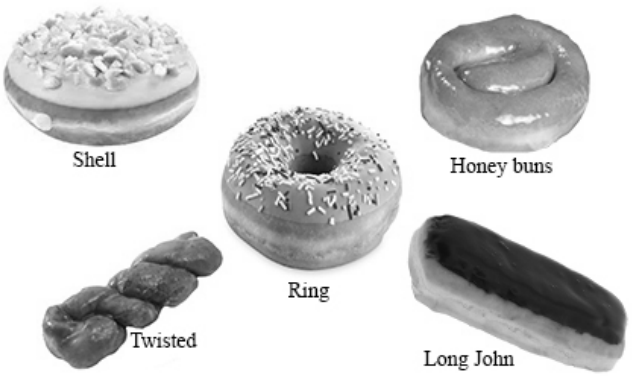
3.9 DOUGHNUTS AND CRULLERS

Doughnuts are deep –fried round wheel or ring shaped cakes or confectionary with a hole and with roots in European history in the Middle Eastern cuisine. They were introduced to America by the Dutch as *oliekoecken* (oil cakes or fried cakes). Another history illustrates that in ancient Rome and Greece, cooks would fry strips of pastry dough and coat them with honey or fish sauce. In Medieval times, Arab cooks started frying up small portions of unsweetened yeast dough, drenching the plain fried blobs in sugary syrup to sweeten them. These Arab fritters spread into northern Europe in the 1400's and became very popular Europe. Doughnuts are made of yeast dough rich in eggs and butter, spices and dried fruits, their sweetness came from the fruit and the final dusting of sugar. The original spelling for this fried good that first appeared in print back in the early 19th Century was '*doughnut*.' This combination of the words dough and nut was used because doughnuts were initially nut –sized balls of sweet dough deep –fried in oil or fat. The word 'nut' was used in the earlier context of referring to small rounded cake or cookies. It is called 'doughnut' in internationally, but 'donut' only in America.The holes became a necessity and were added to the center of the fritter. This was because the fritters would often end up raw in the center after frying– the exterior would cook before the inner part of the doughnut did. The addition of a hole in the center eliminated that problem. In some parts of America and Middle Europe doughnuts are also made in the shape of balls, fingers and stars.

Once fried, doughnuts may be glazed with a sugar icing, spread with icing or chocolate on top, or topped with powdered sugar, cinnamon, sprinkles or fruit and are filled with custards or fruit preserves. Other shapes include rings, balls, flattened spheres, twists, and other forms.

Leavening agents in doughnuts –
Doughnuts are prepared by using two types of leavening agents – natural leavening agents like yeast and chemical leavening agent like baking soda.

- Yeast –raised donuts that use yeast and fermentation to obtain its volume.
- Cake donuts that are chemically leavened (usually with a leavening agent and sodium bicarbonate)



Yeast raised doughnuts

Yeast raised Doughnuts: Yeast or raised (because the dough is raised) donuts, are your classic glazed donut . The dough is mixed with live yeast inside of it and it is cut out into a shape before being fried to golden colour. They're light and airy, but have a chew and a slight yeast flavor. The unique characteristics of donuts are their traditional ring shape and the method of frying in hot oil. Yeast –leavened donuts are porous, resilient and have a bread –like crumb structure. There are few variation according to their shaps ans sizes, like:

- ***Rings:*** conventional donut with a hole in the middle
- ***Twists:*** made by braiding or twisting one or two pieces of dough together
- ***Honey buns:*** cinnamon swirled rolls
- ***Shells:*** round and usually filled with jelly or cream
- ***Long johns:*** rectangular shape

The mixing method used to prepare yeast –raised doughnuts is the modified straight dough method.

1. The dough used for yeast doughnuts is similar to regular sweet dough or bun dough, except it is often not as rich—that is, doughnuts are made with less fat, sugar, and eggs. Doughs that are too rich will brown too fast and absorb too much frying fat. The finished products will be greasy and either too dark on the outside or insufficiently cooked inside. Also, a leaner dough has stronger gluten, which can better withstand the handling involved in proofing and frying.

2. After fermentation, bring the dough to the bench in sufficient time to allow for makeup. Remember that fermentation continues during makeup. If the dough gets too old (proofed too long), the doughnuts will require longer frying to become browned and thus will be greasier. When you are preparing a large quantity of doughnuts, it may be necessary to place some of the dough in the retarder so it doesn't become old.

3. Watch the dough temperature carefully, especially in warm weather. If the dough is much above 80°F (24°C), it will become old more quickly.

4. Proof the doughnuts at a lower temperature and humidity than you do breads. Some bakers proof them at room temperature, if there is a part of the bakeshop that isn't too hot (about 70°F/21°C). Doughnuts proofed this way are less likely to be deformed or dented when handled or brought to the fryer.

5. Handle fully proofed units carefully, as they are soft and easily dented. Many bakers give doughnuts only three –quarters proof. This makes a denser doughnut, but one that is easier to handle.

6. Heat the frying fat to the proper temperature. Fat temperature for raised doughnuts varies from 360° to 385°F (182° to 195°C), depending on the formula. Richer formulas require a lower temperature to avoid excessive browning. The formula in this book requires a frying temperature of 360° (182°C).

7. Arrange the proofed units on screens on which they can be lowered into fat. (For small quantities, you can place them by hand in the fryer, but take care not to burn yourself.) Frying time is about 2 ½ minutes. The doughnuts must be turned over when they are half done in order to brown evenly on both sides.

8. Lift from the frying fat with the screen, or, if you are frying in smaller quantities, with the frying basket or a spider, holding the doughnuts over the frying fat for a moment to let the fat drain from the doughnuts back into the kettle. Set the doughnuts on brown paper to absorb excess fat.

Recipe of yeast doughnut

Ingredients –

- Warm milk – ½ cup
- Sugar –1 tsp
- Dry yeast –1 tsp
- All purpose flour –2 cups
- Baking powder –¼ tsp
- Butter, room temperature –2 tbsp
- Salt –pinch
- Water – ½ cup water
- Refined oil to –grease & deep fry

For chocolate glaze:

- Powdered sugar –1 cup
- Cocoa powder –¼ cup
- Vanilla extract / essence –1 tsp
- Milk –3 tbsp

Method –

- Firstly, activate yeast by adding milk and sugar.
- Now add maida, baking powder, butter and salt.
- Combine and knead to smooth dough adding water as required.
- Grease, cover and rest for 1 –2 hours.
- Punch the dough and roll slightly thick using rolling pin.
- Now with the help of donut cutter, cut round.
- Allow to rest in warm place for 2 hours.
- Deep fry in medium hot oil to golden brown.
- Dip the doughnuts and serve chocolate donuts sprinkled with sugar crystals.

Cake Doughnuts: A cake donut is made with a sweetened batter that's leavened with the help of baking powder or baking soda, and is extruded into oil to cook. Cake doghnuts include apple cider donuts, chocolate cake donuts with glaze, and those crunch old fashioned donuts that are sometimes glazed and sometimes not. Cake doughnut production proceeds at very fast rates leaving a very small window between mixing and frying stages, so proper scheduling of the operations is a must. The batter dropped into the frying fat must rise to the surface (become less dense) very quickly so that it can be conveyed at the surface by the flights of the continuous fryer, or the next batter piece will be dropped on top of the previous deposited doughnut.

Automated and pre –mix batter: Operations that produce cake doughnuts in volume use equipment that drops batter directly into the hot fat. This equipment is usually automatic, although small hand –operated depositors are also available. Automatic depositors use relatively slack dough that is generally made from prepared mixes. To use these mixes and depositors, follow two important guidelines:

- Follow manufacturers' directions closely when preparing the mix.
- Keep the depositor head 1 ½ inch (4 cm) above the fat. If the doughnut must drop much farther than this into the fat, poor shape may result.
- Operations that make cake doughnuts by hand use a stiffer mix that is rolled out and cut with cutters. Three formulas for this type of mix are included in this chapter.

Follow these guidelines when preparing cake doughnuts:

1. Scale ingredients carefully. Even small errors can result in products with unsatisfactory texture or appearance.

2. Mix the dough until smooth, but do not overmix. Undermixed doughs result in a rough appearance and excessive fat absorption. Overmixed doughs result in tough, dense doughnuts.

3. Dough temperature should be about 70° to 75°F (21° to 24°C) when the units are fried. Be especially careful of dough temperature during hot weather.

4. Let the cutout units rest about 15 minutes before frying in order to relax the gluten.

5. Failure to relax the dough results in toughness and poor expansion.

6. Fry at the proper temperature. Normal fat temperature for cake doughnuts is 375° to 385°F (190° to 195°C). Frying time is about 1 ½ to 2 minutes. Doughnuts must be turned over when half done.

Recipe of cake doughnut

Doughnut batter: Traditionally deep –fried, cake doughnuts start with a flour batter made with baking powder, sugar, milk and butter. The batter is usually piped directly into hot oil in a doughnut shape or into doughnut molds for baking.

Ingredients –

- All –purpose flour – 2 cups
- Baking powder – 1 tsp
- Salt – ½ tsp
- Freshly grated nutmeg (optional) – ½ tsp
- Egg – 1 room temperature
- Granulated sugar –2/3 cup
- Vanilla extract –1 ½ tsp
- Unsalted butter – ½ tbsp, melted and cooled
- Buttermilk – ½ cup (or milk), at room temperature
- Vegetable, canola, or peanut oil – for frying

For the chocolate glaze:

- Unsalted butter – 100 gm
- Whole milk – ¼ cup
- Light corn syrup – 2 tsp
- Vanilla extract – 1 tbsp
- Semi –sweet chocolate – 100 gm chopped
- Powdered sugar – 2 cups sifted

Method –

- In a large bowl, mix together all the flour, baking powder, salt, and nutmeg.
- In another large bowl, use an electric mixer fitted with the paddle attachment to beat the eggs and sugar until thick and pale, about 5 minutes. Beat in the vanilla extract.
- On low speed, alternately add the flour mixture with the milk and melted butter, starting and ending with the flour. The dough will be soft.
- Cover with plastic wrap and let sit at room temperature for 30 minutes, or until the dough is firm enough to handle.
- Turn the dough out onto a floured work surface. Roll the dough out into ¼ inch thickness and cut with a doughnut cutter or with a large round cutter and a small cutter for the holes. Place the doughnuts on a lightly floured parchment lined baking sheet. Let the doughnuts sit at room temperature while you heat the oil.

- Heat the oil in a large, deep, and heavy pan to 176°C. Place three to four doughnuts in the oil at a time and fry until golden brown, about 1 minute or less per side (30 seconds for the holes).
- Do not overcook the doughnuts. Drain on a paper towel –lined plate.

For the glaze:

- In a medium saucepan over medium heat, combine the butter, milk, corn syrup, and vanilla and heat until the butter melts. Decrease the heat to low and add the chocolate, whisking until melted. Turn off the heat and add the powdered sugar, whisking until smooth.
- Immediately dip the doughnuts into the glaze. If the glaze begins to set return the saucepan to low heat and stir until liquid again. Let the glaze set on the doughnuts for 30 minutes before serving.

Preparation and Care during frying doughnuts: Properly fried doughnuts absorb about 2 ounces (60 g) of fat per dozen. Therefore, frying fat should be of good quality and properly maintained; otherwise, the quality of the doughnuts will suffer. Observe the following guidelines for care of frying fat:

1. Use good –quality, flavorless fat. The best fat for frying has a high smoke point (the temperature at which the fat begins to smoke and to break down rapidly).
2. Solid shortenings are popular for frying because they are stable and because they congeal when the doughnuts cool, making them appear less greasy. However, such doughnuts can have an unpleasant eating quality because the fat does not melt in the mouth.
3. Fry at the proper temperature. Using too low a temperature extends frying time, causing excessive greasiness.
4. If you do not have automatic equipment with thermostatic temperature controls, keep a fat thermometer clipped to the side of the frying kettle.
5. Maintain the fat at the proper level in the fryer. When additional fat must be added, allow time for it to heat.
6. Do not fry too many doughnuts at a time. Overloading will lower the fat temperature, will not allow room for expansion of the doughnuts, and will make it difficult to turn them over.
7. Keep the fat clean. Skim out food particles as necessary. After each day's use, cool the fat until it is warm, strain it, and clean the equipment.
8. Discard spent fat. Old fat loses frying ability, browns excessively, and imparts a bad flavor.
9. Keep the fat covered when not in use. Try to aerate it as little as possible when filtering.

Finishing Doughnuts: Doughnuts should be well drained and cooled before finishing with sugar or other coatings. If they are hot, steam from the doughnuts will soak the coating. The following are some popular coatings and finishes for doughnuts:

- Roll in a mixture of cinnamon and powdered sugar or simple powdered sugar.
- Ice the tops of the doughnuts with a fondant or fudge icing.
- To glaze, dip in warm Doughnut Glaze (recipe follows) or in a warmed, thinned simple icing or fondant. Place on screens until glaze sets.
- After glazing, and while glaze is still moist, doughnuts may be rolled in coconut or chopped nuts.

Some finishing options:

- **Powdered:** Toss in powdered sugar or cinnamon sugar.
- **Glazed:** Mix 3/4 cup powdered sugar, 3 to 4 tbsps heavy cream or milk (enough to make a runny glaze), and ½tsp vanilla (optional).
- **Chocolate –glazed**: Mix 3/4 cup powdered sugar, 2 tbsps dark cocoa powder, and 4 to 5 tbsps milk or cream.
- **Chocolate –coated**: Dip doughnuts in tempered chocolate thinned with 1 to 2 tbsps vegetable oil.
- **Fruit –glazed:** Mix 1 cup powdered sugar and ¼ cup fruit purée.
- **Violet –glazed:** Mix 1 cup powdered sugar, ¼ cup cream or milk, and 1 tsp violet extract. Garnish with candied violets.
- **Pistachio:** Glaze donuts with basic glaze, then press in chopped toasted pistachios.
- **Coconut: Glaze** with coconut glaze (1 cup powdered sugar, ¼ cup coconut milk, and ½tsp vanilla), and press in toasted coconut flakes.
- **Black and white:** Make a dark chocolate ganache with 1 cup chopped dark chocolate and ½ cup heavy cream. Make a white chocolate ganache with 1 cup chopped white chocolate with ¼ cup heavy cream. Glaze half the doughnut with the chocolate glaze and half with the white glaze.
- **Caramel –glazed:** Melt 1 cup of caramel candies with 1/3 cup heavy cream in the microwave in 10 –second blasts until fully melted. Thin the glaze with additional milk or cream as needed to get a pourable glaze.
- **Meyer lemon:** Mix 1 cup powdered sugar with the zest and juice of 1 Meyer lemon, then add enough milk to form a pourable glaze.
- **Cinnamon roll:** Roll out the dough to ¼ inch thick. Mix together 1 stick melted butter with 1 cup granulated sugar and 2 tbsps ground cinnamon. Spread the mixture evenly all over the dough, then roll tightly into a cylinder. Cut into 1 inch –thick pieces, then fry until golden brown. Glaze with basic glaze.

Comparison between the Yeast raised doughnuts and Cake doughnuts

1. Yeast doughnuts are made of dough, where as cake doughnuts are made of batter.

2. Yeast doughnuts, as the name clearly spells out, are made from dough leavened with yeast, whereas cake doughnuts are traditionally made from a

kind of cake batter that uses a chemical leavener (i.e. baking powder or baking soda).

3. The dough of Yeast doughnuts are very less sweeter than that of cake doughnuts batter.

4. Yeast doughnuts are lighter: Once cooked, a cross –section reveals a mosaic of air pockets, giving the style a puffy, malleable quality, and a slightly chewy texture. Cake doughnuts, on the other hand, have a dense, more compact crumb, and a sturdy, crisp exterior shell.

5. Yeast doughnuts typically get most of their flavor from the glaze or icings or the fillings, where as in Cake Doughnuts, the batter can come in different kinds of flavorings.

6. Yeast doughnuts are generally soft, fluffy with a smooth surface but with lots of bubbles high amount of fat and liquid, but cake doughnuts have small pores that lack honeycomb structure, less soft and fluffy.

7. Yeast doughnut has more chewey where as cake doughnut is much tenderer.
8. All Yeast doughnuts do not look alike, where as all cake doughnuts look alike.

9. Yeast doughnuts are pliable and so it is easier to fill with jam or cream, where as cake doughnut is not pliable and so jam or cream cannot be filled, instead they can be sandwiched between the two layers of the doughnut which has been sliced.

10. Yeast doughnuts take time to prepare as the yeast requires some time to ferment and raise the dough, whereas the baking powder in cake dough batter rises instantly and the product comes our easily. Moreover Yeast – raised donuts absorb less oil than the cake variety.

Crullers: These are rich, light disk or oblong shaped cakes, similar to doughnuts, but are made of rich dough twisted or curled, fried in deep fat and topped with white icing.Crullers are most commonly found in Canada, New England, the Mid –Atlantic and North Central states of the United States, but are also common in California. The German origin is probably why traditional crullers can be found more

Crullers

easily in the Midwest, where many German immigrants settled. The traditional French cruller is made from pate a choux and is basically hollow. The word "cruller" comes from the Dutch word "krulle" or "krullen," meaning twisted cake.

Difference between a cruller and a doughnut: Yeast Donuts are soft, tender with a slight fermented flavor and sweet to the taste. A Cruller has a soft, airy texture with a pleasant light "egg –like" flavor. The center of the Cruller is wet with a crunchy exterior. The shape of a proper Cruller should resemble a golden brown pinwheel.

Recipe

Ingredients –

- Water –1 cup
- Unsalted butter –6 tbsp
- Superfine sugar –2 tsp
- Salt –¼ tsp
- All –purpose flour, sifted –1 cup
- Eggs –3 nos
- Slightly beaten egg whites –2 nos
- ½ –inch star pastry attachment
- Vegetable oil –for frying

For honey glaze:

- Honey – ¼ cup
- Light brown sugar –1 tbsp
- Butter –1 tbsp

Method –

- Bring the water, butter, sugar and salt to a brisk boil in a heavy –bottomed saucepan.
- Stir in the flour all at once and continue stirring until the flour is completely incorporated. Keep stirring over medium –high heat. The more moisture you can remove, the more eggs you can mix in later which will result in a lighter pastry.
- When you see a thin film start to coat the bottom of the pan, the batter is ready. Transfer the dough to the bowl of a stand mixer. Use the paddle attachment to stir the dough for a minute to help it cool. Turn the mixer to medium speed and add one egg. Don't add the next egg until the previous has been completely incorporated into the dough.
- Then add the egg whites a little bit at a time until the dough becomes smooth and glossy and holds a little shape (not much). Do not add too much egg white or else the crullers will become heavy.
- Transfer the dough to a large pastry bag fitted with a ½ –inch star tip.
- Fry the crullers in 2 inches (or more) of hot vegetable oil in a heavy –bottomed saucepan.
- While the oil is heating, cut a dozen 3 –x3 –inch squares of parchment. Lightly grease the squares on one side and pipe a ring of dough onto each of the squares.

- When the oil has reached temperature, carefully place a French cruller, paper –side up, into the hot oil maximum possible all together.
- After a minute or so, use tongs and a sharp knife tip to gently peel the parchment off the cruller.
- When the cruller turns golden (about 2 minutes), flip it over and let it fry for another couple of minutes before removing it to drain on a cooling rack or paper towels.

Make the glaze:

- While the cruller donuts cool, mix the confectioners' sugar, honey, and milk together until smooth.
- When the crullers are cool to the touch, dip the top of each cruller into the honey glaze and set on a cooling rack to let the drips run off. When the glaze has set, the crullers are ready to serve.

Crullers can also be baked.

- Preheat oven to 450°F.
- Pipe crullers onto a parchment –lined baking sheet at least 2 inches apart. Bake for five minutes then reduce oven to 350 degrees and bake another 15 minutes.
- Turn off heat, open the oven door a crack, and let crullers sit for 5 to 10 minutes.
- Glaze and serve.

Whole wheat doughnuts: The whole wheat grain when ground with the skin and germ yields brownish flour called 'atta'or whole wheat flour. The same when refined further or ground without the skin yields whiter flour called 'maida' or refined flour. Whole wheat flours contain lots of fibres and are very important for health as it is easier to digest. So nowadays bakers and confectioners have started preparing doughnuts using whole wheat flour in the recipe, either alone or with a mixture of refined flour. They are mixing whole wheat flour with refined flour to make the product. Although the texture of whole wheat flour doughnut is a bit coarser than the only refined flour doughnut, but one can easily prefer the earlier one than the later when it comes to health.

Recipe with mixture of whole wheat flour and refined flour
Ingredients –

- Warm milk –1 cup
- Dry active yeast –2 tbsp
- All purpose flour –3/4 cup
- Egg yolks –3 nos
- Granulated sugar –2 tbsp
- Vanilla extract –1 tsp
- Salt – ½ tsp
- White whole wheat flour, divided –1 ½ – 1 3/4 cups
- Unsalted butter (softened) or shortening –¼ cup
- Canola oil –for frying
- Filling – peanut butter or lemon curd both

- Glaze or powdered sugar – as required

Method –

- Pour the warm milk into the mixing bowl of a stand mixer. Add the yeast and whisk until dissolved. Whisk in the all purpose flour until the mixture is smooth. Cover the bowl and let the mixture rest in a warm place for 30 minutes.
- Add the egg yolks, sugar, vanilla, salt, and ½ cup of the whole wheat flour. Using the beater blade, beat on low speed until combined and smooth. Add in the butter/shortening and continue to beat on low speed until fully incorporated.
- Switch to the dough hook attachment, and gradually add the remaining flour while beating on low speed. Add just enough flour for the dough to come together and pull away completely from the sides of the bowl. Transfer the dough to a greased bowl, cover with plastic wrap, and refrigerate overnight (or at least 6 hours).
- Once the dough has chilled and risen, turn it out onto a lightly floured surface. Roll it out to about ½ –inch thickness. Use round cookie cutters or biscuit cutters (about 2 ½ to 3 inches in diameter) to cut circles from the dough. Gather up the scraps, re –roll, and continue to cut out circles. Use a smaller cookie cutter to cut doughnut holes from the scraps if you like, as well. Transfer the round doughnuts to a baking sheet and let them rise for about 15 minutes.
- While the doughnuts rise, pour about two inches of oil into a large, deep pot. Heat the oil to about 360°F to fry the doughnuts.
- Meanwhile, line a baking sheet with paper towels and place a wire cooling rack on top of the baking sheet.
- Once the oil comes up to temperature, carefully fry the doughnuts a few at a time, making sure there is plenty of room in the pot. Fry for a minute or two on each side, until the doughnut is puffy and golden. Use a slotted spoon to remove the doughnuts from the oil and then transfer them to the cooling rack to cool.
- When the doughnuts are completely cool, they can be filled with your filling of choice using a pastry bag and a large round pastry tip and glazed or dipped in chocolate.

Recipe with only whole wheat flour
Ingredients –

For Dough
Whole Wheat Flour- 1¼ Cup
Yogurt-¼ Cup
Milk- ¼ cup or as required
Sugar- 2 tbsp
Butter-1tbsp
Baking Powder-1tbsp
Vanilla Essence- 1tbsp
Salt- a pinch
Baking soda- a pinch

For Glaze/Coating
Powder Sugar- ½ Cup

Melted Butter- 2-3tbsp
Warm Water- 2-3 tbsp

Method –

- Take wheat flour in a mixing bowl. Add 1 tbsp butter to it. Mix with finger tips.
- Add powdered sugar, baking Soda, baking powder, salt and vanilla essence to the mixture. Mix well.
- Add yogurt to the mixture. Mix to get a crumbled texture.
- Add required warm milk little by little to get smooth dough. Cover and set aside the dough for 15 minutes. Meanwhile, preheat the oven at 200 degree Celsius for 15 minutes.
- Dust the working surface with little flour and knead the dough again for 2 –3 minutes. Roll it into a thick circle.
- Use a doughnut cutter or use a round cookie cutter or a sharp corner round glass and cut into small disk. Take a small cap/lid of bottle, press on centre of disk and make small hole to get exact shape of doughnut.
- Place the doughnuts on a parchment paper lined baking tray. Bake for 10 –12 minutes or until golden brown in a preheated oven at 200 degree Celsius. I have baked the doughnuts in a microwave using convection mode. Keep an eye on the doughnuts while baking after 7 –8 minutes as temperature may vary from oven to oven.
- Take a small bowl for sugar glaze. Add powder sugar, melted butter, and warm water, mix it well and make syrup. Dip the baked doughnuts in the sugar syrup to coat them from all sides with the syrup. Allow to drain on a wired rack.
- Serve with coffee.

CHECK YOUR PROGRESS-IV

1. Write note on different types of buns.

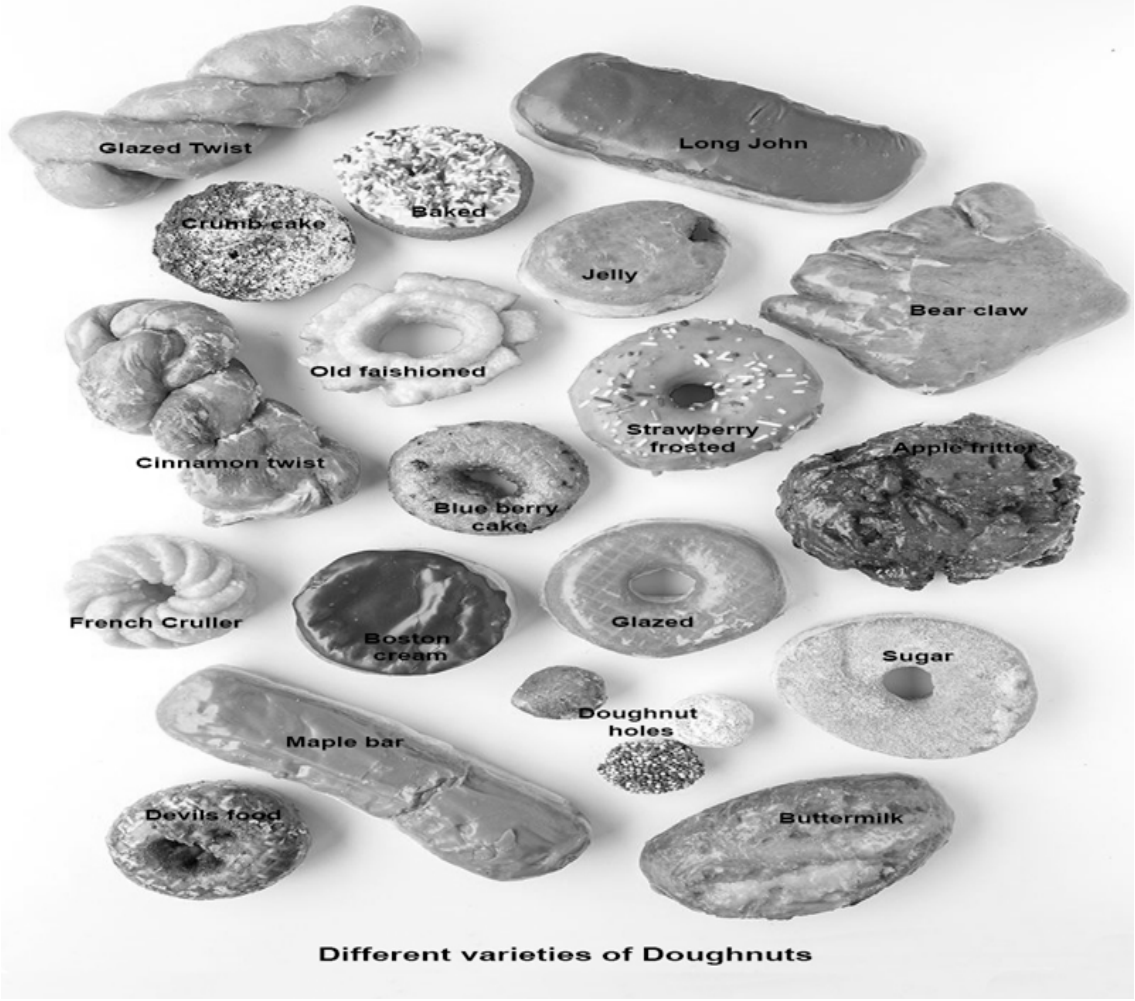
2. Difference between a cruller and a doughnut.

3.10 COMMON PROBLEMS WITH DOUGHNUTS AND CRULLERS

Some of the common faults and problems that arrises are described in table below with is causes:

S.No	Problem	Causes
1	Balled up (they tend to shrink (in width, not in height) and ball up when fried.)	Excessive handling during makeup. Too much dusting flour. The dough has not had enough time to rest (especially donuts cut from the second re –roll),
2	Blistered doughnuts	Dough too warm. Under mixed. Too little floor time. Frying temperatures too high. Excessive handling. Batter too cold.
3	Cracked donuts	This may have happened if you used a cutter and it wasn't sharp enough to cut through the dough cleanly. Or the dough is under proofed or too cold.
4	Collapsed doughnuts (Leads to oily, collapsed, flat donuts).	Under –mixed. Excessive floor time and handling. Too much dusting flour and scrap in dough. Batter too cold. Over proofed

5	Darkcrust	Too little floor time. Frying temperatures too high–fat broken down.
6	Excessive spread	Too much water. Frying temperature too low. Fat broken down. Low fat level. Too much moisture in proofer.
7	Excessive sweating (glazed)	Too much water. Under mixed. Frying temperature too high. Fat broken down. Fat too new.
8	High fat absorption	Dough too warm. Too much water. Under mixed. Excessive floor time. Frying temperature too low. Fat melting point too low. Fat broken down.
9	Lightcrust	Dough too warm. Excessive floor time. Frying temperature too low. Fat too new. Too much scrap in dough. Dough too old or young.
10	Low volume	Dough too warm. Too little water. Over or under mixed. Frying temperature too high. Excessive handling. Too much dusting flour. Too much scrap in dough. Batter is too warm
11	Poor keeping quality	Dough too warm. Too little water. Frying temperature too high. Too much cooling. Fat absorption too low. Excessive handling during makeup. Too much dusting flour. Too much scrap in dough.
12	Too tough (leads to stiffer (denser) doughnuts that don't puff up well when fried.)	Dough too cold. Not enough water. Over mixed. Too much cooling. Excessive handling. Too much dusting flour. Too much scrap in dough. Under proofed
13	Asymmetrical structure	A slack dough, excessive dusting flour, careless rolling and cutting, overproofing or fermentation and proofing temperatures that are too high contribute to poor symmetry or shape.



Different varieties of Doughnuts

CHECK YOUR PROGRESS-V

1. Write note on Common problems with doughnuts.

3.11 SUMMARY

Dough is a thick, malleable, sometimes elastic paste made out of any grains, leguminous or chestnut crops. Dough is typically made by mixing flour with a small amount of water and/or other liquid, and sometimes includes yeast or other leavening agents as well as other ingredients such as various fats or flavorings.

Basic sweet yeast dough is enriched dough, also known as rich dough. This means that the dough is made with fat, sugar, and sometimes eggs, as opposed to lean doughs that do not have any fat present. The addition of fat to yeast dough creates bread that tends to have a softer crust and less chewy crumb and is more flavorful in general.

A Danish pastry, sometimes also known as just Danish, is a multilayered, laminated sweet pastry in the viennoiserie tradition. This pastry type is named Danish because it originates from Denmark. The concept was brought to Denmark by Austrian bakers, and has since developed into a Danish specialty. Like other Viennoiserie pastries, such as croissants, it is a variant of puff pastry made of laminated yeast –leavened dough that creates a layered texture. It consists out of yeast –leavened dough and a type of fat; mostly butter or margarine.

Croissants are a style of crescent shaped Viennoiserie pastries of Austria.Viennoiseries in French comes from the word "Viennois" for people and things from Vienna. The legend takes place during the Ottoman Turk siege of the city; a baker apparently heard the Turks tunneling under the walls of the city as he lit his ovens to bake the morning bread. He quickly sounded an alarm, and the military collapsed the tunnel, saving the city. To celebrate, the baker baked crescent –shaped bread'kipferl', in the shape of the crescent moon of the Turkish flag.

A roll cake is a cake that is rolled. A roll cake is often called a Swiss roll, jelly roll, roll cake, cream roll, or Swiss log. It's a type of sponge cake that is filled with whipped cream, jam or frosting and then rolled into a spiral before serving. A roll cake is similar to a roulade but a roulade can be filled with other things besides sweet fillings and can even be savory. The origins of the term are unclear. In spite of the name "Swiss roll", the cake is believed to have originated in the nineteenth century elsewhere in Central Europe, likely Austria.

A bun is a small, sometimes sweet, bread –based item or roll. Though they come in many shapes and sizes, they are most commonly hand –sized or smaller, with a round top and flat bottom. Buns are usually made from flour, sugar, milk, yeast, butter and occasionally egg. Common sweet varieties contain small fruit or nuts, and may topped with icing or caramel, or filled with jam or cream. Some types of buns are filled with various meats, or used to serve meats (such as hotdogs or hamburgers). "Bun" may also refer to particular types of filled dumplings, such as Chinese *baozi*. Some of these types of dumplings may be bread –like in texture. They are also called Dinner roll in England.

Doughnuts are deep –fried round wheel or ring shaped cakes or confectionary with a hole and with roots in European history in the Middle Eastern cuisine. They were introduced to

America by the Dutch as *oliekoecken* (oil cakes or fried cakes). Another history illustrates that in ancient Rome and Greece, cooks would fry strips of pastry dough and coat them with honey or fish sauce. In Medieval times, Arab cooks started frying up small portions of unsweetened yeast dough, drenching the plain fried blobs in sugary syrup to sweeten them. These Arab fritters spread into northern Europe in the 1400's and became very popular Europe. Doughnuts are made of yeast dough rich in eggs and butter, spices and dried fruits, their sweetness came from the fruit and the final dusting of sugar.

Crullers are rich, light disk or oblong shaped cakes, similar to doughnuts, but are made of rich dough twisted or curled, fried in deep fat and topped with white icing. Crullers are most commonly found in Canada, New England, the Mid –Atlantic and North Central states of the United States, but are also common in California. The German origin is probably why traditional crullers can be found more easily in the Midwest, where many German immigrants settled.

3.12 GLOSSARY

Anpan – A bun that is filled, usually with red bean paste, or with white beans, sesame, or chestnut

Bakpao – Indonesian term for steamed bun. The bun is usually filled with pork, but can also be filled with other ingredients, such as chicken, peanuts, or mung beans.

Bánh bao – Vietnamese meaning "Enveloping Cake", which is a ball –shaped bun containing pork or chicken meat, onions, eggs, mushrooms and vegetables, in the Vietnamese cuisine

Baozi – A type of steamed, filled bun or bread –like item made with baker's yeast in various Chinese cuisines, as there is much variation as to the fillings and the preparations

Blaa – A dough –like, white bread bun (roll) speciality particularly associated with Waterford, Ireland; historically, the blaa is also believed to have been made in Kilkenny and Wexford.
Bread roll – A short, oblong, or round bun served usually before or with meals, often with butter.

Breakfast roll – The breakfast roll is a bread roll filled with elements of a traditional fried breakfast. It typically consists of a bread roll or baguette containing one or more fillings such as sausages, bacon, white or black pudding, butter, mushrooms, tomatoes and tomato sauce or brown sauce. In some cases a hash brown, baked beans or fried egg may be added.

Bun – A bun is a small, sometimes sweet, bread –based roll. Though they come in many shapes and sizes, they are most commonly hand –sized or smaller, with a round top and flat bottom. Buns are usually made from flour, sugar, milk, yeast and butter. Common sweet varieties contain small fruit or nuts, and may topped with icing or caramel, or filled

with jam or cream. Some types of buns are filled with various meats, or used to serve meats (such as hotdogs or hamburgers).

Bunuelo — A fried dough ball popular in Latin America, Greece, Guam, Turkey, Israel and Morocco. It will usually have a filling or a topping.

Challah Roll – is a special bread in Jewish cuisine, usually braided and typically eaten on ceremonial occasions such as Shabbat and major Jewish holidays (other than Passover).

Ritually –acceptable challah is made of dough from which a small portion has been set aside as an offering.

Cheese bun – A variety of small, baked, cheese –flavored rolls, a popular snack and breakfast food in Bolivia, Brazil (especially in the state of Minas Gerais), Paraguay, Colombia and northern Argentina.

Chelsea bun – A currant bun that is first created in the 18th century at the Chelsea Bun House in Chelsea, London, an establishment favoured by Hanoverian royalty which was demolished in 1839.

Cinnamon bun – A sweet roll served commonly in Northern Europe and North America; its main ingredients are dough, cinnamon, sugar, and butter, which provide a robust and sweet flavor

Cocktail bun – A Hong Kong –style sweet bun with a filling of shredded coconut; one of several iconic types of baked goods originating from Hong Kong.

Concha – are known for their shell –like shape and sugar shell pattern on the top. It is similar to Japanese melon pan. This is one of the most famous Mexican pastries and widely recognized in the United States. It is also referred to as "pan de huevo" (egg bread) in other Latin American countries, such as Chile, where they are eaten during tea time or at the beach.They are known as Cemitas in Honduras.

Cream bun – A bun that varies all around the world; typically they are made with an enriched dough bread roll that is baked and cooled, then split and filled with cream.

Curry bread – Some Japanese curry is wrapped in a piece of dough, which is coated in flaky bread crumbs, and usually deep fried or baked.

Dampfnudel – A white bread roll or sweet roll eaten as a meal or as a dessert in Germany and in France (Alsace); a typical dish in southern Germany.

French roll – a circular or oval bread roll having a hard or crispy crust. Also called French twist. Named after a coiffure for women in which the hair is combed back from the face and arranged in a vertical roll on the back of the head

Fruit bun – A sweet roll made with fruit, fruit peel, spices and sometimes nuts; a tradition in Britain and former British colonies including Jamaica, Australia, Singapore, and India.

Hamburger bun – A round bun designed to encase a hamburger; invented in 1916 by a fry cook named Walter Anderson, who co –founded White Castle in 1992.

Hot cross bun – A sweet, spiced bun usually made with fruit but with other varieties such as apple –cinnamon or maple syrup and blueberries and marked with a cross on the top, traditionally eaten on Good Friday in the UK, Australia, New Zealand, South Africa, and Canada, but now popular all year round.

Hot dog bun – A long, soft bun shaped specifically to contain a hot dog or frankfurter.

Mandarin roll – A steamed bun originating from China; cooked by steaming; a food staple of Chinese cuisine which is similar to white bread in western cuisine.

Parker House roll – s a bread roll made by flattening the center of a ball of dough with a rolling pin so that it becomes an oval shape and then folding the oval in half. They are made with milk and are generally quite buttery, soft, and slightly sweet with a crispy shell. They were invented at the Parker House Hotel in Boston, during the 1870s.

Piggy bun – A Hong Kong pastry that is essentially the equivalent of the French baguette; found in Hong Kong bakeries and Cha chaan teng; in Hong Kong, it is often cut in half and served with butter and condensed milk.

Pork chop bun – famous and popular snack in Macau, the "piggy bun" is crisp outside and soft inside; a freshly fried pork chop is filled into it

Rum roll – historic Washington D.C. specialty, similar to a cinnamon bun with rum flavored icing.

Sally Lunn bun – A enriched yeast bread associated with the city of Bath in the West Country of England.

Semla – A traditional sweet roll made in various forms in Denmark, the Faroe Islands, Iceland, Estonia, Finland, Latvia, Lithuania, Sweden and Norway; associated with Lent and especially Shrove Monday and Shrove Tuesday; the oldest version of the semla was a plain bread bun, eaten in a bowl of warm milk; in Swedish this is known as Hetvägg

Shengjian mantou – A type of small, pan –fried baozi which is a specialty of Shanghai and usually filled with pork and gelatin that melts into soup/liquid when cooked.

Siopao – Hokkien term for baozi, literally meaning "steamed buns"; it has also been incorporated into Thai cuisine where it is called salapao.

Sticky bun – A dessert or breakfast sweet roll that generally consists of rolled pieces of leavened dough, sometimes containing brown sugar or cinnamon, which are then compressed together to form a flat loaf corresponding to the size of the baking pan; they have been consumed since the Middle Ages, at which time cinnamon became more prominent.

Sufganiyah – A deep –fried bun, filled with jam or custard, and then topped with powdered sugar. Typically eaten in Israel during Hanukkah.

Sweet roll – A sweet roll or sweet bun refers to any of a number of sweet, baked, yeast –leavened breakfast or dessert foods. They may contain spices, nuts, candied fruits, etc., and are often glazed or topped with icing. Compared to regular bread dough, sweet roll dough generally has higher levels of sugar, fat, eggs, and yeast. They are often round, and are small enough to comprise a single serving.

Teacake – A fruited sweet bun usually served toasted and buttered.

Tingmo – Steamed bread in Tibetan cuisine. It is sometimes described as a steamed bun that is similar to Chinese flower rolls. It does not contain any kind of filling.

Xiaolongbao – A steamed bun from the Jiangnan region of China; fillings vary by region and usually include some meat and/or a gelatin –gelled aspic that becomes a soup when steamed.

Zeeuwse bolus – A spiral shaped bun covered in dark brown sugar, lemon zest and cinnamon.

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3.14 SUGGESTED READINGS

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3.15 TERMINAL QUESTIONS

1 Write a note on 'Basic sweet yeast dough'.
2 What is Danish pastry? Write the recipe of the Danish pastry.
3 What is Croissants? Write the recipe of the Croissant.
4 Write a note on 'Coffee cake dough products'.
5 List the different types of buns.
6 Write the recipe of Swiss Roll.
7 Write the recipe of 'Baba au Rhum'.
8 Difference between bread and a bun.
9 Write a note on Doughnuts.
10 Write the recipe of cake doughnut.
11 Write a note on "finishing options for doughnuts'
12 What are the crullers? Explain with example.
13 Difference between a cruller and a doughnut.
14 Difference between the Yeast raised doughnuts and Cake doughnuts.
15 List some Common problems with doughnuts and crullers and explain the causes of the same.

UNIT: 04
PASTRIES

STRUCTURE

4.1 INTRODUCTION

Words are complicated. There's so many of them, and some of them sound the same but are spelled differently, and mean different things. Similar is the case of Pastry where this word becomes enormously confusing. A pastry chef in a restaurant is in charge of pretty much anything sweet or baked, which can include but not be limited to: breads, cakes, pie, ice cream, candies, mousses, muffins, sweet breads, puddings, cookies, laminated dough pastries, entremets, and both chocolate and sugar work. But if you look up the word pastry in a dictionary it seems to pretty much indicate a dough paste made with a solid fat that is rolled, like a pie crust or puff pastry, where the word pastry is right in the name to either eliminate confusion or add to it, depending on your mood.

So if a pastry chef makes cake, does that make cake pastry? And if we postulate such a theory, are we suddenly in the middle of some high school logic exam question? If all cake is baked and all baked goods are pastry then all cake is pastry. But if all pastry is not cake, then what the heck is it?

Pastry is dough of flour, water and shortening that may be savoury or sweetened. Sweetened pastries are often described as bakers' confectionery. The word "pastries" suggests many kinds of baked products made from ingredients such as flour, sugar, milk, butter, shortening, baking powder, and eggs. Small tarts and other sweet baked products are called pastries. The French word pâtisserie is also used in English (with or without the accent) for the same foods. Common pastry dishes include pies, tarts, quiches and pasties. Pastry can also refer to the pastry dough from which such baked products are made. Pastry dough is rolled out thinly and used as a base for baked products.

Pastry is differentiated from bread by having a higher fat content, which contributes to a flaky or crumbly texture. A good pastry is light and airy and fatty, but firm enough to support the weight of the filling.

Various types of pastries are used in the preparation of sweet and savory dishes in the bakery and confectionery. These include:

1. Short crust pastry
2. Flaky pastry
3. Puff pastry
4. Danish pastry
5. Choux pastry
6. Rough puff pastry
7. Hot water pastry

4.2 OBJECTIVE

After reading this unit the learner will be able to:

- Define Short Dough Pastries
- Identify products made from Puff Pastries
- Identify and resolve Common Problems with Puff Pastries
- Define Éclairs and Cream Puffs
- Prepare Cream Cheese Dough Products
- Define Icings and Cream and Whipped Toppings
- Identify Cakes and Cake Specialties
- Classify Cakes
- Describe various Cake Making Methods
- Describe about Cake Improvers
- Identify and resolve various Problems with Cake Production

4.3 SHORT CRUST/DOUGH PASTRIES

Short crust pastry is the simplest and most common pastry. It is made with flour, fat, butter, salt, sugar, water and sometimes egg and milk to bind the dough. This is used mainly in preparation of tarts, quiche or pie, biscuits and cookies. The flour should have low gluten content, one that is milled from soft wheat flour. The fat will reduce the extensibility of the gluten that is it makes the gluten strands shorter….hence the term

*shortening*for the fat used in the bakery and the term *short crust pastry*. The usual method of making short crust pastry is by the rub –in method. Chilled fat or butter is rubbed into the sieved flour so that it is finely dispersed and resembles a sandy or bread crumb like texture. The fat forms a thin layer or coating on the glutenin and gliadin molecules and results in a short (as in crumbly; hence the term shortcrust), tender pastry, without turning the fat into a continuous paste. Cold water is sprinkled over the mixture to form smooth dough. The ratio of fat to flour is normally 1:2, but the fat can be increased to equal the flour to obtain rich dough. This dough would be very difficult but not impossible to work with. Pate Sucre is a sweet version of this pastry and sugar is creamed with butter before the flour and the moisture is added. The ratio of sugar fat and flour is 1:2:4. Various sweet and savoury products are made with short crust pastry. It forms the base of several pies, tarts, flans and also products like cheese straws and turnovers. A related type is the sweetened sweet crust pastry, also known as *pâte sucrée*, in which sugar and egg yolks have been added (rather than water) to bind the pastry. Few precautions must be taken when making short crust pastry. It is important not to work the dough too much as it will get tough due to the development of gluten. This can also happen when scrapings and trimmings are added to the dough and re –worked. The use of too much flour for dusting will also alter the ratio of the mixture and cause toughening as the extra flour proteins – *glutenin* and *gliadin* – does not have a coating of fat around it, and thus come together to form gluten.

Types of short crust pastries:

1. ***Pâte à foncer*** is French shortcrust pastry that includes egg. Egg and butter are worked together with a small quantity of sugar and salt before the flour is drawn into the mixture and cold water added to bind it.

2. ***Pâte brisée*** is similar to pâte à foncer, but is lighter and more delicate due to an increased quantity of butter – up to three –fifths the quantity of flour. Very often is made with no sugar, as a savoury crust for pies.

3. ***Pâte sucrée*** (sweetcrust pastry, sweet dough, or sweet paste) is made with more sugar, which sweetens the mix and impedes the gluten strands, creating a pastry that breaks up easily in the mouth. An alternative is gluten –free pastry.

4. ***Pâte sablée*** has the same ingredients as pâte sucrée, but the butter is creamed with the sugar and the eggs before the flour is folded in. This mixes the butter more evenly, which makes the dough puff much less, creating a more "snappy" and dry pastry, instead of the crumbly texture of the previous doughs. Sablée works better for sweet tarts, tea biscuits, and piped shapes than other short doughs, as they hold their shape much more efficiently, and are the basis for gingerbread and sandwich biscuits. No water is needed, neither is the dough particularly temperature –sensitive.

Qualities of Short Dough

- A short dough should be non –elastic and somewhat brittle, easily breaking apart when pulled. In many cases it may only just come together when mixed, and may be sticky or have a crumbly texture like sand.
- The baked products that it produces are typically rich and crumbly, with a distinct tenderness much desired in sweet tarts, biscuits or cookies.
- The qualities produced by a short dough can be best appreciated by comparing them to products made from a non –short, or "hard" dough.
- The basic ingredients for bread are flour, water, salt and leaven, and so most often it is made from a dough containing no added fat.
- The tough, chewy nature of bread can therefore be seen as at the opposite end of the spectrum to a sweet, tender short dough.

Recipe

Ingredients –

- Unsalted butter –280gm, softened to room temperature
- Granulated sugar – ½ cup plus 2 tbsp
- Egg –1no
- Vanilla – ½ tsp
- All purpose flour3 cups
- Salt – ½ tsp

Method

- Cream butter and sugar just until combined and slightly aerated. Add the egg and vanilla, mix to combine and scrape down the bowl and beater.
- Add flour and salt and mix until the dough just begins to come together. Remove from the mixer and knead into a ball. Flatten the ball to a disc, wrap in plastic and refrigerate for 1 – 2 hours before using.
- Use as required for tarts, pies, biscuits or cookies.

4.4 PUFF PASTRIES

Puff pastry is one of the most remarkable products of the bakeshop. Although it includes no added leavening agent, it can rise to eight times its original thickness when baked. Puff pastry is rolled –in dough, like Danish and croissant doughs. This means that it is made up of many layers of fat sandwiched between layers of dough. Puff pastry can be made as upto thousand layers or more. The whole purpose of rolling and folding is to build up a layered structure of alternating layers of dough and fat. This process is known as *lamination*. Unlike Danish dough, however, puff pastry contains no yeast. Steam, created when the moisture in the dough is heated, is responsible for the spectacular rising power of puff pastry. As with so many other products, there are nearly as many versions of puff pastry as there are bakers. Both formulas and rolling –in techniques vary.

INGREDIENTS

Refined Flour – The flour that is used in making of puff pastry should be strong, with good quality gluten. A good patent flour or one of medium gluten strength 13% flour is a structure builder and because of its gluten – forming ability, can dictate the lift. Too soft a flour will result in a softer dough. The dough will be easier to handle but final volume and flake will be sacrificed. It the flour is too strong then the dough will be tough to handle and the final product may suffer from shrinkage.

Water – It is a rule of thumb that the consistency of the dough should match the consistency of the roll in fat. If the dough is too soft then the layers may be ruptured by the hard fat. If the dough is firm, it will be difficult to roll out. The product may shrink and fat may leak out. Water also serves as temperature control i.e. it should be cold to maintain firmness of fat.

Salt – Salt enhances flavor and also has a toughening effect on the gluten structure.

Acid – The addition of an acid improves sheeting ability by lowering the pH and mellowing the gluten. It has no effect on the leavening action. A weak acid such as lemon juice is added. This provides greater extensibility to the gluten.

Puff Pastry Shortening –Butter is the preferred fat for rolling in because of its flavor and melt –in the mouth quality. Special puff pastry shortening like semi solid lard or margarine is also available. Every shortening performs a different role. They are added to the dough to modify the dough itself and as a layering medium to assist in the raising of the puff pastry during baking. These shortenings are easier to work because they are not as hard when refrigerated and because they don't soften and melt at warm temperatures as easily as butter does. They are firm and waxy in nature and are exclusively used to make puffs. They are also less expensive than butter. Because of their nature, they can be rolled out in smooth continuous sheets between the dough layers. Their melting point between 43^0C – 50^0C will produce excellent results, but should be high enough to with stand frictional heat to which they are subjected during sheeting and folding operation. However, it can be unpleasant to eat because it tends to congeal and coat the inside of the mouth.

Puff Pastry Types: There are two types of puff pastry – Full and Three Quarter. There are three well –known methods of manufacture – English, French and Scotch. The differences in these types are in the fat contents and in the number of rolls and folds given. Full puff pastry contains flour and fat in equal ratio. While ¾ pastry contains ¾ of fat to each kilogram of flour.

The English method (Three Fold) – (Flaky): Sieve the flour; rub in 20 gms of butter or margarine. Make a bay or well, add salt and acid and make a dough and allow it to rest. Cream the margarine into a homogenous mass. The dough then rolled into a rectangle

about 18" x 6", the margarine is divided into approx. 3 parts. The first part is evenly distributed to cover 2/3rd of the rolled out dough. The flap of the dough containing no margarine is folded over to cover half of the treated area and then folded over to again cover the last portion. The pastry is given a half turn so that the open ends are parallel to the rolling pin. This process is repeated twice so as to finish all the margarine. Lastly one blindfold is given. The pastry is covered with a damp cloth and allowed to recover from the manipulation for about 30 minutes after each rolling. (7 – 9 layers)

French method – (Continental Book Fold): The dough is the same fashion as for the English method. The initial rolling out of the dough is different for it is rolled out to the shape of an open envelope with the four angles slightly thinner than the center. The chilled margarine/butter is placed in the center of the rolled out square and the envelope is closed by bringing the four angles to the center. After proper relaxation of the dough, it is turned upside down and sheeted into a rectangular shape and folded in a book fold.

Scotch Method – (Blitz): This is the quickest way of making puff pastry. The word is derived from the German word "Blitzen" meaning lightening. In this method the chilled margarine is mixed into the sieved flour in pieces about the size walnuts. The folding process is a three fold followed by 3 – Four folds, all of which is accomplished in 25 min.

Baking : Puff pastry obtains its lifting power through the sealing of moisture in the dough, as heat penetrates the product, the layers of shortening melt and the water in the dough vaporizes and causes the layers to expand. The shortening also helps by holding in these vapors. The gluten in the dough expands with the pressure of the steam and holds the steam in. The shortening melts and penetrates the layers of the dough, making it flaky and tender. The starch then gelatinizes and the proteins coagulate forming a rigid mass. The structure remains firm and flaky.

Oven Temperature : Proper oven temperature is important. A temperature of 204^0C – 218^0C with an even steady heat is very important. Too low a temperature allows shortening to weep between the layers of dough resulting in poor quality and low volume. Too high a temperature prematurely seals the piece and results in low volume and raw centers.

Washing: Puff pastry pieces are generally washed with an egg wash. Care should be taken to prevent the wash from running down the sides of the pieces while brushing the top. The eggs will coagulate with the heat of the oven, seal the sides and prevent the pastry from rising evenly. (Poor Volume)

Guidelines for makeup and baking of puff dough products

1. Dough should be cool and firm when it is rolled and cut. If it is too soft, layers may stick together at the cuts, preventing proper rising.
2. Cut with straight, firm, even cuts. Use a sharp cutting tool.
3. Avoid touching the cut edges with the fingers, or layers may stick together.
4. For best rising, place units upside down on baking sheets. Even sharp cutting tools may press the top layers of dough together. Baking upside down puts the stuck –together layers at the bottom.

5. Avoid letting egg wash run down the edges. Egg wash can cause the layers to stick together at the edges.
6. Rest made –up products for 30 minutes or more in a cool place or in the refrigerator before baking. This relaxes the gluten and reduces shrinkage.
7. Trimmings may be pressed together, keeping the layers in the same direction. After being rolled out and given a three –fold, they may be used again, although they will not rise as high.
8. Baking temperatures of 400° to 425°F (200° to 220°C) are best for most puff dough products. Cooler temperatures will not create enough steam in the products to leaven them well. Higher temperatures will set the crust too quickly.

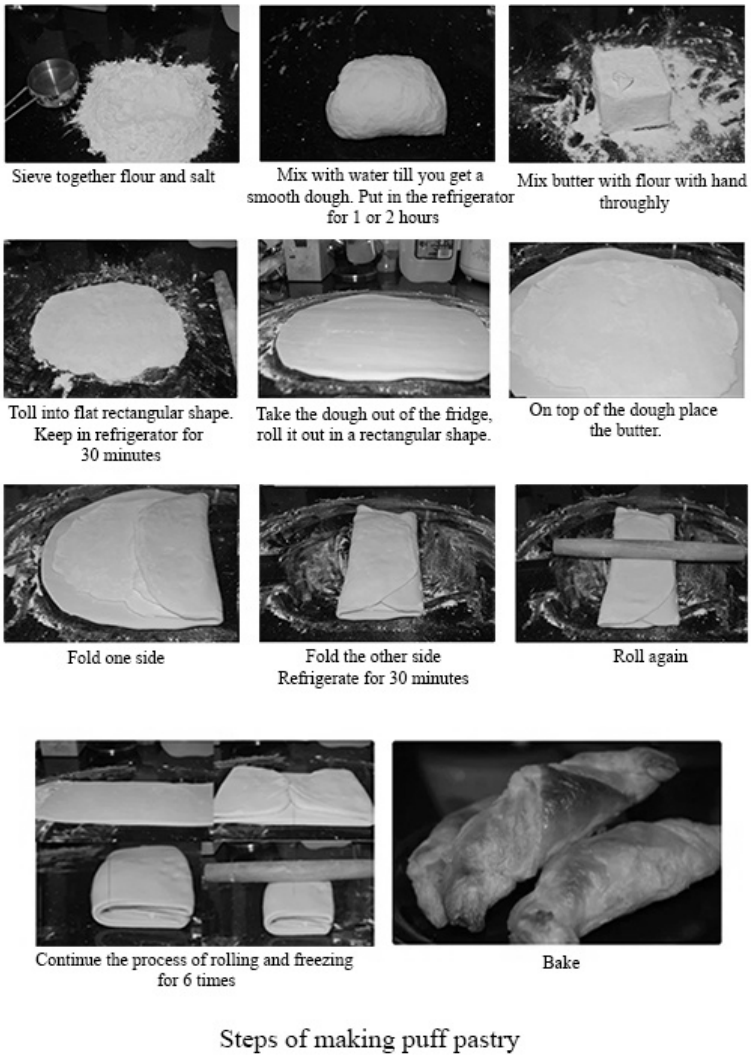
Recipe

Ingredients –

- Refined flour –1 ½ cups
- Butter –1 cup
- Salt –1 pinch
- Water – ½ cup

Method –

- On a surface place flour and salt. Slowly pour in water Mix till you get a smooth dough. Put in the refrigerator for 1 or 2 hours.
- In the meantime, take the butter and roll it out with some flour into a rectangular shape. Put in the refrigerator for about 30 minutes.
- Take the dough out of the fridge, roll it out in a rectangular shape. On top of the dough place the butter. Fold one side. Then the other. Refrigerate for 20 minutes.
- Roll the dough out into a rectangular shape
- Fold it again, refrigerate for 30 minutes. Repeat the process from 3 to 6 times
- Bake at the desired temperature.



Steps of making puff pastry

4.1.1 Common Problems with Puff Pastries

S. No.	PROBLEM	CAUSES
1	Puff dough has white spots or ice crystals on it	1. Freezing and thawing many times
2	Puff dough stick to the table	1. Work table rough 2. Dough left out on the table for a long time
3	Puff dough sheets and squares crack when handling	1. Dough was not thawed enough to handle 2. Dough had dried out while working with it
4	Puff dough tear while working	1. Dough is rolled too thin
5	Fat Runs Out	1. Dough not folded enough. 2. Oven is too cold. 3. Warm pans are used. 4. Melting point of fat is too low.
6	Puff is Hard and Tough	1. Too much water has been added to the flour but not enough fat. 2. Handling the dough too much 3. Inferior quality flour
7	Puff is Soggy in the Middle	1. Undercooked 2. Very high oven temperature
8	Edges fell over while baking	1. Crust is too thick and falls over because of its own weight. 2. Too high a proportion of fat in the recipe 3. Under mixing 4. Placing warm dough in the over to bake before it has been chilled will also contribute to this problem.
9	Loss of sweetness, open texture and lack of crust color	1. Proofed too long 2. Excessive retarding time.
10	Blisters on baked product	1. Too much humidity

CHECK YOUR PROGRESS-I

1. Write note on ‘Types of Short Crust Pastries’.

2. Write a note on ‘Common Problems with Puff Pastries’.

4.5 ECLAIRS AND CREAM PUFFS

An éclair is an oblong pastry made with choux dough filled with a pastry cream or custard and topped with chocolate icing or dipped in fondant icing. The word comes from the French éclair, meaning "flash of lightning", so named because it is eaten quickly (in a flash).The dough, which is the same as that used for profiterole, is typically piped into an oblong shape with a pastry bag and baked until it is crisp and hollow inside.

The word "éclair" made its appearance in the 1860s, describing the pastry previously called petite duchesse in France. It may have been created by French chef Antonin Carême, who is responsible for other desserts including the Charlotte and Napolean cake. Its first print reference in English was in an article in Vanity Fair in 1861, and then in Boston Cooking School Cook Book in 1884. The eclair is making a resurgence in popularity and can now be seen filled with trendy fillings such as matcha tea or mocha cream filling. The tops of the pastry may now be decorated with fresh fruit and fanciful fruit glazes. Frozen eclairs are also to be found with ice cream fillings.

A cream puff (US), profiterole (English) or chou à la crème (French) is a filled French choux pastry ball with a typically sweet and moist filling of whipped cream, custard, pastry cream, or ice cream. The puffs may be decorated or left plain or garnished with chocolate sauce, caramel, or a dusting of powdered sugar.

The choux pastry (pâte à choux) is a key component of the éclair or cream puff or profiteroles, and gougères. This pastry rises only from the action of steam. It doesn't use any yeast, baking soda, or baking powder. This makes the éclairs different from long – shaped doughnuts such as the Long John, which are made with doughnut pastry that uses another leavening. Choux pastry is made by heating milk, water, sugar, salt, and butter to a

boil, stirring in bread flour to incorporate it, allowing it to cool a little, then adding eggs. Choux pastry dough is piped through a pastry bag or dropped with a pair of spoons into small balls and baked to form largely hollow puffs. The dough is then baked at a high heat to generate the steam and get the dough to rise. Then the oven temperature is lowered to complete baking and brown the pastry.

The result is an airy, almost hollow shell that is crisp enough on top to be iced. After cooling, it is ready to be filled with a variety of fillings as desired. A thicker filling is best to prevent the bottom of the pastry from getting soggy. After cooling, the baked éclairs and profiteroles are injected with filling using a pastry bag and narrow piping tip, or by slicing off the top, filling them, and reassembling. For sweet profiteroles, additional glazes or decorations may then be added. Pastry cream is often the filling. It is thick custard made with egg yolks, milk, sugar, cornstarch, and may include butter. The icing should be one that hardens, such as fondant or ganache. This allows the éclair to be handled easier. A second flavor of icing may be piped on top for decoration and added taste.

Cream puffs, Eclairs and gougères can be stored in an airtight container at room temperature for up to two days, or freeze them for up to six weeks in a ziptop freezer bag.
The exact procedure for making éclair paste is detailed in the formula that follows. In general, the method consists of these steps:

1. Bring the liquid, fat, salt, and sugar (if used) to a boil. The liquid must be boiling rapidly so the fat is dispersed in the liquid, not just floating on top.
2. If this is not done, the fat will not be as well incorporated into the paste, and some of it may run out during baking.
3. Add the flour all at once and stir until the paste forms a ball and pulls away from the sides of the pan.
4. Remove the paste from the heat and let it cool to 140°F (60°C).If the paste is not cooled slightly, it will cook the eggs when they are added.
5. Beat in the eggs a little at a time. Completely mix in each addition of eggs before adding more. If the eggs are added too quickly, it will be difficult to get a smooth batter.
6. The paste is now ready to use.

Recipe of Choux paste

Ingredients –

- Butter – ½ cup
- Water –1 cup
- All –purpose flour –1 cup
- Salt –¼ tsp
- Eggs – 4 large

Method **–**

1. Combine the liquid, butter, and salt in a heavy saucepan or kettle. Bring the mixture to a full, rolling boil.
2. Remove the pan from the heat and add the flour all at once. Stir quickly.

3. Return the pan to moderate heat and stir vigorously until the dough forms a ball and pulls away from the sides of the pan.
4. Transfer the dough to the bowl of a mixer. If you wish to mix it by hand, leave it in the saucepan.
5. With the paddle attachment, mix at low speed until the dough has cooled slightly. It should be about 140°F (60°C), which is still very warm, but not too hot to touch.
6. At medium speed, beat in the eggs a little at a time. Add no more than a quarter of the eggs at once, and wait until they are completely absorbed before adding more. When all the eggs are absorbed, the paste is ready to use.

Recipe of éclairs

Ingredients –

- Choux paste – 400 gms

Fillings and Icings

- Package instant vanilla pudding mix –150 gm
- Cold milk – 2 ½ cups
- Heavy cream –1 cup
- Confectioners' sugar –¼ cup
- Vanilla extract –1 tsp
- Semisweet chocolate –100 gm
- Butter –2 tbsp
- Confectioners' sugar –1 cup
- Vanilla extract –1 tsp
- Hot water –3 tbsp

Method –

- Preheat oven to 450^0F (230^0C). Grease a cookie sheet.
- With a spoon or a pastry bag fitted with a No. 10, or larger, tip, spoon or pipe choux paste onto cookie sheet in 1 ½ x 4 inch strips.
- Bake 15 minutes in the preheated oven, then reduce heat to 325^0F (165^0C) and bake 20 minutes more, until hollow sounding when lightly tapped on the bottom. Cool completely on a wire rack.
- For the filling, combine pudding mix and milk in medium bowl according to package directions. In a separate bowl, beat the cream with an electric mixer until soft peaks form. Beat in ¼ cup confectioners' sugar and 1 tsp vanilla. Fold whipped cream into pudding. Cut tops off of cooled pastry shells with a sharp knife. Fill shells with pudding mixture and replace tops.
- For the icing, melt the chocolate and 2 tbsps butter in a medium saucepan over low heat. Stir in 1 cup confectioners' sugar and 1 tsp vanilla. Stir in hot water, one tbsp at a time, until icing is smooth and has reached desired consistency. Remove from heat, cool slightly, and drizzle over filled éclairs. Refrigerate until serving.

Recipe of Cream puff or Profiteroles

Ingredients –

- Choux paste – 400 gms

For chocolate filling:

- White chocolate –125 gm chopped
- Cream –60 ml
- Butter –50 gm
- Yolks –2 egg
- Rum –to taste

For chocolate cream topping:

- Water –275 ml
- Sugar –275 gm
- Cocoa powder –1 tbsp
- Dark chocolate –75 gm chopped
- Cream –125 ml
- Butter –2 tbsp

Method –

- Preheat oven to 450^0F (230^0C). Grease a cookie sheet.
- With a pastry bag fitted with a No. 10, or larger tip, pipe choux paste onto cookie sheet into small domes.
- Bake 15 minutes in the preheated oven, then reduce heat to 325^0F (165^0C) and bake 20 minutes more, until hollow sounding when lightly tapped on the bottom.
- After baking, pierce each profiterole to allow steam to escape. Return pastry to a low oven to dry out.
- Take out and cool completely on a wire rack.

For the filling:

- Melt white chocolate with the cream and butter. Cool.
- Stir in yolks add rum mix by cut and fold method.
- Cut the profiteroles in half, fill them with the sweetened cream and pile them up on a plate.

For the topping sauce:

- Prepare sugar syrup with water, sugar, add dark chocolate, cocoa powder, cook till thick.
- Cool and then add cream and butter
- Drizzle or layer the Profiteroles on top. And serve.

Tips to ensure success: Éclairs and Profiteroles might look tricky and fancy, but they are actually very straightforward to make if you follow just 3 key tips:

- Cool dough before adding eggs – this is the key to ensure the heat from the dough doesn't cook the eggs and so they incorporate properly when mixed together. The egg is the key to making the Choux pastry rise and become hollow.
- Mix eggs in thoroughly – the dough will look like it splits when you start mixing the eggs in, but persist! The batter will come together – it needs to be smooth;
- Don't pierce until crispy – A key step is to remove the profiteroles partway through baking to pierce a hole in them, and then return into the oven. This is to make them dry out and cook inside so they hold their shape (and so it's not raw batter inside).

Common problems with Éclairs and Cream puffs

S.No	Problem	Causes
1	Not rising or flattened	1. Oven temperature less. 2. Too much eggs 3. Excess water 4. Excess butter
2	Getting soggy	1. Pastry not pierced, to allow the trapped air to escape. 2. Not dried in oven. 3. Not rested on wire mesh. 4. Gone old so the crust becomes soft from the moisture inside.
3	Collapsed	1. High heat 2. Too much fat 3. Water and butter mixture not boiling while added to the flour. 4. Allow enough space between puffs, to let the steam escape when they expand. 5. Oven door opened in the middle of baking.
4	Uneven and large cracks	1. Sugar and/or salt are not dissolved completely. 2. Water loss during prolonged boiling of water sugar and butter. 3. Flour not shifted. 4. Dough is beaten for too long resulting in separation of fat. 5. Less salt added.

Arrange all the ingredients for choux paste

Boil water sugar, salt and butter together

Add flour, mix well

Beat eggs

Mix smoothly

Form the paste

Step by step making of Éclairs and Profiteroles

Pipe for Profiteroles

Pipe for Éclairs

Bake and fill inside

Bake and fill inside

Swizzle and top with sauce

Swizzle and top with sauce

4.6 CREAM CHEESE DOUGH PRODUCTS

Cream cheese is an American invention developed in 1872 in New York State. It is a soft cow's –milk, mild tangy tasting fresh cheese with a high fat content (approx 35%), spreadable texture and creamy white in colour.Cream cheese is categorized as a fresh cheese since it is unaged. As a result, it has ashort shelf life, once opened. It is available in various sized solid white blocks or whipped and flavored. Cream cheese should be gently softened before blending them into fillings, icings and batters. Blend the cheese on low speed with a paddle to soften and remove lumps before adding sugar, eggs or other liquid ingredient. Cream cheese is one of the most popular soft cheese products in North America. Its soft creamy texture gives richness to cheesecake, frosting, bagel –toppers, and dips and makes wonderfully light and flaky pastry crusts. It is used as a popular spread for bagels and toast, in cheesecakes, pastry fillings and icings. Cream cheese is sometimes used in place of or with butter (typically two parts cream cheese to one part butter) when making cakes or cookies, and cream cheese frosting.

Similar to American, another important cream cheese is French *Neufchâtel*, which has less fat than regular cream cheese, but it also has more moisture. Cream cheese is sold in large blocks, tubs, or smaller packages.

Cream cheese is categorized as a fresh cheese since it is unaged. As a result, it has a short shelf life, once opened. At room temperature, cream cheese spreads easily and has a smooth and creamy texture. It can be rolled beautifully without splitting or crumbling. It is sold in foil –wrapped blocks or in a soft –spread form which has air whipped in to make it spreadable right from the refrigerator.

Recipe of Cream cheese dough
Ingredients –

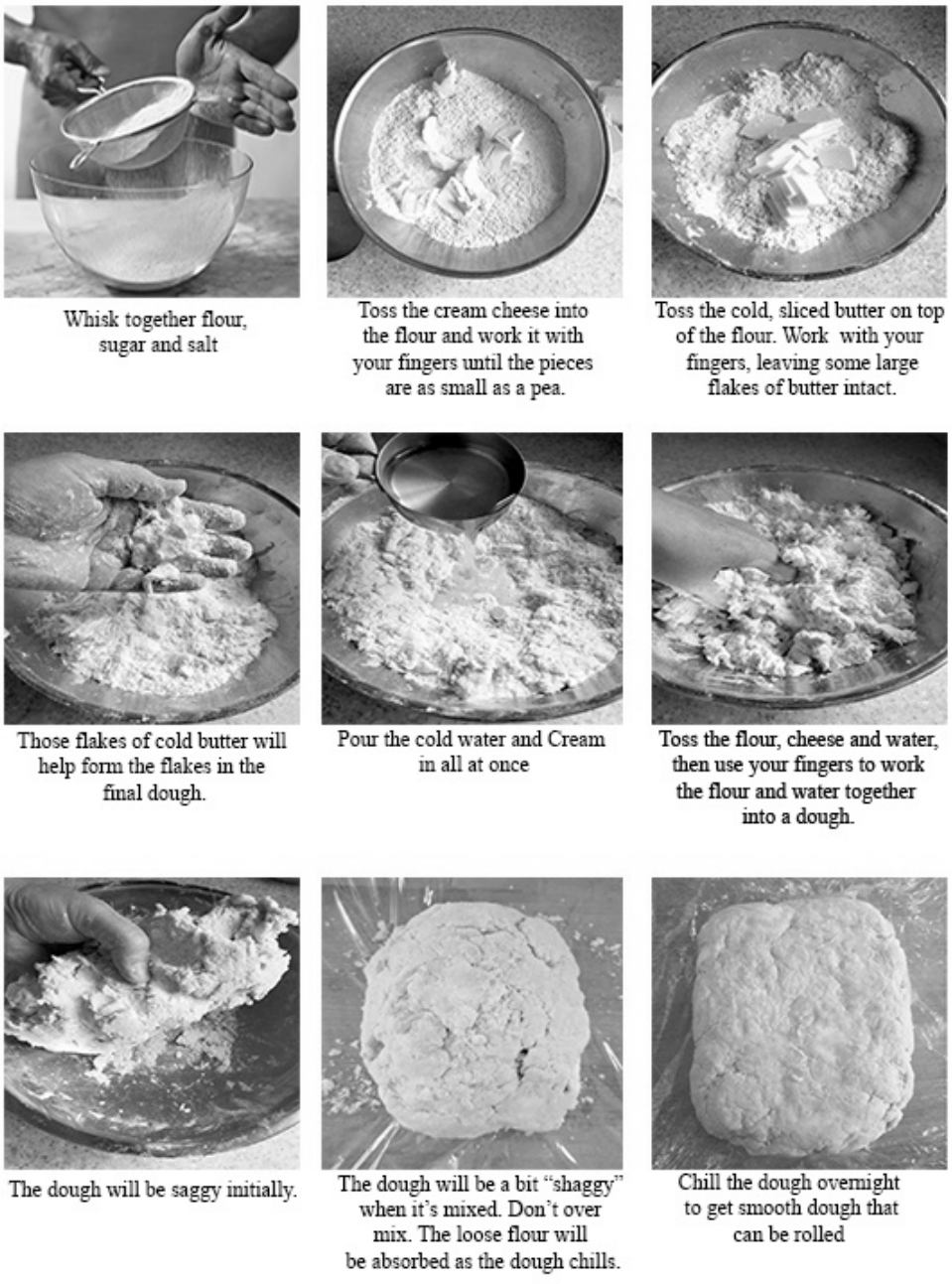
- All –purpose flour –2 ¾ cups (380gm)
- Granulated sugar –1 tbsp (14gm)
- Table salt –1 tsp
- Cream cheese, cut into 1" chunks – ½ cup (120gm)
- Unsalted butter, cold and cut into 1" chunks –1 stick (80gm)
- Heavy whipping cream – ¼ cup (60ml)
- Cold water – ¼ cup (60 ml)

Method –

- Whisk together the flour, sugar and salt in a mixing bowl.
- Toss in the cream cheese. Using your fingers, mix the cream cheese into the flour until it resembles coarse corn meal.
- Toss the butter into the flour and use your fingers to work it in. Allow the flakes to break up into slightly smaller pieces. Work quickly so the butter doesn't get warm. Don't break the butter down completely. There should be some large flakes remaining.
- Pour the cream and water onto the flour all at once and toss to combine. Gently work the dough just until it comes together. Form the dough into a

rectangle or square, wrap and refrigerate for at least 2 – 3 hours, or make it the day before and let it rest overnight.

- The dough can be frozen for up to 3 months.



Preperation of Cream Cheese Dough

Cream cheese dough products

- Cheesecake
- Rugelach
- Blue cheese tart
- Cream Cheese Pastry

Recipe of Cheese cake

Ingredients –

- Cream cheese – 4500 gm
- Sugar –1575 gm
- Cornstarch – 90 gm
- Lemon zest, grated –15 gm
- Vanilla extract – 30 gm
- Salt – 45 gm
- Eggs – 900 gm
- Egg yolks – 340 gm
- Heavy cream – 450 gm
- Milk – 225 gm
- Lemon juice – 60 gm
- Cream cheese dough – as required

Method –Cheesecake may be baked with or without a water bath. Baking in a water bath results in cakes with browned tops and unbrowned sides. Baking without a water bath results in browned sides and a lighter top.

- Prepare the pans by lining the bottoms with either a very thin layer of cream cheese dough. Prebake the short dough until it begins to turn golden.
- Put the cream cheese in the mixing bowl and, with the paddle attachment, mix at low speed until smooth and lump free.
- Add the sugar, cornstarch, lemon zest, vanilla, and salt. Blend in until smooth and uniform, but do not whip. Scrape down the sides of the bowl and the beater.
- Add the eggs and egg yolks, a little at a time, blending them in thoroughly after each addition. Scrape down the bowl again to make sure the mixture is well blended.
- With the machine running at low speed, gradually add the cream, milk, and lemon juice.
- Fill the prepared pans. Scale as follows:
  - 10” pans—2050 gm
  - 9” pans—1600 gm
  - 8” pans—1350 gm
- To bake without a water bath, place the filled pans on sheet pans and set them in an oven preheated to 200°C. After 10 minutes, turn the oven down to 105°C and continue baking until the mixture is set, about 1–1 ½ hours, depending on the size of the cake.

- To bake with a water bath, set the filled pans inside another, larger pan. Fill the outer pan with water and bake at 175°C until set.
- Cool the cakes completely before removing from pans. To unmold a cake from a pan without removable sides, sprinkle the top of the cake with granulated sugar. Invert the cake onto a cardboard cake circle, then immediately place another circle over the bottom and turn it right –side up.

Recipe of Rugelach

Ingredients –

- Light brown sugar – ¼ cup
- Ground cinnamon –1 ½tsps
- Raisins – ¾ cup
- Walnuts, finely chopped –1 cup
- Apricot preserves, pureed in a food processor – ½ cup

For egg wash

- Egg beaten –1
- milk –1 tbsp
- Cream cheese dough – as required

Method –

- To make the filling, combine 6 tbsps of granulated sugar, the brown sugar, ½tsp cinnamon, the raisins, and walnuts.
- On a well – floured board, roll each ball of dough into a 9 –inch circle. Spread the dough with 2 tbsps apricot preserves and sprinkle with ½ cup of the filling. Press the filling lightly into the dough. Cut the circle into 12 equal wedges.

- Starting with the wide edge, roll up each wedge. Place the cookies, points tucked under, on a baking sheet lined with parchment paper. Chill for 30 minutes.
- Preheat the oven to 350 degrees F.
- Brush each cookie with the egg wash. Combine 3 tbsps granulated sugar and 1 tsp cinnamon and sprinkle on the cookies. Bake for 15 to 20 minutes, until lightly browned. Remove to a wire rack and let cool.

CHECK YOUR PROGRESS-II

1. Write the 'Recipe of Rugelach'.

2. List the Common problems with Éclairs and Cream puffs.

4.7 ICINGS AND WHIPPED CREAM TOPPINGS

These are common name of prepared confections that are used to cover and decorate cakes. When they are placed in between two or more layers they are referred as fillings.

Icings: Icing, also known as frosting, is a sweet decorative creamy glaze coating used as a filling between the layers or as a coating over the top and sides of a cake. It is used to add flavor and to improve a cake's appearance. Icing can also extend a cake's shelf life by forming a protective coating. There are seven general types of icing: buttercream, foam, fudge, fondant, glaze, royal icing and ganache. Each type can be produced with a number of formulas and in a range of flavorings. Because icing is integral to the flavor and appearance of many cakes, it should be made carefully using high –quality ingredients and natural flavors and colors. A good icing is smooth; it is never grainy or lumpy. It should complement the flavor and texture of the cake without overpowering it. A basic icing is called a glacé, containing powdered sugar (also known as icing sugar or confectioners' sugar) and water. This can be flavored and colored as desired, for example, by using lemon juice in place of the water.

Icings have three main functions –

- They improve the keeping qualities of the cake by forming protective coatings around it.
- They contribute flavour and richness
- They improve appearance.

Types of Icing –

There are six basic types of icings and other cake coatings

- Fondant
- Buttercreams
- Foam type icings
- Fudge type Icings
- Flat type Icings
- Royal or decorator's icing

Others

- Glazes
- Rolled coatings

Fondant

Fondant is sugar syrup that is crystallized to a smooth creamy white mass. When applied it sets up into a shiny, non –sticky coating.

Fondant is prepared by dissolving 500gms of granulated or cube sugar in 150 ml of water and 15 ml of glucose and then allowed to boil gradually till it reaches the soft ball stage 112 –116^{o}C (234 –240^{o}F) which may be tested by dropping a little syrup in iced water where it will from a ball under water but lose its shape immediately when it is exposed to air. The syrup must be cooled immediately and the air bubbles then subside.

The syrup is, then, poured out into a cold surface and worked first with a spatula until it turns from a clear liquid to a white crumbly solid. It is then kneaded by hand until smooth and finished by being left to ripen in a cool place for at least 12 hours.
The object is to produce minute crystals in a super saturated solution of sugar giving a creamy texture to the finished product.

Uses –

- For first coating on fruit cakes before applying Royal icing.
- For dipping fresh fruits to make confections for immediate consumption.
- For casting into moulds.
- Pastel coloured icing for cakes

Butter Cream Icings or Crème Au Beurre

Butter cream icings are light smooth mixtures of fat and icing sugar which are creamed together to the desired consistency and lightness. They may also contain eggs to increase their smoothness or lightness. This icing is very popular and is used for covering many kinds of cake. They are easily flavoured and coloured to suit a variety of purposes.

There are four types of basic kinds of butter cream:

a) **Simple butter cream**, also called American buttercream are made by creaming together fat and powdered sugar to the desired consistency, a small quantity of egg white may be whipped in to obtain the desired lightness.Note that cream cheese frosting is merely simple buttercream which uses cream cheese instead of butter as the fat.

b) **Decorators butter cream** is a simple butter cream used for making flowers and other cake decorations. Because butter tends to melt at room temperature (or at least become very soft), buttercream frosting is not ideal for producing the decorative flowers and curlicues you see on fancy wedding cakes. The solution is to so –called decorator's buttercream, which—instead of butter—is made with vegetable shortening. It is creamed only a little, because if too much air is incorporated, it lacks in lightness, it makes up for in stability, making it ideal for producing those decorative flourishes.

c) **Meringue butter creams**, sometimes called Swiss or Italian meringue buttercream, this variation is made by beating a hot syrup of sugar and water into a basic egg white foam, then whipping softened butter into the resulting meringue to make the frosting. Heating the meringue gives it extra stability, which means this frosting is extremely light and airy.

d) **French butter creams**, is probably the richest buttercream and yet it's also extremely light in texture. It's made by adding boiling syrup into beaten egg yolks and then whipping into a foamy consistency, to which softened butter is then added and beaten some more until light and creamy. Unsalted butter is the preferred fat for butter creams because of its flavour and melt in the mouth quality.

e) **Pastry –Cream Butter cream**, also known as German buttercream, this variation is made by combining pastry cream (which is custard with some sort of added starch, such as flour or cornstarch) with butter, and possibly additional confectioner's sugar.

Recipe for Butter icing

1. Beat 125 gms. of butter add 125 gms. of icing sugar with 30 gm of milk and flavouring. Beat until creamy and smooth.
2. Butter cream or crème au beurre –Place 2 egg whites and 125gm of icing sugar in a mixing bowl and whisk until mixture holds shape. Cool slightly. Cream 125 gm butter until soft then beat in the meringue mixture a little at a time. Flavour or colour as desired.

Foam Type Icing

They are also known as boiled icings. They are simple meringues made with boiling syrup and may also contain gelatin as a stabilizer. Foam type icings should be applied thickly to cakes and left in peaks and swirls. These icings are not stable and should be used they day they are prepared.

Flat Icings

These icings are also known as water icings and are mixtures of confectioner's sugar, water, sometimes corn syrup and flavouring. They are used for coffee cakes, Danish party and sweet rolls. They are a simple mixture consisting of five pounds of powdered sugar 300ml water, 200 ml corn syrup and flavouring as desired. Egg white may also be added to lighten the frosting.

Fudge Type Icing

Fudge type icings are rich cooked icings. They are heavy and thick and they may be flavoured by a variety of ingredients. They are used on cup cakes, layer cakes, loaf cakes, sheet cakes, etc. To store fudge icings they must be properly covered with cling film and then kept in an airtight container in the refrigerator. To use stored fudge icing, warm in a double boiler until it is soft enough to spread. They are stable frostings which hold their shape well on cakes and cup cakes.

Chocolate Fudge Frosting

- Sugar – 450 gms
- Glucose or corn syrup – 150 gms
- Water – 120 ml
- Butter – 150 gms
- Sugar powder – 375 gms
- Cocoa powder – 175 gms
- Vanilla essence – to taste

Method –

- Combine granulated sugar, glucose and water and boil till 116°C.

- Sift powdered sugar and cocoa together, cream sugar/cocoa with butter till light and fluffy and gradually add syrup and essence and blend well.
- Use immediately while still warm and spreadable.

Royal Icing

This icing is the traditional covering for Christmas and wedding cakes, and is made from icing sugar beaten with egg whites and lemon juice; a tsp of glycerin may be added. In the hands of a skilled confectioner this can be used to produce perfectly flat smooth surfaces or piped into intricate borders, patterns or trellis work, which are very fragile but very hard when set. It is always applied over a layer of marzipan or fondant.

Recipe for royal icing for 6 inch round or 5 inch square cakes –

- Egg whites –2. No.
- Icing Sugar –500 gms
- Lemon juice –1 tsp
- Glycerine –1 tsp
- Cream of tartar –2.5 gms

Method –

- Beat the egg whites with a fork until frothy
- Gradually beat in ½ the icing sugar, using a wooden spoon (+ Lemon juice and cream of tartar)
- Beat in the remaining icing sugar with the glycerine
- Beat thoroughly until smooth and white, and having a consistency that stands in soft peaks.
- Add colouring if required.
- Cover the bowl with a damp cloth and leave it to stand for several hours to allow bubbles to escape. Before using stir well with wooden spoon but do not over beat.

Other Icings similar to Royal Icing are –

Sugar paste or Moulded Icing: Beat one egg white and 15 ml glucose gradually adding 500gm icing sugar to form a still paste. Turn unto a surface sprinkled with corn flour and knead until smooth. Wrap in cling film and keep and keep in a plastic bag to prevent it from drying, will keep refrigerated for 6 weeks. This quantity is sufficient to cover 8 inch round cake.

Satin Icing: Boil together 50 gms of butter + lemon juice +dissolved 250 gm of icing sugar and cook for 2 min. Remove from heat and beat in another 250 gm of icing sugar till stiff. Gradually mix in another 175 gm of icing sugar and knead until smooth preserve as above.

Glazes or Glace: Glazes are thin glossy transparent coatings that give shine to baked products and help prevent drying. The simplest mixture for this purpose is syrup made

from 250 gms of icing sugar in 30 ml of water or milk. They are brushed over small cakes or poured to give a smooth finish. The glaze recipes are of two types: chocolate and gelatin –based. Chocolate glazes are usually melted chocolate containing additional fats or liquids, or both. They are applied warm and set up to form a thin, shiny coating. Gelatin based glazes, which include many fruit glazes, are usually applied only to the tops of cakes and charlottes made in ring molds. Ganache may also be considered as an icing.

Ganache: A flavoured cream made with chocolate and fresh cream, sometimes with butter added. It may be used as a sauce, or to glaze a cake or it may be whipped and used a filling and/or icing. Ganache can also be made of stiffer consistency, chilled and rolled into truffles or as topping for petit fours. It was created in Paris round about 1850

Method –Bring 100 ml of double cream to the boil. Remove from heat and add 225 gms of plain unsweetened chocolate broken into even squares. Stir until the chocolate has melted and is thoroughly combined with cream. Leave until cool but not set then whip until pale, thick and light or before whipping it may be poured over cakes as chocolate icing.
Toppings are anything that is used to cover a cake or a pastry and it may be fruits, jam, nuts etc. and Icings are that part of toppings which are sweet coatings that may be applied to cakes and pastries.

Rolled Coatings : The three commonly used rolled cake coatings are rolled fondant, marzipan, and modeling chocolate. Rather than being applied by spreading or pouring like the other products discussed, these are rolled into thin sheets, using a rolling pin, and draped over the cake to cover it. To ensure the coating adheres to the cake, the cake is first brushed with apricot glaze or a similar product, or iced with a thin layer of buttercream before the rolled coating is applied.

Rolled fondant is a dough like product consisting primarily of confectioner's sugar combined with small quantities of glucose, water, gelatin, and other ingredients to give it the proper consistency. It is firm and stiff enough to be kneaded, and pliable enough to be rolled out in thin sheets. Like poured fondant, it is almost always purchased ready prepared.

Marzipan is a paste made of ground almonds and sugar.

Modeling chocolate is a stiff paste made of melted chocolate and corn syrup.

Rules for selection of icing

- The flavour texture and colour of icing must be compatible with the cake.
- In general use heavy frosting with heavy cakes and light frosting with light cakes. e.g. Angel food cakes with simple flat icings. High ratio cakes with butter cream or fudge type icings. Genoese sponge with French or meringue type icing.
- Use the best quality flavourings and use them sparingly.
- The flavour of the frosting should not be stronger than the cake.

- Use colour sparingly, light pastel shades are more appetizing than loud colours.

Whipped cream topping/frosting: Whipped cream frostings is smooth and satiny texture which consist of whipped cream, powdered sugar, and flavorings such as vanilla, pineapple, strawberry etc. The commonly whipped cream is Chantilly cream which has vanilla as flavouring agent. As with butter cream, the cornstarch in the powdered sugar helps stabilize the frosting. It is used as a filling for cakes, as a frosting, one can pipe it, or it can be used simply as an accompaniment to a slice of pie, a bowl of fresh fruit, or to garnish a pudding.

Preparation of whipped cream : While making whipped cream frosting it is mandatory to the cream, the bowl, and the wire whisk very cold, as this will help the cream reach its maximum volume when whipped. It is best to use a metal bowl and place it in the freezer, along with the wire whisk, for at least 15 minutes. Always use heavy cream, also known as heavy "whipping" cream. This is cream with a butterfat content of between 35 – 40%, which means it will double in volume and reach stiff peaks when beaten. When beating the cream, add it to the cold mixer bowl, along with the vanilla and sugar. Start the mixer at low speed and gradually increase the speed to high. Depending on what you are using the cream for, beat just until soft or stiff peaks form. Cream beaten longer turns into butter, so necessary precaution to be taken. If you do accidentally over beat, just add a little more cream and beat until soft or stiff peaks form. To stabilize the cream so it will not separate when stored, take about 1 tsp unflavored gelatin and sprinkle it over 1 tbsp cold water. Let it stand about 5 –10 minutes or until it has softened and swelled (bloom). Then heat it gently (I do this in the microwave in 5 second intervals) to dissolve the gelatin. Then whisk it into the softly whipped cream.

Recipe

Ingredients –

- Heavy whipping cream –1 cup
- Powdered sugar – ½ cup

Method –

- Place the mixing bowl and whisk attachment in the freezer for 5 to 10 minutes to chill.
- Prepare the whipped cream. Pour the heavy cream into the chilled bowl and use an electric or stand mixer to beat the heavy cream on medium –high speed until the cream starts to thicken.
- Slowly add the powdered sugar and continue beating on high speed until stiff peaks form.

CHECK YOUR PROGRESS-III

1. Write note on 'preparation of whipped cream'.

2. Write a note on 'Icing'.

4.8 CAKES AND CAKE SPECIALTIES

Cakes have their part to play in ancient beliefs and superstitions, some which still carries on to modern times. In olden times, people used cakes as offerings to their gods and spirits around the world. The Chinese celebrate Harvest Moon festival and have moon cakes to honour their moon goddess. This tradition continues up to today. Russians have sun cakes called blini which are thin pancakes to pay their respect to a deity called Maslenitsa. Ancient Celts rolled cakes down a hill during the Beltane festival held on the first day of spring to imitate solar movement. With such a rich history and connection of humans with cake, it is no wonder that they remain such an important part of our lives.

Why are cakes round? Although these days we have a variety of shapes from heart –shaped to cartoon characters, animals, castles and even R –rated shapes if you are so inclined, cakes are traditionally round. This symbolizes the cyclical nature of life, the sun and the moon, which is probably the reason why we have cakes during important events; highlighting that we are embarking on a new journey in our life –span. Ancient breads were also round, typically fashioned into round balls and baked in shallow pans. In the 17th century, cake hoops made from metal or wood were increasingly used.

When did cakes become easier to make? The invention of baking soda and baking powder during the Industrial Revolution increased the popularity of baking cakes due to the ease provided to the masses. Ovens were beginning to have more temperature controlled settings which meant people could leave their cakes to bake without labouring and watching over them constantly. Railroads also made ingredients readily available and cheaper.

So there you have it; a few interesting facts about the cakes we take so much for granted. Like everything else evolving with time, cakes have their moments in history too. Next time you enjoy your cake, think of all the human inventions needed over time, necessary to allow you this little luxury.

INGREDIENTS USED IN CAKE PREPARATION

The ingredients used to make shortened (butter) and un –shortened (foam) cakes differ. However, the goal is always to the same: to create great cake recipes through a delicate balance of its ingredients – making sure they have the strength to hold the recipe together, but still create a tender, moist and flavorful cake. Most cakes are created from liquid batters with high fat and sugar contents. The baker's job is to combine all the ingredients to create a structure that will support these rich ingredients yet keep the cake as light and delicate as possible. As with other baked goods, it is impossible to taste a cake until it is fully cooked and too late to alter the formula. Therefore, it is extremely important to study any formula before beginning and to follow it with particular care and attention to detail.

Cake making ingredients are classified as

- Essential ingredients: Flour, sugar, shortening, milk and eggs.
- Optional ingredients: Baking powder, flavourings and essences, fruits, nuts, cocoa powder, chocolate, cake improvers, syrups etc.

Ingredients are also classified according to the function which they perform in cake making.

- Structure builders: Flour, eggs, milk and shortenings.
- Tenderizers: fat, sugar, baking powder and egg yolks.
- Dryers: Flour, starches and dry milk powder
- Toughners: Flour, dry milk powder and egg whites.
- Favorers: Butter, eggs, vanilla or other flavorings, liquid and salt.
- Moisteners: milk or water, liquor, egg, syrups and sugar.

1. Flour: Vast majority of cakes – with the exception of cheesecakes, foam cakes and gluten –free cakes – contain wheat flour as very backbone of their composition. It establishes the crumb structure in cakes and is used to bind all of the other ingredients together during the cake making process. Wheat flour contains two very important proteins, *glutenin* and *gliadin*, when mixed with moisture and stirred, create its structural network. This protein content for cake making in flour should be 7 to 9 percent. Under low ph conditions, starch gelatinizes faster and thus affects a faster setting of cake structure when baked. The bad part about gluten is that too much – from too much mixing or using the wrong type of flour – creates a tough, dry and flavorless cake. It's gluten from the wheat flour that gives dough its strength and elasticity – qualities we want in yeast breads,

but not in cakes. Cakes made from strong flour will peak in the center and will be tough and dry to eat. In case of too weak flour, the cakes may flatten out or even sink.

To help prevent this, you'll see cake recipes especially high –ratio ones, typically made with chlorinated soft wheat flours, such as bleached cake flour, a potentially containing low –gluten forming proteins. (High ratio cakes are where the sugar is higher than the flour level, by weight.) Other lower gluten flour types include Southern bleached all –purpose and pastry flour. Soft wheat flours are generally low in water absorption and do not require harsh mixing or a long mix time.

Chlorination of cake flour provides two great benefits. First is bleaching, which gives a bright whiter crumb color to cakes but second and more importantly it lowers the gelatinization temperature of the starch within the cake flour. This makes it possible for the cake to set faster and therefore reduces the loss of leavening during baking. Bleaching also gives the cake flour the ability to carry more sugar and fat (as well as water), without their tenderizing (collapsing) effects, balancing the recipe.

2. Sweeteners –Caster sugar, Icing sugar, Brown sugars: We typically think of sugar's role in a cake recipe to add sweetness, but it also plays other important roles depending upon whether it is in the crystalline (granulated white, caster or brown) or liquid form (honey or corn syrup). All sugar acts as a tenderizer by preventing the wheat flour proteins from forming an excessive amount of gluten and slows down the coagulation of the egg white and milk proteins, as well, it also contribute to structure of the cake when baked. It does this because sugar is hygroscopic, another word for its ability to absorb or attract moisture from the air, and dissolve readily in it (honey and some liquid sugars are more hygroscopic than crystalline sugar). By doing so, sugar essentially absorbs available water in the recipe, until saturated, leaving the rest for the wheat's available gluten forming proteins. Gluten is formed when the wheat flour protein's are moistened and agitated or mixed; the higher the flour's gluten –forming potential, the more available water or liquid and the more mixing (agitation) that takes place and the less tenderizers, such as sugar and fat, (and the warmer the ingredients), the more gluten is formed. Also because of its hygroscopic nature, it helps with a recipe's moisture retention and thus increases its shelf life by slowing the staling process.

Most commonly used crystalline sugar or sucrose plays an important role by incorporating air into the batter for leavening when beaten with butter or margarine or solid shortening, called "creaming" (only when the fat is at an optimal temperature). Sugar plays an important role with the lubrication of other ingredients in the recipe, when *caramelized*, golden brown coloured crust is formed. Increasing sugar in a cake recipe will raise the gelatinization temperature of the starches in the wheat flour and thus will increase expansion time, so care must be taken in its ratio to the other ingredients; too much can cause a cake's structure to fail or the cake may be so tenderized that it crumbles when cut rather than staying in slices (a warm cake will also cause crumbling). When the sugar is reduced too much, the gluten structure is so strong that the cake develops some long cells or tunnels. Overall volume may even increase, but the cake would be tough.

Other types of sugars used in the cakes include dextrose, caster, icing and brown sugar. Also syrups such as invert sugar, corn syrup, glucose, molasses, honey, sorbitol or refiner's syrups are used in part with powdered sugar for their special characteristics. When using these sweetener varieties you must be aware that some do not have the same sweetness as granulated sugar (sucrose) and do contain various levels of water. Sugars of any kind when used in cakes tend to soften the batter and make it thinner, and they need to be included as liquids. Coarse grained sugar, also known as superfine sugar is used to help create the finest texture and maximum volume in a cake. Too large grain will have cutting action on fat which will prevent entrapping of air cells during creaming operation. Too fine grain will also not produce desirable aeration. Sugar can stand in for fat and is often added to commercial low –fat products or recipes.

3. Fats and shortenings: There are four types of fat and shortening available; Butter, lard, hydrogenated fat and margarine. The primary function of solid fat, also known as plastic fat, solid shortening, stick butter or margarine, is to incorporate innumerable air bubbles into its malleable mass for volume. This is done through creaming, or beating the fat with crystalline sugar, also known as white granulated or brown sugar (white granulated sugar combined with molasses). But, it can only be done successfully if the right ingredients, ratios, mixing times and temperature (70^0F –75^0F), and using the proper tools are followed. Too hard fat will not cream up well wile too soft fats will not be able to retain the aeration. Fats have a tenderizing action on the flour proteins and thus expanding the air cells and helping to lift the cake's batter during baking, resulting in eventual cake tenderness. They are also known as shorteners; they also shorten the length of the gluten strands when the flour is stirred with that moisture. Fats also tenderize by readily coating the flour proteins like a raincoat, during mixing, preventing moisture from reaching them, helping to reduce their gluten forming potential and improving the shelf life. Fat is also a good tenderizer because it slows down the coagulation of the egg with the flour and milk proteins that set the structure of the cake when baked. Fat

Some fats, such as butter or hydrogenated fatimpart taste and flavor to a cake, whereas margarine does not have as fine a texture and taste. Shortening does not contribute flavor, unless you use the "butter flavored" type.

4. Eggs: Eggs perform a multitude of important functions in a cake recipe, depending on the part used. Foamed eggs provide leavening, especially separated and beaten whites. Whole eggs and whites contribute to structure of the cakes. Egg yolk is also a rich source of emulsifying agents Lecithin and, thus, is a tenderizer thus facilitating the incorporation of air during creaming or whipping process and inhibits wheat starch gelatinization. Egg yolks also add color (due to the presence of Luthein), nutrition, and flavor and help to retain moisture in the finished cake. Eggs also act as binding agents and thus improve sustainability. On the other hand, whites can have a drying effect, but they contribute slightly more protein than yolks do, although with far fewer nutrients and without the fat and cholesterol.

5. Leaveners: A leaven, often called a leavening agent (and also known as a raising agent), is any one of a number of substances used in doughs and batters that cause a foaming action (gas bubbles) that lightens and softens. It starts with the creation of millions of tiny air bubbles from various mixing methods, trapped in the structural framework of the cake's batter by the gluten strands. Air incorporation comes from beating eggs, creaming butter and sugar together, from folding ingredients together, and from any agitation. Cakes are then leavened when the air bubbles in their batters expand when heated from water vapor or steam from liquids. The type of leavener to be used is based upon the kind of cake required for, according to volume, taste, flavour, colour, structure and consistency. Leaveners can be of three kinds – chemical leaveners, biological leaveners and mechanical aeration.

CHEMICAL LEAVENERS–

Baking Powder –made from Cream of tartarand sodium bicarbonate and starch, is a leavening agent, which causes your batter to rise. It is available in two forms: single acting baking powder – which acts instantly and the cakes has to be baked immediately as soon as it is mixed. Double acting powders – In this some of the gas is released when it is mixed to the batter at room temperature and the final gas is released in the oven when it faces high temperature. Too much baking powder results in a bitter tasting product, while too little results in a tough cake with little volume.

Baking Soda –Baking soda is pure *sodium bicarbonate,* and needs to be paired with an acidic ingredient like honey, chocolate, or yogurt so that carbon dioxide is released due to reaction. This carbon dioxide expands in volume in the oven causing the product to rise. It is used in the production of rich red colour speciality cakes, but use of too much will result in a soapy, coarse cake. Since it reacts immediately, so it is recommended for recipes which call for soda immediately or else the product will fall flat.

A chemical leavening agent provides a source of gas to the recipe called carbon dioxide. When moistened (baking soda and double acting baking powder) and/or heated (double acting baking powder), it expands the millions of air bubbles previously created in a batter or dough from mixing or any agitation made to the cake's ingredients, trapped in the structural framework by the gluten strands. If the batter is over mixed, becomes too warm or not baked promptly, the gas will escape and the final recipe will have poor texture and low volume. One of the biggest failures of a cake recipe is using baking powder or baking soda that has been weakened from being moistened previously in the cabinet or refrigerator from humidity. Another failure can be caused by pre –wetting a chemical leavened batter because they start to release carbon dioxide bubbles immediately (double acting baking powder will again leaven when heated). Refrigeration will slow their release, but not stop it. Also, when a batter is placed in an oven that has not been preheated, baking powder fails to act until the oven reaches over 120 degrees F. Using the wrong flour can also affect leavening.

BIOLOGICAL LEAVENERS These include Saccharomyces cerevisiae producing carbon dioxide found in: baker's yeast, beer (unpasteurised—live yeast) ginger beer, and Kefir and sourdough starter. Clostridium perfringens producing hydrogen found in salt – rising bread. Compressed yeast is also called cake yeast, because of its use in cake making. Yeast cakes have texturethat is closer to a Brioche or a sweet roll instead of a sponge cake. Some also call for trimming off the browned crust and just using the soft interior. Yeast raised dough is supported by the protein structure of gluten while cakes made with baking powder and baking soda are supported by a starch structure. Recipes like yeast cakes, coffee cakes etc. using yeast usually also call for bread (strong) flour which has a higher protein content (12%) than all purpose (regular) flour (8%). Cake recipes using baking soda or baking powder usually call for cake flour which has less protein (3%) than that of normal flour.

MECHANICAL AERATION – while creaming fat and sugar or fat and flour or beating egg with or without sugar. When ingredients are beaten or whisked together using hand, spatula, whisk or the appropriate attachments on a machine/blender and no baking powder used it is considered to be mechanically aerated. Sponge goods are good example as the egg and sugar are whisked to a peak and then the flour is folded in, no other form of aeration is used.The surface area will strive to remain at a minimum thus offering a resistance which drives the mixture behind the beating equipment as it penetrates still further into the mix. It is during this fractional moment of time before the beater strikes again that air bubbles are drawn into the mixing until at last it is thoroughly aerated. Cake contains moisture and when it is heated, the moisture turns into steam which causes into raised volume of the product.

6. Dairy and Liquids: Milk is usually the main liquid dairy used in cake recipes. It hydrates the dry ingredients, dissolves the sugar and salt, provides steam for leavening and allows for the baking powder and/or baking soda to react and produce carbon dioxide gas. Milk contains proteins (caseins) that set or coagulate from the oven's heat and help form the structure of the cake, as do flour and eggs. It enriches the cake nutritionally and improves flavor and taste of cakes. Lactose sugar present in milk improves the crust colour and moisture retention capacity of cakes.Water vapour also leavens the cakes thereby acting as a tenderizer.

Other dairy products, such as buttermilk, sour cream or cream cheese add more moisture and flavor to a cake; consequently those made with them keep well. The acid in the buttermilk and sour cream help tenderize the gluten in the recipe, producing a finer crumb. Sour cream and cream cheese add richness to a recipe, which makes them moist and almost springy.Shelf life of cakes is determined by the amount of moisture retained in the cake which eventually depends upon the amount of water used. Other liquids than are used or can be used include rum, wine, fruit juices, sherbets etc.

7. Flavorings and Essences: These are the ingredients that add distinction and character to baked goods. Flavour can come from wet ingredients or dry ingredients, for example, we use a sprinkle of cocoa powder to give an added depth of chocolate. Flavorings and essences come in different forms: ground spices, extracts (especially pure vanilla extract),

citrus zest (peel), citrus oil and even liqueurs. Essence in general term that can mean an oil, extract or concentrated substance made from an animal or vegetable. Oils are generally available in the pure form, containing no alcohol or water. It must be used sparingly. Extracts are diluted oils; usually containing about 20% pure oil and the rest are additives. Alcohol is frequently used as an additive. Flavourings and essences can broadly be divided into artificial (or synthetic) flavourings and natural flavourings e.g. pure vanilla essence, orange, pineapple, strawberry etc. the role of an essence is to impart flavour and it is always added to the batter just before baking, so as to retain the flavour in the batter.

Flower Essences: Baking with flower essences can add a subtle, perfumed flavour to cake sponges, cookies and frostings. Violet, lavender and rose essences are some of the most popular flower essence flavours.

Fruit Essences: Using a fruit essence rather than fruit itself can give a more intense flavour. It also means fruit doesn't have to be added to the sponge which can alter both the texture and colour. Strawberry, raspberry, and blueberry are all delicious berry essences, while orange and lemon bring a sharper citrus flavour. Banana essence gives a powerful synthetic banana flavour, so add little by little so as not to overdo it.

Candy Essences: Candy oils come in a wide range of flavors, such as orange, lime or lemon flavors, tangerine, cherry, etc.

Nut Essences: For a delicious nutty flavour, a splash or two of nut essence can transform your cakes and cookies. Almond and hazelnut work especially well when paired with other ingredients in your cake such as fruit and chocolate. If you have a nut allergy, avoid nut essences as you would any nut ingredients.

Bean essences: Vanilla bean paste is a much thicker mixture of vanilla beans, sugar and water and can be used sparingly as an alternative to vanilla extract.
Other essences commonly used in baking include coffee, rum, brandy and coconut.

8. Salt: Salt or sodium chloride is an important ingredient in cake making. It is generally added at the later state while baking cakes. Without salt the cake will taste flat. Usually only a pinch of salt is added, but the amount of salt added may differ according to the amount of flour/ salted butter used. It should be such that the salty flavor should not be discernible. Depending upon the method of combining ingredients, salt can also have a strengthening effect if it's combined with egg whites. If whipped egg whites to which salt has been added are "folded in," they're better able to hold their volume. Although salt is not considered to be an aid in leavening, it can contribute slightly to the volume of some recipes. It gives a balance to the sweetness and other flavors during baking, moistens the cake (as it is hygroscopic in nature) and also improves the crust colour of cakes by lowering the caramelization temperature of sugar.

9. Emulsifiers: Convenience, fast aeration, uniform performance, stable production, and stability in the end product are all key factors when considering the perfect cake emulsifier for industrial cake production.

Oil and water are immiscible since the interaction results in high energy at the common surface. Through the physical action of mixing one can break up the oil into fine droplets which may be dispersed/ distributed into the water phase to form a dispersion which may be called an emulsion. An emulsion is an unstable multiphase system containing at least two immiscible liquid phases. When the physical mixing action is stopped the oil droplets will coalesce and the oil and water will again separate into 2 different layers. To stabilize an emulsion, the droplets of the disperse phase must be as small as possible and as widely distributed as possible in the continuous phase. Further the viscosity of the continuous phase must be high to retard coalescence. Ultimately to prevent such coalescing of oil droplets and subsequent layer separation, certain chemicals may be used which are known as emulsifiers. In other words emulsions act as a hook between water phase and oil phase and prevent them from separating. This activity keeps the water evenly distributed in the cake batter with considerably reduced rate of evaporation and thus increasing shelf life. It also helps the fat to get distributed evenly in the batter, thus the air cells are also evenly distributed which leaven the cake and give good volume.

Emulsifiers are made up of molecules that have a non –polar (fatty acid) end which carries no charge and has an affinity for oil and a polar (glycerol) end which carries a charge and has an affinity for water. Such a molecule can situate itself at the interface between oil and water. The polar end will immerse itself in the aqueous phase and the non –polar end will immerse itself in the lipid phase and prevent coalescence of the oil droplets. This helps the two phases to stay intimately mixed and form a stable emulsion.

As cake baking has become a more precise industrial activity, baking emulsifiers have become a very important class of ingredients in the manufacture of cakes and other sweet goods. Good example of emulsifiers are: DATEM (emulsifier E 472e), Lecithin, SSL and CSL (sodium and calcium stearoyl lactylates).

10. Dry Fruits and Nuts: These are of specific organoleptic characteristics (flavour, taste and consistency) and are used depending upon the choice. Traditionally dried fruits and nuts are used as they generally do not add moisture to the cakes. Commonly used fruits and nuts are raisins, currants, sultanas, hazel nuts, walnuts, figs, mixed peel and glace cherries.

11. Spices: Spice is easily one of the best cake flavors around. Common spices used in baking include ground cinnamon, ground mixed spice, ground ginger and nutmeg. It's worth having jars of these to hand and buying others as needed. Few marked specialty spiced cakes may be: buttermilk spice cake, spice Bundt cake, carrot cake, gingerbread spice cake, pumpkin cake etc.

12. Chocolate: It's worth having some plain chocolate in your store cupboard for making chocolate cakes; for breaking up to use as chocolate chips and for making rich chocolate

cake toppings. In most recipes a plain chocolate of around 40 per cent cocoa solids is adequate unless otherwise stated. Chocolates provide colour, texture, moisture, flavour and taste to cakes.

13. Cocoa: Another key ingredient for chocolate cake recipes, cocoa provides an intense chocolate flavour. It has the benefit of not needing to be melted and is completely stable. A couple of tbsps are often used in place of flour in addition to melted chocolate to give depth to the recipe. It is also used when making chocolate butter cream for icing and filling cakes.

There are other ingredients that frequently feature in recipes which you might also like to have at the ready if you bake regularly. These include:

1. **Black treacle** – This is often used in rich fruit cakes and other full –flavoured bakes.

2. **Candied peel –** Made from sugared citrus fruits, candied peel is frequently used in Christmas cakes, panettone and Florentine biscuits.

3. **Desiccated coconut** – If you like coconut –flavoured cakes or cakes spread with jam and dipped in coconut then keep a packet of unsweetened desiccated coconut to hand.

4. **Dried fruit –** If you're a fruit cake fan, it's good to have a bag of currants, sultanas and raisins in the cupboard. There are plenty of other dried fruits available so buy them as you need them or select your favorites to modify a recipe.

5. **Glacé cherries –**You can buy either the bright red glacé cherries which are dyed or the deeper red un –dyed cherries for use in fruit cakes, particularly Christmas cake.

6. **Golden syrup –** Sticky and sweet, golden syrup makes a moist sticky cake and, like black treacle, keeps for a long time in the cupboard.

7. **Ground almonds –** Ground almonds are often used in place of flour or as well as flour in cake recipes. They produce a moist cake and are suitable as a gluten –free option.

8. **Honey –** Honey is often used in addition to sugar and creates a moist and fragrant cake.

9. **Jam –**Smooth apricot jam is a must if you like to make celebration cakes as it's used to stick marzipan on to fruit cake. Strawberry or raspberry jams are also good as a filling for a Victoria sandwich.

10. **Lemons, limes, oranges –** A little bit of zest can liven up a plain sponge mix. Some recipes also require the juice to make a sugar syrup for drizzling.

11. **Nuts –** Mixed chopped nuts, walnut halves, hazelnuts, flaked almonds and pecans are among the nuts you might want to have on hand. Again, choose the ones you like the best. Often one type of nut can be substituted for another in recipes. Store nuts in airtight containers as they might get rancid in contact to air.

12. **Polenta –** Polenta is another flour substitute – cakes made with this ingredient tend to be denser, pleasantly textured and have a vibrant yellow colour.

13. **Sunflower oil –** Sunflower oil has many culinary uses and it's ideal for baking as it has a mild flavour which allows the other ingredients in a cake to shine through.

14. **Food Colours** – This is an important constituent of cake as every cake is associated with a certain type of colour. Addition of colour it gives the food an attractive and appetizing appearance. Dyes of various colours (most commonly blue, green, red and yellow) are used to the cakes. Food colorings are available in small to big bottles in liquid form and in wide variety of colors.

CHECK YOUR PROGRESS-IV

1. Write note on Cake making Ingredients.

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2. Difference between chocolate and coco.

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4.9 CLASSIFICATION OF CAKES

There are many different types of cakes and many different ways of dividing them into various categories, but professional bakers categorize cakes by ingredients and mixing method. (Home bakers tend to categorize cakes by flavoring –i.e., chocolate cakes, fruit cakes, and so on –which is helpful when you're trying to decide what to eat, but not as helpful when you're trying to understand how best to make a cake.) Depending on how the batter is prepared, you will find that the final texture (and color, if it is a yellow or white cake) varies. Below is a comprehensive but by no means exhaustive list of the basic types of cakes: (Fig. 3A)

A. SHORTENED (FAT OR OIL) CAKES

These contain some kind of fat—often butter, but sometimes oil—and baking powder to leaven them or make them rise. If the fat is butter, the ingredients are usually combined using the creaming method, which means that the soft butter and sugar are beaten together in an electric mixer to partially dissolve the sugar and to incorporate some air. Then the dry and wet ingredients are added in alternating doses. This results in a light and airy crumb, though not quite as light as that of a sponge cake. The best butter cakes have a moist buttery richness tempered by lightness. Included in this category are:

- **Pound cakes:** This is the simplest type of butter cake. A classic pound cake is made with a pound each of butter, sugar, eggs, and flour. This produces a dense yet tender texture. Pound cakes are heavier than the types of butter cakes used for constructing layer cakes. They're easy to prepare, with the only trick being that the butter must be quite soft when you begin. These cakes are usually very lightly flavored and served plain or topped with a simple glaze or water icing. A pound cake is usually baked in a loaf or Bundt pan. Many coffee cakes, sour cream cakes, and fruit crumb cakes are variations of pound cake.

- **Butter (and oil) layer cakes:** Many different types of cake can be arranged in layers. However, classic American layer cakes are usually butter or oil cakes. The birthday cake you ate as a child was probably of this type. These cakes are lighter than traditional pound cake, but more moist and flavorful than European –style sponge layer cakes. Cakes in this category include: devil's food cake (the classic chocolate layer cake), golden cakes (made with egg yolks, which add richness and a golden color), and white cakes (made with egg whites, which create a lighter, whiter –colored cake).

B. SPONGE AND FOAM CAKES

These are notable more for what they are missing than for what they contain: They usually do not include fat, such as butter or oil, and they do not incorporate leaveners, like baking powder. Instead, volume is created by **whipping the eggs** or egg whites. The air whipped into the eggs expands during baking, causing these cakes to rise on their own without baking powder. However, the success of this method depends on not deflating the eggs after whipping them. To this end, dry ingredients are usually sifted over and gently folded in, and fat is often avoided, as it would weigh down the foamy batter.

This method produces extremely light, airy cakes with a spongy texture but generally less flavor and moisture than butter and oil cakes. The basic types of sponge and foam cakes are:

1. **Angel Food Cake**: This type is made with egg whites alone and no yolks. The whites are whipped with sugar until very firm before the flour is gently folded in, resulting in a snowy –white, airy, and delicate cake that marries beautifully with fruit. Most angel food cakes have a spongy, chewy quality derived from their relatively high sugar content and the absence of egg yolks. Baked in ungreased two –piece tube pans, angel food cakes are cooled by being inverted, since this type of cake would collapse if cooled right –side –up in the pan or if removed from the pan while still warm.

2. **Genoese:** This type of sponge cake is made with whole eggs rather than just egg whites, which gives it a richer flavor than angel food cake. The eggs are combined with sugar and gently heated over simmering water, then whipped (heating the eggs allows them to be whipped to a greater volume). Genoese lacks much assertive flavor of its own, but it is often used to construct layered or rolled cakes when a lighter texture than a butter cake is desired. To add flavor and moisture, Genoese cake layers are always moistened with flavored syrup, and they are often sliced into thin horizontal layers and stacked with rich fillings such as butter cream. These layer cakes, common in the coffeehouses of Europe, are called "European –style" to distinguish them from American –style butter layer cakes, which generally have fewer, thicker layers.

3. **Biscuit** (always pronounced the French way as *bees –kwee*): This type of sponge cake contains both egg whites and yolks, but, unlike in Genoese, the whites and yolks are whipped separately and then folded back together. This creates a light batter that's drier than a Genoese but holds its shape better after mixing. For this reason, it's often used for piped shapes such as ladyfingers. If baked in a tube pan like an angel food cake, it makes a very chewy sponge cake that was popular in the early 20th century but has since fallen out of favor. However, it's still known in a slightly different form as the classic Passover sponge cake, in which the flour is replaced by matzoh cake meal and potato starch.

4. **Chiffon Cake:** This fairly recent American creation was invented by a salesman who sold the recipe to General Mills, which spread the recipe through marketing materials in the 1940s and 1950s. A classic chiffon cake is kind of a cross between an oil cake and a sponge cake. It includes baking powder and vegetable oil, but the eggs are separated and the whites are beaten to soft peaks before being folded into the batter. This creates a cake with a tender crumb and rich flavor like an oil cake, but with a lighter texture that's more like a sponge cake. Chiffon cakes can be baked in tube pans like angel food cakes or layered with fillings and frostings.

C. LOW – OR NO –FLOUR CAKES

Cakes made without flour (or with very little) generally have a creamy or silky texture. They can be baked or unbaked:

1. **Baked Flourless Cakes:** These include baked cheesecakes and flourless chocolate **cakes**. For easy removal, they're often made in a spring form pan, though some can also be made in regular round layer cake pans. Often the filled pan is placed in a larger pan that's half –filled with water to insulate the delicate, creamy cake from the oven's strong bottom heat, which might give the baked cake a porous rather than silky texture. This is called baking the cake in a water bath.

2. **Unbaked Flourless Cakes:** These types of cakes are typically molded in a dessert ring or spring form pan then simply chilled before unmolding. They include unbaked cheesecakes and mousse cakes**.** They often have a crust or bottom layer that's baked before the mousse is added. Sometimes other layers, such as Genoese or biscuit, are alternated with the mousse.


Butter (and oil) layer cake


Pound cakes


Butter (and oil) layer cake

Butter (or oil) cakes

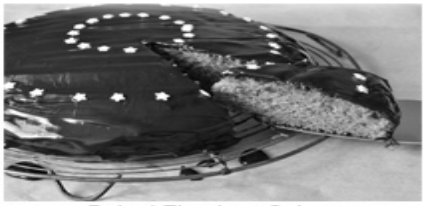

Chiffon Cake

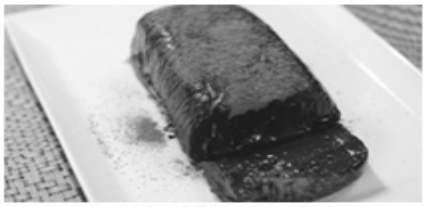

Genoise sponge cake


Angel Food Cake


Biscuit cake

Sponge and Foam Cakes


Baked Flourless Cake


Unbaked Flourless Cake

Low- or No-Flour Cakes

Classification of cakes

CHECK YOUR PROGRESS-V

1. Write note on Sponge and Foam Cakes.

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2. What is angel food cake? Explain.

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4.10 CAKE MAKING METHODS

Cake making methods can be divided into two main categories:

A. Shortened cakes – In shortened category there are 4 methods of mixing
   1. Creaming method or sugar batter method
   2. Two stage method or blending method
   3. Flour batter method
   4. Sugar batter method

B. Egg foam method
   1. Sponge method
   2. Angel food method
   3. Chiffon method

The 3 main goals of cake making are

- To combine ingredients into a smooth uniform batter.
- To form and incorporate air cells in the batter.
- To develop a proper texture in the finished product.

A. **SHORTENED CAKES** – In short end category there are 4 methods of mixing

1. **Creaming Method:** This is the conventional method used for many cookie doughs, butter cakes, and pound cakes. It was for a long time the standard method for mixing high –fat (butter) cakes. Butter cakes are highly prized for their flavor; shortening adds no flavor to cakes. Butter also influences texture because it melts in the mouth, while shortening does not. However, many bakers may prefer to substitute shortening for all or part of the butter in these formulas. Shortening has the advantage of being less expensive and easier to mix. In creaming recipes, use regular shortening, not emulsified shortening. Regular shortening has better creaming abilities. Examples – cookies, marble cake, choco chips brownies, cup cake etc.

   Method – The creaming method starts out with softened, solid fat (such as butter or margarine). All fats used should be at room temperature. Very hard shortenings will not cream up well while too soft shortenings will not be able to retain aeration. The fat is then mixed with granulated or brown or powdered sugar which is added gradually. Granular fats should be avoided which have poor whipping quality. The creaming comes into play as the fat is mashed against the sides with the sand –like sugar crystals working against it, softening it even more while forcing air into it. Creaming should be done at a low to medium speed. A high speed may melt the fat, causing a loss of air bubbles. Creaming for too long creates a coarse texture in the finished cake. When adequate aeration is achieved, the mixture becomes very light, fluffy and brighter in appearance. Eggs are added gradually. Eggs should be at room temperature. Before adding the eggs they should be whipped to the stiff consistency and small amount of flour is added to it so that the mixture doesn't curdle. If the batter is curdled, there is a loss of aeration which results in low volume and poor texture of cakes. The air cells of the whipped eggs either diffuse into the air cells already present or increase the number of air cells in the cream and the liquid part of the egg is evenly distributed in the mixture giving it a smooth , velvety appearance. Liquids such as liquid sugars, water, milk, fruit juices, fruit pulp, etc along with essences and colour can be added at this stge. This is done in order to have sufficient moisture in the mix to prevent toughening of gluten while mixing flour. Next stage is to incorporate flour in the mixture. Flour should be sifted with other ingredients such as baking powder or soda etc in order to ensure its thorough dispersal. It has to be mixed with minimum possible of mixing action.

2. **Two Stage Method:** This is a simple, foolproof way of mixing a cake base, using very few steps in the process. This method was developed for use with modern high ratio shortening. High ratio cakes contain a large percentage of sugar more than 100% based on the weight of the flour. Also they are made with more liquids than creaming method cakes. This method is often used to make cakes in high volumes bakeries. This method is typically used when a recipe contains a higher portion of sugar than flour by weight. Emulsified shortening, such as the high –ratio variety, is used because the amount of liquid ingredients is also proportionally larger than, for example, in the foaming or creaming methods. This type of batter is always leavened with a chemical agent (baking soda and/or baking powder) rather than

relying solely on the air incorporated with a whip. Whole eggs, granulated sugar, cake flour, and baking powder are placed in a mixer and stirred at low speed to form a paste. Emulsified shortening is added and the mixture is whipped at high speed for two minutes. Milk or water is then added along with a flavoring, such as vanilla extract. The batter is whipped at high speed one minute longer. Example – Yellow cake

Method – Scale all the ingredients. Have all the ingredients at room temperature. Sift the flour, baking powder, soda, salt etc in the mixing bowl and add the shortening and mix. Sift the remaining dry ingredients into the bowl and add part of water or milk. Mix slowly. Scrape down the sides from time to time to ensure even mixing. Combine the remaining liquids and lightly beaten eggs and add this mixture to the batter in 3 parts. Continue to mix to form produce a smooth and homogenous batter. The finished batter is normally quite liquid. The mixture is now ready for panning and baking.

3. **Flour Batter Method:** The following procedure is used only for a few specialty items. It produces a fine –textured cake, but there may be some toughening due to the development of gluten. Flour –batter cakes include those made with either emulsified shortening or butter or both. Fat and an equal weight of flour are creamed together till it becomes light and fluffy.

   Method – In the flout batter method, the flour is added as two separate portions firstly mixed with the creamed ingredients with a second portion added later to the batter. The flour and fat are mixed together, while the eggs and sugar are whisked together in a separate bowl. The fat is usually creamed with a similar amount of flour, for example: 400g flour to 450g fat to obtain a suitable creamy mixture until the flour particles are thoroughly coated with fat. Once the eggs and sugar are sufficiently whisked to form foam they are added in small portions to the flour and fat mix. Once these two portions are combined together in a cohesive batter any additional flour is added. The mixed batter should be deposited into cake pans and baked without delay. It must be kept in mind that once the leavening agents have been added to the batter, they begin to react and evolve carbon dioxide gas

4. **Sugar Batter Method:** The sugar batter is based on the emulsion of oil in water with air bubbles being trapped in the fat phase while other ingredients are dissolved in the water phase.

   Method – The fat and sugar are creamed depending on the temperature and creaming quality of the fat at medium speed to produce a fluffy and light in coloured mixture. During this stage, small air cells are formed which are entrapped into the creamed mixture. This mixture takes on volume and becomes lighter in consistency. The exact time for proper creaming at this stage is will depend on several factors like temperature of the fat and the speed of the mixing machine – High speed will create friction and tends to destroy the number of air cells that are formed and incorporated during the early stages of mixing. The liquid egg is added

in 4 –5 portions with creaming in between each addition to prevent any curdling occurring and producing a batter that is smooth and has a velvety appearance and texture. In the final stages of the creaming method of mixing sifted flour and any additional water, milk or essence is then gently added to the batter.

B. EGG FOAM METHOD

The egg foam method is the method we use to make Genoese, French macaroons, sponge cake, and angel food cake, among others. Batters made using this method are generally very low in fat, often having no extra fat added, except the fat in the egg yolks, if whole eggs are called for. Egg –foam cakes have a springy texture and are tougher than shortened cakes. This makes them valuable for many kinds of desserts that require much handling to assemble. The egg foam method relies on the leavening power of eggs and steam to create the lift necessary to make a delicate angel food cake or Genoese. The method mostly starts by whipping of eggs (egg whites for Sponge cakes and whole eggs for Genoese) and sugar until they turn light. Sift dry ingredients i.e. flour over the egg mixture and gently but thoroughly fold together all the ingredients. Don't dump the flour or you will break a lot of your bubbles and have a flat cake.

Method – The method mostly starts by whipping of eggs and sugar until they turn light. Sift dry ingredients i.e. flour over the egg mixture and gently but thoroughly fold together all the ingredients. Don't dump the flour or you will break a lot of your bubbles and have a flat cake. Foam cake methods use beaten eggs to give the cake volume.

1. **Sponge Method**: Sponge cakes are made from the three ingredients no baker can do without—eggs, sugar, and flour—although some sponges also contain butter. Classically made sponge cakes (Genoese in French) do not contain baking powder or baking soda; their volume and light texture come solely from the air whipped into the eggs. Sponge contains equal parts eggs, sugar, and flour. The weight of the eggs is always used as the basis for determining the quantity of the remaining ingredients. Whole eggs, entirely or in part, may be replaced with egg yolks or egg whites. More egg yolks will result in a denser sponge with finer pores. Increasing the amount of egg whites produces a lighter sponge with a larger pore structure. Increasing the yolk content in an already heavy sponge cake can have a detrimental effect. Granulated sugar or, even better, the finer grade castor sugar, should always be used in a sponge cake to ensure that the sugar dissolves easily. The flour used in a sponge cake must have a good ratio between starch and protein. Some gluten (a high percentage of which is found in bread flour, for instance), is necessary to bind and hold the structure, but too high a percentage makes the batter rubbery and hard to work with and results in a tough and chewy sponge. A flour with too much starch, such as cake flour, will produce a light and tender sponge, but the structure will collapse partially when baked. Flour for sponge cakes should always be sifted. If you use unsweetened cocoa powder or any other dry ingredient, sift it in with the flour. When adding the flour to the batter, not to break the air bubbles that you just whipped in. Fold in the flour with a rubber spatula or your hand and turn the mixing bowl slowly with your other hand at the same time to combine the ingredients evenly. Never stir the flour into the batter or add it with the mixer.

Butter can be added to a sponge in an amount up to two –thirds the weight of the sugar. The butter should be melted but not hot. It is always added last, after the flour has been completely incorporated. Chopped nuts or chopped candied fruit may be added to a sponge cake without changing the formula; provided it is a fairly heavy sponge (the pieces will settle on the bottom in a very light sponge batter).

Method – Scale all the ingredients accurately. Combine the eggs and sugar in a clean bowl. Immediately set the bowl over hot water until the mixture warms up to 43^0C (for greater volume). If any liquid is included add it now at this stage only. Fold in sifted flour be careful not to deflate the volume.
Immediately pan and bake the batter. Delay will cause loss of volume. Genoese is a variation of fatless sponge. Sponge method is of six types:

i. **Cold –Foaming Method** – In the cold –foaming method, the eggs and sugar are placed directly in the mixer bowl and whipped at high speed until creamy and light in color and the foam has reached its maximum volume. The butter can be added as well, but is generally left out since this method is typically used when the sponge will be soaked with a liqueur or flavoring, as in tiramisu or trifle, for example. Because part of the sugar melts in the oven rather than over the water bath as in the warm method, there are larger air bubbles in the finished sponge.

ii. **Warm –Foaming Method** – In the warm method, eggs and sugar are placed in a mixer bowl and stirred over immersing water (so that the eggs do not cook) to about 110°F (43^0C) or until the sugar has dissolved completely. The mixture is removed from the heat and whipped at high speed until creamy and light in color and the foam has reached its maximum volume. Sifted flour is folded in, followed by the melted butter, if used. The main objective in the foaming method is to create a batter with the maximum amount of air.

iii. **Egg –Foaming Metho**d –In this method, the eggs are first separated; the yolks are whipped with part of the sugar to a light and fluffy consistency, and the whites and the remaining sugar are whipped to soft peaks. The yolks are gradually folded into the whites, followed by the sifted flour, part of which is replaced with finely ground nuts or almond paste, followed by any other ingredients, and, last, the melted butter, if used. Because this method produces a somewhat lighter sponge than the other two foaming methods, the sponge tends to shrink away from the sides of the pan more than is desirable. For this reason, it is best not to grease the sides of the cake pan. Instead, cut the baked sponge free using a sharp, thin knife.

iv. **Emulsifier – Method Sponge** –Another method and probably the most common in the baking industry today, is the emulsifier method; it is quick, convenient, and almost foolproof. The emulsifier is basically a whipping agent that contains a molecule that preserves the emulsion of lipids (fat) and water. By keeping the ingredients suspended and preventing separation, emulsifiers allow the batter to hold the air that has been whipped in without falling. In the emulsifier –method sponge, all ingredients, including the flour, are whipped together with the emulsifier for a specified time. The emulsifier method uses baking powder and does not rely on air as a leavening agent, so the sponge does not need to be baked immediately and can wait for its turn for the oven,

v. **Ladyfinger Sponge** – Another sponge variation is the ladyfinger sponge, also known as a piped sponge, which is used not only for cookies but also for several classic desserts, including tiramisu, charlotte Russe, and gateau Malakoff. In this method, more air is whipped into the batter so that it can be piped in to various shapes without running. Ladyfinger sponges are meant to be very dry after baking, but they easily absorb moisture from fillings or syrup.

vi. **Othello Sponge –**Othello sponge is comparable to the ladyfinger sponge, and the two are easily interchangeable. The Othello sponge has a lighter structure due to less flour and more egg white. The batter should immediately be piped out and baked as soon as it is finished, as the mixture becomes tough if left to stand too long.

2. **Angel Food Method:** This type of cake contains neither fat nor chemical leaveners. It relies solely on stabilized egg white foam for leavening. The foaming power of the egg whites results from a combined effort of various proteins to increase the thickness (viscosity) of the albumen and produce a fine mesh of foam (tiny bubbles) that will hold together for a time if properly combined with the sugar. Angel food batters have much higher sugar content than any other sponge or butter cake. Although sugar has a mixed influence in the whipping stage, where it acts to delay the foaming of the whites, it stabilizes the foam once it is whipped, especially in the oven, where sugar is necessary to prevent a total collapse. Sugar does this by forming hydrogen bonds and delaying evaporation. Mixing and baking an angel food cake successfully is a delicate procedure. Scale all the ingredients accurately. The egg whites may be slightly warmed in order to achieve better volume. Sift the flour with half the sugar. This helps the flour to mix more evenly with the egg whites. Beat the egg whites along with salt and cream of tartar until soft peak. Gradually add the sugar that was not mixed with flour. Beat until the egg whites form soft peaks. Do not beat until stiff. Fold in flour sugar mixture lightly and then bake it.

Method – Scale all the ingredients accurately. Te egg whites may be slightly warmed in order to achieve better volume. Sift the flour with half the sugar. This helps the flour to mix more evenly with the egg whites. Beat the egg whites along with salt and cream of tartar. Gradually add the sugar that was not mixed with flour. Beat until the egg whites form soft peaks. Do not beat until stiff. Fold in flour sugar mixture lightly and then bake it.

3. **Chiffon Method:** A chiffon cake is a very light cake made with vegetable oil, eggs, sugar, flour, baking powder, and flavorings. It is a combination of both butter and foam type (sponge type) cakes. Instead of the traditional cake ingredient butter or paste (such as shortening), vegetable oil is used; Chiffon cakes and angel food cakes are both based on egg –white foams, but here the similarities in the mixing methods end. In angel food cakes, a dry flour –sugar mixture is folded into the egg whites. In chiffon cakes, a batter containing flour, egg yolks, vegetable oil, and water is folded into the whites. Egg whites for chiffon cakes should be whipped until they are a little firmer than those for angel food cakes, but do not whip them until they are dry. Chiffon cakes contain baking powder, so they do not depend on the egg foam for all their leavening. A chiffon cake is a cross between an oil cake and a sponge cake. It includes baking powder and vegetable oil, but the eggs are separated and the whites are beaten before being folded into the batter creating the rich flavor like an oil cake, but with a lighter texture that's more like a sponge cake. They can be baked in tube pans or layered with fillings and frostings. The lack of butter, however, means that chiffon cakes lack much of the rich flavor of butter cakes.

   Method – Scale all the ingredients. Use good quality flavorless vegetable oil. Sift the dry ingredients including part of sugar into a mixing bowl. Mixing with the paddle attachment gradually add oil, yolks, water and flavoring in a slow steady stream. Mix until smooth. Whip the egg whites along with cream of tartar, sugar to firm moist peaks. Fold the whipped egg whites in the flour liquid mixture. Deposit in pans and bake.

4.11 CAKE IMPROVERS

Cake Improvers are “miracle ingredient.” When added to cake batter at the creaming stage, it supposedly renders the crumb soft and moist and increases shelf life. The mysterious product contains rice starch, polyglycerol esters, and mono – and di –glycerides – the same additives found in many boxed cake mixes and commercial baked goods.

How Cake Improvers works: The addition of small amounts of certain forms of starch to cake batter mixes surprisingly and unexpectedly improve the basic important properties of the batter mix as shown both by the prebaked batter mix specific gravity as well as the substantially increased cake volumes obtained in the finished baked cakes. Moreover, it is found that in using these particular forms of starch, the finished baked cakes have extremely good crumb softness initially and can retain crumb softness over a storage period of six days. This fact is extremely important since the average family will not

consume a cake on the same day that it is baked. Thus, the capability of a cake to retain a desirable level of softness for a long time is of prime concern. It is found that the addition of small quantities of a pre –gelatinized starch which does not contain more than about 18% by weight of amylase leads to vastly superior cake batter mixes and to the finished baked cakes obtained there from. While any form of pre –gelatinized low amylase –containing starch can be used. It effects in the batter mix system, such as hydration speed, quantity of absorbed water, extent of decreasing the specific gravity or the extent of increase in cake volume or the capacity to retain crumb softness in the finished baked cake is greatly improved. The starch must be pre –gelatinized before addition to a cake batter mix. Pre –gelatinization is carried out in conventional manner by heating the starch in the presence of excess water until the starch granules have broken and then the starch is dried upon drum rollers or any other form of conventional drying apparatus.

Various low amylase –containing starches may be incorporated in cake batter mixes, like waxy maize starches, waxy sorghum starches, starch ethers and esters, which are considered to contain at most trace amounts of amylase. An improved method of cake baking which comprises preparing a cake batter of principally flour, sugar and shortening and adding thereto from about 1% to about 5% of a pre –gelatinized starch which contains not more than 18% by weight of amylase, and then baking the said batter at elevated temperature to obtain an improved cake, said proportion of added pre –gelatinized starch being based upon the weight of solid ingredients in said batter.

In general the batter mix is capable of rapidly taking up water at high absorption levels so that the viscosity of the batter mix can be adequately increased. With a high viscosity the cake batter can entrap sufficient air during the mixing cycle with liquid components to provide a low specific gravity. A low specific gravity, in turn, will almost always yield finished baked cakes of adequate volume and good softness, texture and tenderness. Basically then, the desired properties in the batter mix system are rapid and high levels of hydration, high viscosity, and low specific gravity after the mixing cycle.

Cake gel is a cake improver, comprised of emulsifiers and humectants, which greatly improves volume through increased aeration and provides a more uniform crumb structure. It also improves softness in cake. Additionally, it increases batter stability and reduces variances that may be caused due to changing flour quantity and changing process parameters.

Adding Cake gel helps in smooth mixing of all ingredients, improves batter consistency and strength, better and uniform crumb texture, extra volume and better eating qualities. It contains ingredients such as Emulsifiers, propylene glycol and water. It is to be added in the cake batter at a dosage of 3 to 8% on flour weight. (30g to 80g per 1kg flour).

What is a cake enhancer? : These fatty acids come from vegetable fats, and act as emulsifiers, allowing fats and liquids to combine more easily. They also serve as stabilizers and texture enhancers. Widely used in commercial baked products, they keep baked goods fresh and soft, and help cakes stay moist, light and fluffy and stay fresher longer.

CHECK YOUR PROGRESS-VI

1. How Cake Improvers works?

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2. What is a cake enhancer?

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4.12 CAKE PRODUCTION

Cake batters are prepared using carefully tested formulas. Since these formulas are balanced, no changes should be made in the few ingredients that are added. For example, if the directions call for water to be added, do not add milk instead. Substituting ingredients or adding other ingredients will make the formula out of balance and can ruin the finished product. Follow the directions for a cake batter to get a good product.

Cake baking is not difficult, but it requires some organization and forethought. While the steps for making a cake vary considerably depending on the type, you'll want to do the following before attempting any recipe:

1. Read through the Recipe: This sounds obvious, but cakes in particular have certain requirements, such as the temperature of ingredients, that cannot be altered. You don't want to realize too late that the butter you just mixed with sugar was supposed to be softened.

2. Assemble ingredients and ensure Their Correct Temperature: Get all of your ingredients and equipment out on the counter before you begin and make sure they're at the proper temperature. This is especially important for butter and eggs: Soft butter makes for a smooth batter and a lofty cake, and room –temperature eggs keep the batter's temperature consistent.

To soften butter, leave it out for several hours; it should offer no resistance when you press on it. Or, you can hurry the process using a microwave: Cut the butter into ½–inch cubes, arrange them in a single layer on a microwave –safe plate, then microwave on high for 3 seconds at a time, testing in between, until the butter is softened but not melted.

3. Preheat the Oven: Before preparing the batter, your oven should be at the correct temperature. A batter will not react properly to heat if it sits at room temperature for 10 minutes waiting for the oven to heat. Nor will it rise properly if the oven continues to warm up after the pan has been placed in it. Avoid burning your cake by setting a rack in the middle of the oven for cake layers or in the lower third for a tube cake so that the top of the pan is not too close to the top of the oven.

4. Prepare Your Equipment: To ensure that your finished cake has the right shape, it's important to make sure that it will come out of the pan in one piece. The most common way to do this is to coat the pan with butter, but the specifics may vary depending on the type of cake. For cake layers in general, you coat the inside of the pan with very soft but not melted butter using a brush. Follow that with a disk of parchment paper cut to the size of the inside of the pan. For a butter cake baked in a Bundt pan, coat with soft butter, and then coat the buttered surface with fine, dry bread crumbs, tapping the inverted pan to dislodge any excess. Follow with a quick coat of vegetable cooking spray for a guarantee that the cake won't stick. Line a rectangular or square pan with foil by molding the foil first on the back of the pan, then pressing it into the pan. Butter the foil. This makes it easy to lift a cake that you don't want to invert, such as a crumb cake, right out of the pan.

5. Prepare the Batter: Instructions will vary depending on the type of cake: For butter cakes, the ingredients will typically be combined using the creaming method; for sponge cakes the eggs will generally be beaten, then folded in. For the proper texture, be sure to follow the instructions closely, and then pour the batter into the pan or pans and bake.

6. Test for Doneness: To test a cake, plunge a thin knife or cake tester into the center (or halfway between the side and the tube if using a tube pan). When a cake is finished, you will find a few crumbs sticking to the knife or tester when you withdraw it. If the cake is not ready yet, there will be wet batter on the knife or tester.

7. Cool the Cake: Most cakes are cooled on a metal rack for even air circulation. A recipe will indicate whether the cake should be cooled in the pan or unmolded immediately. Follow instructions carefully—leaving certain types of cakes in the pan for too long may cause them to stick. Angel food cakes and chiffon cakes need to cool suspended upside down in their tube pans or they will deflate and look squashed and unappealing when you cut them. Invert the pan over several inverted ramekins so that the edges of the pan are supported by them. It is best to figure out the system for doing this before you begin baking the cake by testing the empty pan over the ramekins to make sure your system will be stable.

8. Unmold the Cake: When you are ready, gently run a sharp, thin knife between the edge of the pan and the cake. Then invert a rack or platter (as indicated in the recipe) over the

top of the pan. Turn the pan over and lift it off the cake. You may be asked to finish cooling the cake upside down or instructed to turn it right side up again. Be sure to follow instructions, as each type of cake cools best in a different way.

9. "Finish" the cake: As described in the section on fillings, frostings, and glazes, options for finishing a cake are numerous. Some varieties, such as pound cakes and crumb cakes, are finished already when they come out of the oven and don't need any embellishment at all. For others, a simple dusting of powdered sugar or quick brush with a glaze may be all that's required. And some cakes, such as European –style layer cakes, can be filled with multiple fillings, frosted with a different frosting or glaze, and then adorned with elaborate decorations, such as piped butter cream or marzipan crafted into roses and leaves.

It is to be noted that:
The oven temperature at which these cakes should be baked will vary over a considerable range, depending on factors such as richness of the formula, size of pan, and moisture content of the batter. Batters which are high in sugar content require low baking temperatures in the range of 325 – 350ºF(160 –175ºC), while leaner mixtures may be baked at a temperature range of 350 –400ºF(175 – 200ºC). The average baking time for layer cakes will take 15 –20 minutes and for cupcakes 10 –15 minutes.

Secrets to Baking Perfect Cakes:

1. **Good results start in the mixing bowl:** A cake is essentially a chemistry experiment—a series of ingredients mixed in a specific order to cause reactions that produce specific effects. Butter cakes, like pound cakes and most layer cakes, get their soft, fine texture and moistness—called a crumb—by first creaming together fat and sugar, adding eggs, and slowly incorporating dry ingredients into the mixture while alternating with a liquid, such as milk or buttermilk. Angel food, sponge, and chiffon cakes get their signature airy, foam like textures when whole eggs or egg whites (depending on the cake) are whipped until voluminous, and then folded into the batter. The air incorporated by whipping the eggs gives these cakes volume, making them springy and elastic. So whatever cake you're making, be sure to follow the recipe instruction closely. The order and method described really counts when cake baking.

2. **Know your oven:** To prevent an under – or overdone cake, get an oven thermometer—it's the best way to be sure your oven is calibrated correctly. Bake the cake in the middle (too close to the top or bottom can cause overbrowning). Gently close the oven door—a hard slam can release air bubbles trapped in the batter. To check for doneness, lightly press the center of the cake; if it springs back, it's done. Or insert a wooden pick; it should come out clean.

3. **Choose the proper pan size (and color):** Your recipe calls for two 9 –inch round cake pans, but you only have 8 –inch pans. What to do? Go get two 9 –inch pans. Pan size is specified in recipes because a cake increases in volume 50 to 100 percent during baking; if your pan is too small, the cake could overflow. Color is

important, too; glass or dark nonstick pans usually require a 25 –degree reduction in baking temperature versus silver –colored aluminum pans.

4. **Use the right flour for the recipe:** Different flours contain varying percentages of protein—the more protein, the more gluten. Cake flour has the least protein and yields extra –light baked goods, like angel food cake. Bread flour has the most and is used for denser items; all –purpose is in the middle and produces tender cakes.

5. **Weigh, don't measure, flour:** If you don't have a kitchen scale, it's time to buy one. Weight is the only accurate way to measure flour. Depending on how tightly flour is packed into a measuring cup, you can end up with double the amount intended. That's why we give flour measurements in ounces first.

6. **Chemistry counts:** The intimate chemistry among key ingredients delivers the foundation for good cake. Flour thickens the batter and provides gluten, a protein that gives the cake structure. It forms when flour is combined with a liquid and agitated. Don't over mix, which can cause your cake to turn tough. Leaveners, like baking soda or powder, produce carbon dioxide bubbles, which are trapped by the starch in the batter and expand during baking, causing the cake to rise. Fats, like butter, shortening, or oil, help retard gluten formation while providing moisture for the cake. This ensures a tender texture. Sugar breaks up gluten, keeping the texture tender; it absorbs liquid, keeping the cake moist; and it caramelizes in baking, enriching flavors and helping the cake brown. Eggs firm up when cooked, helping cake batters set in the oven. Egg yolks contain fat, as well as lecithin, an emulsifier that allows fats and water to mix smoothly and ensures even texture.

7. **Give your cake a cool down:** Cool cakes in the pan on a wire rack for 20 minutes, and then remove from pan. Once cooled, place a plate on top, invert the pan, and gently tap or shake it to release the cake. Angel food cakes are usually baked in tube pans, then inverted either on feet attached to the pan or over a bottle to cool upside down while still in the pan—gravity helps the cake keep its volume. When it has cooled, run a narrow spatula around the edges, and release onto a plate.

8. **Frost like a professional:** Put a small dollop of frosting in the center of the cake plate, and place the first cake layer on top. This will keep the cake from moving as you work. Use an offset spatula to frost the top, add the next layer, then coat the whole cake with a thin layer of frosting. (This "crumb coat" holds loose crumbs in place.) Place the cake in the freezer for 15 minutes, then remove and finish frosting, starting with the top, then the sides.

9. **Fondant may make for a beautiful cake, but...:** Rolled fondant—the smooth coating seen on elaborate wedding and reality –show competition cakes—is a combination of gelatin, glycerin, and sugar that forms into an easily molded dough. It doesn't taste very good, though. Poured fondant is cooked –sugar syrup that's used as a cake filling, in candies, or to top petit fours—you might know it better as the center of a Cadbury Crème Egg.

10. **How to factor in a higher altitude:** Since there is less air pressure at higher altitudes, cakes rise more and can dry out because liquids evaporate more quickly. If you live above 3,500 feet, follow these guidelines: Increase the oven temperature to 375° and liquid by 2 tbsps for each cup used. Decrease each cup of sugar by 1 tbsp, each tsp of baking powder by ⅛ tsp, and the baking time by 5 minutes.

4.12.1 Cake Formula Balancing

What is a cake formula? It is an accurate record of the quantities of the raw materials necessary to make a particular type of cake. In other words……..it is an accurate recipe. If the recipe is correct, it will produce a good cake. As important as the recipe is the correct temperature, time and packing of the product. A good cake is one showing no faults, either in appearance, texture or while eating. It should be of good flavor and aroma and if it contains fruits, they must be evenly distributed. Bakery being the science that it is, we refer to the recipe as a ***formula.*** In the bakery, the range of ingredients that are used and which are essential is limited. There is Flour, Fat, Sweetening and Moistening. Each of these has a specific role to play and must be in ***Balance*** with each other.

What is balance? The ingredients that are used in cake making are divided according to their functions:

The tougheners – these are the ingredients that provide structure and form and give shape to the product. These will include flour and egg. The starch in the flour gelatinizes and the protein in the egg coagulates during baking and gives shape to the cake.

The softeners – these are the ingredients that soften the texture of the cake and include sugar and fat and milk. This softens the texture of cake and makes it different from that of bread, which contains basically the same ingredients but in a different proportion.

The moisteners – these ingredients like milk, egg and liquid sweeteners like golden syrup provide the moistening effect in the batter and adjust the consistency.

The driers – are those ingredients, which absorb the excess moisture in the batter and include flour, milk powder, and cocoa powder.

The problem in Balancing is that certain ingredients perform more than one function. Eggs provide toughening but are also a moistening agent. Milk is a moistening agent, but milk powder is a drier!!!! The aim of formula balancing is to balance the moisteners with the driers and the toughener**s** with the softeners. A simple sponge recipe may be in perfect balance, but when converted into a chocolate cake, the addition of cocoa powder in the recipe will mean additional driers so the corresponding moistening (addition of milk) will have to be increased as well.

There are three simple rules that govern Formula Balancing:

- The weight of the fat should not exceed the egg

- The weight of the fat should not exceed the sugar
- The weight of the sugar should not exceed the total liquid

The Effect of Sugar: Sugar sweetens. It also has the power to lift and lighten the cake and to give the crust its color. It improves the taste and the flavour of the cake as well as the keeping quality and it adds to its nutritive value. The extra sugar in a recipe will result in the M Fault, when the extra sugar has lifted the batter to such an extent that the protein – starch structure can no longer hold up the cake and collapses. Excess sugar will result in spots on the crust and the crumb will be sticky (excess moisture). On the other hand, if the batter is made with less sugar, it will have a decreased volume with a peaked surface. The crumb will be dry and harsh. The peaked top is the result of the lack of softening action of the sugar on the gluten, which in turn will have greater resistance to expansion resulting in a peaked top.

The Effect of Fat: Fat imparts a rich and pleasant eating quality to the cake and increases the food value. Butter adds flavor and improves the quality of the cake. Because of its shortening property, fat/butter also prevents toughness. It holds the air that is incorporated in the initial process of creaming. Too much fat in a recipe will result in a cake of poor vol; Ume. The top crust will be thick and greasy. An increase in fat must be balanced by an increase in the toughners (structural material) like flour and egg. Less fat will make the cake tough, the volume will be poor and the crumb structure will show tunnel like holes pointing to the centre of the crown of the cake.

The Effect of Baking Powder: Baking Powder is used for aeration, thus increasing the volume of the cake. Some recipes do not use baking powder and the aeration is provided by mechanical means like creaming or beating (of eggs) or by sieving. Excess baking powder will produce the same effect as an excess of sugar will produce. The only difference is that there is a generation of gas beyond that which the flour and egg can take, with the result, the cake collapses. The crust of the cake is darker than normal and the crumb is open and is discolored especially near the base of the cake. Less baking powder will produce a cake of poor volume.

Characteristics of cakes: The following are the characteristics of a cake:

	External		Internal
1.	Volume	1.	Grain
2.	Colour of Crust	2.	Colour of crumb
3.	Symmetry of form	3.	Aroma
4.	Character of crust	4.	Taste.
		5.	Texture

Volume: It is difficult to set standards for volume of cakes which will vary according to different types of cakes and also according to consumer preference. However, the cakes should not have a pinched appearance and should not appear over extended too. A well risen cake will have a pleasing appearance with slight convex top surface. Although, the relative weight of

a particular volume of cake will differ in different types of cakes, but a cake should not appear too small or too large for its weight.

Colour of crust: The crust should have a pleasing golden brown colour. Too dark or too light or dull colour is not desirable. Crust must have a uniform colour, free from dark streaks or sugar spots or grease spots.

Symmetry of form: Cakes should have a symmetrical appearance. Peaking, low sides, sunken or high centre, burst, caved in bottom or uneven top are undesirable characteristics of cakes.

Character of crust: Crust of a good cake should be thin and tender. Thick, rubbery, sticky or over moist, too tender, tough or blistery crust is indicative of poor quality of cakes

Texture: Texture denotes the pliability and smoothness of the crumb as felt by sense of touch. It depends on the physical condition of the crumb and type of grain. A good texture is soft and velvety without weakness and should not be crumby. Rough, harsh, too compact, lumpy or too loose texture is not desirable.

Grain: The grain is the structure formed by the extended gluten strands including the area they surrounded. Grain will vary according to the type of cake. However; uniformity of the size of cell and thin cell walls are desirable qualities. Coarseness, thick cell walls, uneven size of cells, large holes and tunnels are indicative of poor grain. Grain should not be too open or too close.

Colour of crumb: Crumb should have a lively, lustrous and uniform colour. It should be free from any streaks or dark patches. Grey, non – uniform, dark, light or dull colour of crumb will be undesirable.

Aroma: Aroma of good cake should be pleasant, rich, sweet and natural. It is not desirable to have any foreign aroma i.e. aroma not produced by normal ingredients of cake. Flat, musty, strong or sharp aroma is indicative of poor quality of cake.

Taste: Taste of a cake should be pleasant, sweet and satisfying. Cakes should not have any unpleasant after taste in the mouth, should not have a blend taste and should not have any foreign taste i.e. taste which cannot be acquired by the use of normal ingredients of cakes. Use of excessive salt or soda will also adversely affect the taste.

CHECK YOUR PROGRESS-VII

1. What is a cake formula?

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2. Write a short note on 'Characteristics of cakes'.

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4.13 ESPECIALITY CAKES

The term specialty cake is generally used to describe a cake that has been filled, iced, and has some type of finishing touch on the icing. Whether or not the cake is decorated attractively can influence your sales to a great degree. The decoration should tempt the customer to try the product and, at the same time, it should suggest the flavor and texture of the cake and filling. The decoration is the final wrapping, or packaging, designed to market your product.

Wedding and specialty cakes are a culmination of the talent, skills, and knowledge of the pastry chef or baker. To make a beautiful and flavorful cake, the pastry chef or baker must hone his or her skills in almost all aspects of the baking and pastry arts. Creation and development of cakes such as the ones in this chapter are limited only by the creativity of the individual.

Traditional British –style wedding cakes are perhaps the quintessential wedding cakes, from which most other wedding cake styles are derived. These are, in general, unfilled dark fruitcakes. The richness of the cake reflects a time when refrigeration was unavailable. Dried fruit, sugar, suet, and thick layers of coatings and icings helped the cakes stay fresh for one year, as the top layer would be saved and eaten on the couple's first anniversary. The cakes are traditionally coated with a layer of jam, then with

marzipan, and finally with several coats of royal icing. The jam and marzipan keep the white icing from absorbing oils or moisture from the cake, while protecting the cake itself from moisture loss and staling. Traditional British –style cakes consist of three tiers supported by pillars, generally pastillage, and both the icing and the decoration, which consists of royal icing piping and pastillage, are pure white. The British cultural influence is reflected in the styles of wedding cakes that evolved in countries colonized by Britain. Decoration consists of minute royal icing piping and gum paste flowers. Colors, if used at all, are the softest of pastels. Although these cakes may be quite ornate, their overall appearance is very soft and delicate. The tiers may simply be stacked, may be supported on pillars, or, often, may be displayed on offset asymmetrical cake stands. Beautiful realistic flowers are created from gum paste, and royal icing embroidery, string work, flood work, and ornaments are used to create stunning and intricate effects.

The British cake also spawned American –style cakes. American wedding cakes are most clearly defined by the use of buttercream icing, buttercream piping décor, and buttercream roses, often colored. There is no single cake type of choice in American cakes, but pound cakes, high –ratio cakes, génoise, and carrot cakes are most common. (Fig.3B)

Modern wedding cake: ***Modern –style cakes*** are efficient in production, visual and taste appeal and can be tailored to the customers liking. Simple elegance and a light, fresh appearance are the objectives, in contrast to the baroque ornamentation of more traditional styles. Cutouts can be made in advance, and then placed on the cake relatively quickly for decoration. The taste of the finished product is an important factor in favor of the modern –style wedding cake, with virtually no restrictions on the type of cake or fillings. Generally, as with modern cuisine, fresh and seasonal products are employed to their best advantage. If a customer loves fresh strawberry charlotte, there is no reason the patisserie cannot create a festive, attractive wedding cake composed of charlottes.

Speciality cakes: Specialty cakes employ many of the same techniques as do wedding cakes. There are two elements that distinguish wedding cakes from specialty cakes: Specialty cakes are typically not tiered or stacked as are wedding cakes, and they are most often less ornately decorated. In some respects, however, the creation of a specialty cake presents fewer restrictions for the pastry chef or baker's creativity. Specialty cakes are less limited by shape, color, and type of décor.

Types of décor for these cakes will be restricted only by ambient temperature and humidity.

Layered Cakes

Single layer cake

Fig. 3B Wedding and Speciality cakes

4.13.1 PROBLEMS WITH CAKE PRODUCTION

EXTERNAL APPEARANCE	
FAULT	**CAUSES**
Cracked middle	a. Too much raising agents e.g. baking powder. b. Cake tin too small c. Oven temperature to hot d. Too much flour
Sunken cake	a. Oven temperature too low b. Oven door opened before the cake has set c. Too much of a particular ingredient d. Excessive jarring or moving of the cake during baking. e. Excessive mixing of the batter.
Side of the cake crunchy/burnt	f. Too much fat used to butter pan g. Oven temperature too hot h. Butter not suitable for baking i. Cake left in the oven for too long j. Cake tin not sufficiently lined
Can't get cake out of the pan	a. Cake tin not well lined b. Cooled too long
Cake too dark	a. Oven temperature too hot b. Incorrect amount of water c. Excessive sugar
Cake burned on top	a. Oven temperature too hot b. Incorrect amount of water
Cake shiny and sticky	a. Oven temperature too cool b. Not baked long enough c. Too much sugar in recipe
Crust too thick	a. Excessive baking time
Cake shrinks	a. Excessive liquid b. Oven temperature too hot c. Improper mixing procedure d. Cake baked too long

Cake rose unevenly	a. Flour was not blended well into the main mixture b. Oven temperature uneven c. Oven temperature too high
Cake too small	a. Scaling weight too low. b. Oven temperature too high. c. Batter temperature too high. d. Batter temperature too low. e. Incorrect amount of water.
Sugary top or white spots on the crust	a. Too much sugar b. Not enough liquid or hydration c. Sugar too coarse d. Batter standing too long before baking
Wet Streak at the Base of the Cake	e. Too much liquid f. Not rested properly
INTERNAL CAKE APPEARANCE	
Cake very dense/ dense grain	a. Enough air wasn't beaten into the cake b. Eggs added too quickly c. Not enough raising agent d. Excessive liquid e. Improper mixing
Close texture	a. Insufficient raising agent b. Too heavy handling of dough c. Not enough liquid d. Oven too cool f. Too little creaming of fat and sugar e. Curdling of creamed mixture
Coarse and irregular grain	a. Improper mixing procedures b. Stiff batter c. Depositing batter carelessly into pan d. Oven temperature too cool
Dry, crumbly texture	e. Baked for too long in too slow oven f. Insufficient liquid g. Too much raising agent h. Over –mixing of the batter i. Too little egg j. Too much sugar

Off color cakes	a. Unclean equipment b. Oven temperature too cool c. Improper mixing procedure
Sunk fruits	f. Fruits are too large/heavy g. Sugary syrup on outside of fruit was not washed off causing fruits to slide through mixture when heated h. Cake mixture over beaten/ too wet so could not hold fruit in place i. Oven temperature too hot
Burnt on top, isn't cooked in the middle	a. Cake tin too small b. Oven temperature too hot
GENERAL FAULTS	
Batter overflowed (weeping)	a. Wrong adjustments to recipes b. Cake tin too small
Poor flavor	a. Improper mixing procedure b. Faulty baking conditions c. Improper cleaning of equipment
Cake too tough	a. Excessive mixing b. Batter too stiff(insufficient water) c. Batter too thin(excessive water)
Cakes too tender for cutting	a. Over mixing of the batter b. Less egg c. More sugar d. Slow baking
Top crust peels and flakes off	a. Over mixing b. Cool oven c. Insufficient steam during baking
Lacks body structure	a. Excessive mixing b. Insufficient liquid
Dries out too soon	a. Excessive baking time b. Insufficient liquid c. Improper mixing procedure
Cake Staling Quickly	a. Oven too cold so the cakes are in the oven too long, and the crumb dries out b. Too much baking powder c. Not enough liquid in the batter to keep the cake moist

Faults during post production of cake during icing and decoration of creamed and whipped cakes:

Icing and creaming, and decoration or garnishing are the last steps of cake making. Most of the cakes are decorated with creamed icing (butter cream and whipped cream) and now a day's icing with fondants is also becoming fashion. In the fondant icing, many designs and themes can be given. The use of moulds and stencil is required sometimes to give accuracy, variety and attractiveness with the desired finish.

Some of the common and major problems may be:

1. **Curdling or breaking:** This fault may arise during the production of icing for the cakes. As we know that, there are various types of icing like butter cream, fondant, whipped cream, meringue icing. So while prepare these icing there may be chances of curdling which results in the uneven texture and may ruin your all efforts made for icing the cake. An utmost care must be taken while preparing and applying these types of icing over the cake so that even finishing and shine may be retained. Some remedies can be useful for such faults:

- Maintaining adequate temperature during production of icing especially for butter cream and whipping creaming. Preferably air-conditioned temperature is advised to get the better results.
- While whisking whipped or double cream, a bowl of ice can be placed under the whisking bowl.
- Remove water droplets, acidic particle or dirt if any in the bowl which may curdle the cream.
- Whip the cream slowly and in a controlled way.
- Don't over-whip – Once it just reaches stiff peaks, and then stop. Over-whipped cream will first turn grainy and then to butter or curdled.
- Use specific guideline given by the manufacturer of cream or such commodities.
- Same care must be taken while applying on the cakes; cake should be leveled and smoothened.
- Cakes must be moistened before applying the creams otherwise grainy particle may ruin the finishing.
- Cream should be taken in batches while adding colours and flavours and it should be used immediately otherwise after keeping for long time, cream may loose its texture or it may curdle.
- While making the meringue, the mixture should not be too hot when the butter is added.

2. **Too Lumpy**: This fault may arise due to adding sugar or other ingredient to the butter cream or other icing. If the sugar is not added properly to butter while creaming it may give lumpy texture to the cakes. Such problem may also happen in the fondant iced cake, where fondant may be exposed to air and may results into lumps while applying.

Some remedies for such fault may be:

- For the butter icing, super fine sugar should be used and it should be sifted two-three times before using to remove lumps if any.
- Fondant should be kept wrapped in cling film or plastic sheet to avoid craks or lumps.
- While rolling the fondant, there should be adequate temperature of the confectionery lab otherwise lumps or cracks may appear in the finished cake and may ruin all efforts.
- Make sure you sift all the dry ingredients separately before adding the liquid. Also, use only softened fats and add the sugar syrup very carefully.

3. **Too stiff:** sometimes cake may appear too stiff. This could be because of too stiff icing is applied on the cake. The most common reason for this is that the liquid content is too less, or that the icing is too cold. Remedy for such fault:

- Adjust the formula, something that can only be perfected with practice.
- In the case of the icing being too cold, wait until it reaches room temperature. You can even heat it slightly if required.

4. **Not Adhering/Too Thin:** if you have observed, sometimes we apply the icing hurriely on a slightly warm or hot cakes, icing (cream or butter) swirls down and give an effect of thin or not adhering icing. This may sometime happen due to thin icing or improper whisked cream. Some remedy for such fault may be:

- Always be patient and wait until cake reaches the room temperature.
- When the icing seems thin, you just need to wait for it to cool down. It usually ends up becoming a lot thicker.
- Follow the right technique for application.

CHECK YOUR PROGRESS-VIII

1. Write note on curdling and Lumping.

2. Write a note on 'Problems with Cake Production'.

4.14 SUMMARY

Short crust pastry is the simplest and most common pastry. It is made with flour, fat, butter, salt, sugar, water and sometimes egg and milk to bind the dough. This is used mainly in preparation of tarts, quiche or pie, biscuits and cookies. The flour should have low gluten content, one that is milled from soft wheat flour. The fat will reduce the extensibility of the gluten that is it makes the gluten strands shorter, hence the term *shortening* for the fat used in the bakery and the term *short crust pastry*.

Puff pastry is one of the most remarkable products of the bakeshop. Although it includes no added leavening agent, it can rise to eight times its original thickness when baked. Puff pastry is rolled –in dough, like Danish and croissant doughs. This means that it is made up of many layers of fat sandwiched between layers of dough. Puff pastry can be made as upto thousand layers or more. The whole purpose of rolling and folding is to build up a layered structure of alternating layers of dough and fat. This process is known as *lamination*.

An éclair is an oblong pastry made with choux dough filled with a pastry cream or custard and topped with chocolate icing or dipped in fondant icing. The word comes from the French éclair, meaning "flash of lightning", so named because it is eaten quickly (in a flash).The dough, which is the same as that used for profiterole, is typically piped into an oblong shape with a pastry bag and baked until it is crisp and hollow inside. A cream puff (US), profiterole (English) or chou à la crème (French) is a filled French choux pastry ball with a typically sweet and moist filling of whipped cream, custard, pastry cream, or ice cream. The puffs may be decorated or left plain or garnished with chocolate sauce, caramel, or a dusting of powdered sugar.

Cream cheese is an American invention developed in 1872 in New York State. It is a soft cow's –milk, mild tangy tasting fresh cheese with a high fat content (approx 35%), spreadable texture and creamy white in colour. Cream cheese is categorized as a fresh cheese since it is unaged. As a result, it has a short shelf life, once opened. It is available in various sized solid white blocks or whipped and flavored. Cream cheese should be gently

softened before blending them into fillings, icings and batters. Blend the cheese on low speed with a paddle to soften and remove lumps before adding sugar, eggs or other liquid ingredient.

Icing, also known as frosting, is a sweet decorative creamy glaze coating used as a filling between the layers or as a coating over the top and sides of a cake. It is used to add flavor and to improve a cake's appearance. Icing can also extend a cake's shelf life by forming a protective coating. There are seven general types of icing: butter cream, foam, fudge, fondant, glaze, royal icing and ganache. Each type can be produced with a number of formulas and in a range of flavorings. Because icing is integral to the flavor and appearance of many cakes, it should be made carefully using high –quality ingredients and natural flavors and colors. A good icing is smooth; it is never grainy or lumpy. It should complement the flavor and texture of the cake without overpowering it. A basic icing is called a glacé, containing powdered sugar (also known as icing sugar or confectioners' sugar) and water.

Cakes have their part to play in ancient beliefs and superstitions, some which still carries on to modern times. In olden times, people used cakes as offerings to their gods and spirits around the world. The Chinese celebrate Harvest Moon festival and have moon cakes to honour their moon goddess. This tradition continues up to today. Russians have sun cakes called blini which are thin pancakes to pay their respect to a deity called Maslenitsa. There are many different types of cakes and many different ways of dividing them into various categories, but professional bakers categorize cakes by ingredients and mixing method. (Home bakers tend to categorize cakes by flavoring –i.e., chocolate cakes, fruit cakes, and so on –which is helpful when you're trying to decide what to eat, but not as helpful when you're trying to understand how best to make a cake.) Depending on how the batter is prepared, you will find that the final texture (and color, if it is a yellow or white cake) varies.

Cake Improvers are "miracle ingredient." When added to cake batter at the creaming stage, it supposedly renders the crumb soft and moist and increases shelf life. The mysterious product contains rice starch, polyglycerol esters, and mono – and di –glycerides – the same additives found in many boxed cake mixes and commercial baked goods.

A cake formula is an accurate record of the quantities of the raw materials necessary to make a particular type of cake. If the recipe is correct, it will produce a good cake. As important as the recipe is the correct temperature, time and packing of the product. A good cake is one showing no faults, either in appearance, texture or while eating. It should be of good flavor and aroma and if it contains fruits, they must be evenly distributed. Bakery being the science that it is, we refer to the recipe as a formula. In the bakery, the range of ingredients that are used and which are essential is limited. There is Flour, Fat, Sweetening and Moistening. Each of these has a specific role to play and must be in Balance with each other.

4.15 GLOSSARY

Black treacle – This is often used in rich fruit cakes and other full –flavoured bakes.

Candied peel – Made from sugared citrus fruits, candied peel is frequently used in Christmas cakes, panettone and Florentine biscuits.

Desiccated coconut – If you like coconut –flavoured cakes or cakes spread with jam and dipped in coconut then keep a packet of unsweetened desiccated coconut to hand.

Dried fruit – If you're a fruit cake fan, it's good to have a bag of currants, sultanas and raisins in the cupboard. There are plenty of other dried fruits available so buy them as you need them or select your favorites to modify a recipe.

Food Colours – This is an important constituent of cake as every cake is associated with a certain type of colour. Addition of colour it gives the food an attractive and appetizing appearance. Dyes of various colours (most commonly blue, green, red and yellow) are used to the cakes. Food colorings are available in small to big bottles in liquid form and in wide variety of colors.

Glacé cherries –You can buy either the bright red glacé cherries which are dyed or the deeper red un –dyed cherries for use in fruit cakes, particularly Christmas cake.

Golden syrup – Sticky and sweet, golden syrup makes a moist sticky cake and, like black treacle, keeps for a long time in the cupboard.

Ground almonds – Ground almonds are often used in place of flour or as well as flour in cake recipes. They produce a moist cake and are suitable as a gluten –free option.

Honey – Honey is often used in addition to sugar and creates a moist and fragrant cake.

Jam –Smooth apricot jam is a must if you like to make celebration cakes as it's used to stick marzipan on to fruit cake. Strawberry or raspberry jams are also good as a filling for a Victoria sandwich.

Lemons, limes, oranges – A little bit of zest can liven up a plain sponge mix. Some recipes also require the juice to make a sugar syrup for drizzling.

Nuts – Mixed chopped nuts, walnut halves, hazelnuts, flaked almonds and pecans are among the nuts you might want to have on hand. Again, choose the ones you like the best. Often one type of nut can be substituted for another in recipes. Store nuts in airtight containers as they might get rancid in contact to air.

Pâte à foncer is French shortcrust pastry that includes egg. Egg and butter are worked together with a small quantity of sugar and salt before the flour is drawn into the mixture and cold water added to bind it.

Pâte brisée is similar to pâte à foncer, but is lighter and more delicate due to an increased quantity of butter – up to three –fifths the quantity of flour. Very often is made with no sugar, as a savoury crust for pies.

Pâte sablée has the same ingredients as pâte sucrée, but the butter is creamed with the sugar and the eggs before the flour is folded in. This mixes the butter more evenly, which makes the dough puff much less, creating a more "snappy" and dry pastry, instead of the crumbly texture of the previous doughs. Sablée works better for sweet tarts, tea biscuits, and piped shapes than other short doughs, as they hold their shape much more efficiently, and are the basis for gingerbread and sandwich biscuits. No water is needed, neither is the dough particularly temperature –sensitive

Pâte sucrée (sweetcrust pastry, sweet dough, or sweet paste) is made with more sugar, which sweetens the mix and impedes the gluten strands, creating a pastry that breaks up easily in the mouth. An alternative is gluten –free pastry.

Polenta – Polenta is another flour substitute – cakes made with this ingredient tend to be denser, pleasantly textured and have a vibrant yellow colour.

Sunflower oil – Sunflower oil has many culinary uses and it's ideal for baking as it has a mild flavour which allows the other ingredients in a cake to shine through.

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- The Golden Book of Baking by barronsduc www.barronseduc.com

4.18 TERMINAL QUESTIONS

1. Write note on 'Types of Short Crust Pastries'.
2. Write a note on 'Common Problems with Puff Pastries'.
3. Write the 'Recipe of Rugelach'.
4. List the Common problems with Éclairs and Cream puffs.
5. Write note on 'preparation of whipped cream'.
6. Write a note on 'Icing'.
7. Write note on Cake making Ingredients.
8. Difference between chocolate and coco.
9. Write note on Sponge and Foam Cakes.
10. What is angel food cake? Explain.
11. How Cake Improvers works?
12. What is a cake enhancer?
13. What is a cake formula?
14. Write a short note on 'Characteristics of cakes'.
15. Write note on curdling and Lumping.
16. Write a note on 'Problems with Cake Production'.