



PMFME SKILL TRAINING

PREPARATION OF CARROT CAKE



Indian Institute of Food Processing Technology

Ministry of Food Processing Industries, Govt of India

Thanjavur, Tamil Nadu

2020

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Introduction

Cake occupies an important place among bakery products. The cake contributes about 15% to the total production of bakery products produced in the country. However value wise it contributes to over 30% to the total value. The production of cake in India is estimated at 5 lakh tones and it is expected to increase at the rate of 10% per annum.





Cake- is a unique bakery products which has a very soft and spongy texture. It is a sweet product and has a very high calorific value in view of the high amount of fat present (40-60%). It has also good nutritional quality because it contains egg, milk, fruits, nuts etc. Unlike other bakery products like bread and biscuits which are made from a dough, the cake is made from a batter. The cake is mainly leavened by the air that gets incorporated during mixing of the batter. However chemical leavening agents are also used to support leavening. The retention of the air in the batter has been achieved by the egg used in the recipe. Value addition will increase the trend and varieties in cake with broad range of formulations and nutritional quality.

Carrots (*Daucus carota* L.) are rather inexpensive and it is highly nutritious as it contains appreciable amount carotene. Total vitamins B1, B2, B6 and B12 besides being rich in carotene. Vitamin – A in carrot ranges between 2055 to 9100 IU/100g. High carotenoid intake is associated with lowering risk of many cancers, especially the prostate cancer. Further, vitamin A is an antioxidant which is key to the growth and repair of tissues and helps the body to fight with infections, keep eyes healthy, nourish epithelial tissues in the lungs, as well as of the skin. Apart from being high in carotenoids, carrots are also high in dietary fiber. Carrots also contain a significant supply of calcium, potassium and phosphorus.

Value addition of carrot in cake increases the nutritional profile and helps in proper utilization of crop by reducing wastage. It helps farmers to produce higher shelf-life product with reasonable higher income.

CAKE MAKING METHODS

There are four basic methods of baking cakes. They are

-  Sugar Batter Method
-  Flour Batter Method
-  Genoise/ Sponge Method
-  All in one Method

SUGAR BATTER METHOD

The fat and sugar are creamed at medium speed of mixer until fluffy and light in colour. 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

1. Temperature of the fat
2. 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.

During the second stage the eggs are added one at a time, with a good creaming between each addition. It is the yolk of the egg that contains fat which coats the surface of the cells formed during creaming and allows the cells to expand and hold the liquid added without curdling. It is, in fact, possible to add the egg in a steady stream, providing the correct temperature is used to supply enough energy to maintain the emulsion. When all the eggs have been creamed well in the mixture to form the batter at this stage, any required flavouring material like vanilla essence; pineapple essence etc. may be added. In the final stages of the creaming method of mixing, the flour is added alternatively with the liquid, in small portions, at low mixer speed. This procedure allows the flour to absorb some of the liquid and prevents curdling. The mixed batter should be smooth. The optimum temperature for all the ingredients is 21°C(70°F).

FLOUR BATTER METHOD

This method is used primarily in the production of high-ratio type cakes. The cake made by this method, although lacking in volume, are usually moist, tender, of fine grain and have excellent keeping qualities of shelf-life. The first step is blending of flour and shortening until the flour particles are thoroughly coated with fat. This is followed by the addition of the dry ingredients and about 35% of the required liquid, including eggs. The whole mixture is mixed for a pre-determined period. Lastly, the remainder of the liquid is added and mixing is continued until the batter is smooth. 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. In a fluid batter, this gas tends to rise upwards, the tiny bubbles coalescing as they come in contact with each other to form larger cell with greater buoyancy. It should be noted that

there is an inevitable escape of gas from the batter as well as a coarsening of the cell structure if a mixed batter is left too long out of the oven. It is, therefore, a good practice to place panned cake batters into the oven soon after mixing. 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- 350°F(160-175°C), while leaner mixtures may be baked at a temperature range of 350-400°F(175- 200°C). The average baking time for layer cakes will take 15-20 minutes and for cupcakes 10-15 minutes.

A good cake shows evenly distributed minute (very fine) cells without any large holes.

✚ Have Good Colour.

✚ Should Eat Moist.

✚ Have Good Flavour, and general appearance should be attractive with good eye appeal.

GENOISE/SPONGE METHOD

It is a cake made with whole egg, unlike some other sponge cakes in which we have to separate yolks and egg whites, and beaten separately. The whole eggs, and sometimes extra egg yolks, are beaten with the sugar and heated at the same time using double boiler or Bain –Marie. It is done to a stage known as "ribbon stage" when if the batter is allowed to fall; it will fall like a ribbon. A cake made with this method is generally a fairly lean cake, getting most of its fat from egg yolks, but some recipes also add in melted butter or oil before baking.

ALL IN ONE BLENDING METHOD

Cake batter is an emulsion of the oil-in-water type with air bubbles entrapped in the fat phase and the remainder of the ingredients dissolved or dispersed in the water phase. It is generally accepted that the aeration of a cake depends on the entrapment of air in the batter by creaming the shortening or whipping the eggs and on the expansion of carbon dioxide gas if baking powder is used together with the water vapour pressure within the air bubbles upon heating in an oven.

The successful mixing of a cake is dependent upon:

1. Dispersion of all the ingredients as efficiently as possible.
2. Introduction of air into the mixed
3. Proper distribution of this air throughout the mixture
4. Breaking down of large air cells into finer and finer cells

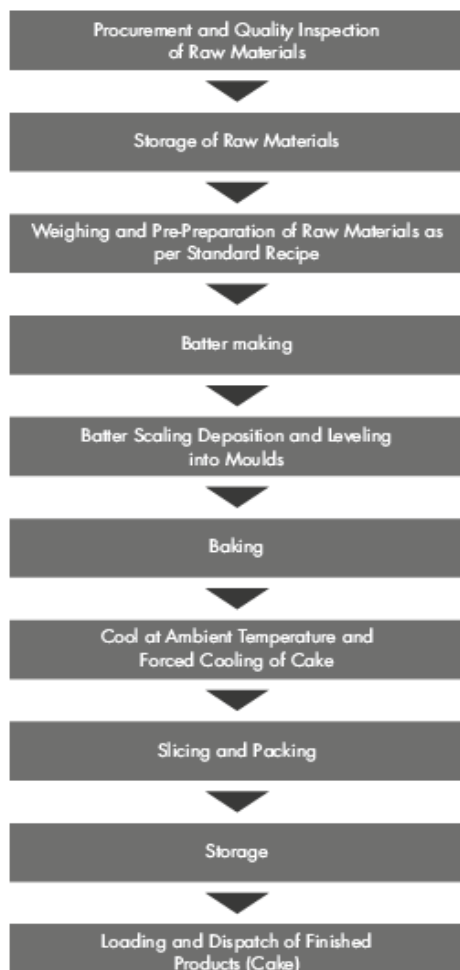
The application of this method has made great advances in the area of prepared flour mixes. The introduction of emulsified shortenings has further enhanced the use of this mixing procedure, thereby many of the creaming and combination methods of cake making.

In this method, the wire whisk, which is really a combination of many beaters, is used to secure the fastest break-up and incorporation of the ingredients. However, the use of a whisk greatly increases the aeration, and therefore, baking powder should be reduced by about 10% of whatever amount of baking powder is normally used.

Examples: For a batter type cake formula; using a 3-speed mixer.

- 1st speed ½ minute** : To wet ingredients
- 1st speed 1 minute** : To eliminate possible large air pockets and to still finely break down the air cells
- 3rd speed 2 minutes** : To get a fast break-up and incorporation of air into the ingredients
- 2nd speed 2 minutes** : To distribute the air increasingly finely throughout the mixture

Method of cake preparation



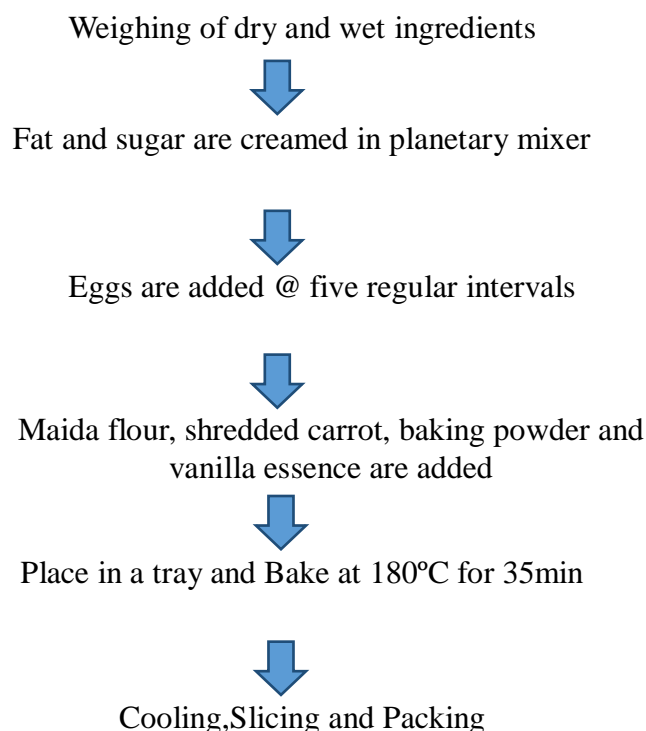
BASIC PRECAUTIONS IN CAKE MAKING

- Batter temperature 20-25°C
- Plastic consistency batter
- Specific gravity - 0.80
- Baking temperature (160-180°C)
- Water absorption capacity (52-55%)
- Sedimentation value of cake flour (15-20 ml)

PREPARATION OF CARROT CAKE

- 1) For preparation of carrot cake, ingredients like maida flour, fat, sugar, egg, shredded carrot and baking powder are weighed, sieved and kept ready for processing.
- 2) Fat and sugar are creamed in planetary mixer.
- 3) Eggs are added to the creamed mixture at five regular intervals.
- 4) After that maida flour, shredded carrot, baking powder and vanilla essence are added to the planetary mixer and allowed to mix for 5 minutes.
- 5) After mixing, the prepared cake batter are poured on to the greased trays, and the trays are kept in trolley.
- 6) Then they are moved into rotor oven and baking is done at 180⁰ C for 35 minutes.
- 7) After baking, trolley is removed from oven.
- 8) Cake is then cooled to room temperature and cut into uniform pieces.

Flow process of carrot cake making



Essential ingredients of cake

Cake formulas can be classified into two main types, depending upon differences due to batter appearance or character. They are:

Batter type cakes:

These cakes depend on eggs. Flour, and milk for structure and contain reasonably high percentages of fat. Much of the volume of the finished cake is achieved by the use of baking powder. Examples are butter cake, pound cake, layer cake, fruit cake etc.

Foam type cakes

These cakes depend principally upon the extension and denaturation of the egg protein for the bulk of the structure of the finished volume, and with one or two exceptions, can be regarded as unshortened cakes or cakes without shortening.

Depending upon the egg used, foam type cakes may be classified into:

- a) **Meringue or Angel Food Type Cakes:** Which use only the egg white portion of eggs.
- b) **Sponge Type Cakes:** Using either whole eggs or yolks or a combination of both.
- c) **Chiffon Type Cakes:** Which are combinations of batter and foam and the resulting products, have a modified foam type grain and texture.

Functions of Ingredients

Flour:

Low protein flour is usually preferred for cake manufacture. This is so because the rise in cake is dependent on the aeration rather than on gluten development. The flour should be finely ground because in batter formation the flour particles do not disintegrate to the same extent as in mixing of dough. In case of high ratio cakes, the sugar increases the gelatinization temperature of starch causing problem in crumb-setting which ultimately cause the cake to collapse immediately after baking. In such case chlorinated flours are preferred.

Flour furnishes structure in cakes and is used to hold the other ingredients together. In general, cake flours are milled from soft wheats of low protein content. The role of wheat proteins in cake making is much less prominent than that in bread production. Low protein wheats provide weak quality gluten desired in cakes. A good cake flour would have low protein content varying from 7.0% to 8.5% depending on the type of cake being prepared.

Thus, high quality batter type cakes may be obtained from flour containing 8.0 to 8.5% protein, whereas foam-type cakes are best prepared from flours of protein level below 8.0%. Millers normally mill a short patent flour for cake flour, this results not only in low protein content but also in low ash or bran content in the finished flour. An ash content of 0.38% and lower are desired for cake flour. Granulation of the flour has considerable effect on the quality of cakes. Fine granulation and uniform particle size in cake flours result in fine-grained cake crumb with thin cell walls.

The milled cake flour may be bleached with chlorine and this results in a drop in flour pH value. Such bleached flour is called high ration cake flour. Cakes from bleached flours are more tender and less likely to collapse and have better crumb colour, finer grain and, often, greater volume.

Sugar:

Sugars are used primarily as sweeteners in cakes as well as in other sweet goods. In cake making, sugar also has a softening effect on the gluten in flour, resulting in tender texture. Sugars also fasten the rate of caramelization of the batter, allowing the cake crust to colour

faster and thereby retain moisture in the baked cake. Sugar therefore contributes to texture, moistness and colour in cakes as well as sweetness and richness. Granulated sugar or granulated sucrose is the predominant form of sugar used in cake making.

Dextrose, corn syrup, or invert sugar may be substituted for part of the sucrose in some formulas but they are less sweet than granulated sugars. Other forms of sugar that are occasionally used in cakes are malt extracts and honey, which are added for distinct flavour or for colour. In western countries, there has been an increasing trend towards the use of liquid sugars instead of granulated sugar where they have been found to give acceptable quality products.

Fat:

Fats are the primary enriching ingredient in cakes. The functional properties of fats with respect to cake making lie in its shortening, creaming and emulsifying effects on cake batters. Fat distributed in a cake batter prevents the formation of a gluten structure, producing what is known as shortness, and results in tenderness in cakes. The creaming ability of fat is, its ability to entrap air, is a very important factor in the production of good volume and texture in cakes. The emulsifying property of fat determines how much liquid can be incorporated in

a batter without the occurrence of curdling. The more liquid can be added to a cake batter, the more sugar will the batter be able to hold dissolved in the liquid. Shortenings, which have a high emulsifying power, are called high-ratio shortenings.

Shortening is responsible for a more tender structure and preventing the dry mouth feel of cakes. While selecting shortening for cake manufacture the following points should be taken into consideration-

- ✚ Fat should be plastic in nature. It should be solid at room temperature as well as during creaming process.
- ✚ Granular fat should be avoided as it has very poor whipping quality.
- ✚ In order to acquire specific characteristics in cakes, a combination of fats like hydrogenated shortening, butter or margarine may be used.
- ✚ The texture of the fat should neither be too hard nor too soft as very hard shortening will not cream up well, while too soft shortening will not be able to retain aeration.

The types of fats available for cake making are:

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1. Butter: Butter is an emulsion of the water-in-oil type and consists chiefly of the fat of milk or butter fat together with curd, milk sugar, mineral salts, and about 14% water. It is obtained by churning the ripened cream of cow's milk. Butter is known for the distinctive flavour it imparts to baked products, but its creaming and emulsifying properties are inferior to other cake fats.

2. Margarine: Margarine is a fat resembling butter and is an emulsion of edible oils and fats with ripened milk. Its composition is similar to that of butter but it lacks the characteristic flavour of butter. Cake margarine usually has good creaming and emulsifying properties.

3. Shortenings: Shortenings are white or yellow fats for the most part from vegetable oils, refined and hardened. They are virtually 100% fat. Shortenings were first called compound

fats because they are normally made from refined coconut oils, palm-kernel oil, cotton seed oil and other also have very good creaming properties and for this reason are commonly used in cakes as well. However, shortening cannot be excepted to give the flavour of butter, and where this flavour is required, it is advisable to use a proportion of butter in the cakes. Shortening when used in small proportions along with butter, helps impart excellent texture and better keeping qualities in cakes. If shortening is used to replace part, or all, of the butter or margarine in a mixture, it must be remembered that shortening is 100% fat whereas butter or margarine is only about 84% fat. Therefore, in order to maintain proper formula balances, only 396 grams (154 oz) of shortening should be used to replace 454 grams (1.1b) of butter or margarine.

4.High-ration shortening or margarine: These are a range of more specialized fats designed to have good emulsifying properties so that they are particularly suitable for the production of high-sugar, high-liquid cakes.

5. Vegetable oils: These are blends of oils from vegetable sources refined in the same way as shortening. They differ only in that they are liquid at normal temperature. Vegetables oils are used mostly in chiffon cake production.

6. Lard: Lard is fat separated from the fatty tissues of pigs by rendering. Pure lard does not cream up well by itself but lard can now be processed which does have fairly good creamingproperty.

Leavening agents:

The cakes are leavened either by mechanical aeration of fat and sugar leading to entrapping air cells in the mixture or by using leavening agents. For cake manufacture usually double-acting baking powder is used. A desired quality of cakes in lightness, or a high ration of volume to weight. Lightness in cakes is due to a large extent to the action of leavening agents, which bring about the evolution of gas during the mixing of the batter and in the oven. The air incorporated into a batter by whipping or creaming is a form of leavening; so is water converted to steam in the oven. Eggs and shortening that whip or emulsify are also parts of the leavening system.

Added chemical leavening in cakes is mostly in the form of baking powder. Baking powder consists of balanced proportions of sodium bicarbonate and acid leavening agent. To provide the acid leavening a number of chemicals compounds are used according to the particular needs of the end product. Some end products call for the early evolution of gases in the batter

phase and further gas production under oven heat. This is achieved by the so-called "double-acting" baking powder, consisting of the usual sodium bicarbonate with at least two acid components with different reaction rates.

Eggs :

Eggs are very important and a costly ingredient of bakery products especially cakes. Eggs furnish structure, moisture, flavour and colour in cakes. Eggs play a major role in the incorporation of air in foam type cakes and therefore in the resulting cake volume, grain and texture. Freshness is a very important requisite of eggs for cake making. Eggs, egg white (ovalbumin), and to a lesser extent milk proteins are important foam stabilizers, which slow down the coalescence of air bubbles. Emulsifiers and egg proteins reduce the foam-destabilizing effect of fat in foam type cakes by keeping the emulsified fat particles well-dissolved in the aqueous phase and preventing from destabilizing the thin foam lamella between the gas bubbles. These also enhance the incorporation of air into the batter during mixing by reducing surface tension.

Salt

Salt is used as an adjustment of sweetness and therefore contributes to flavour.

Flavour

Flavour extracts are solutions of the flavours in ethyl alcohol or some other solvents. The base of these flavours is the extracted essential oil of the fruit or bean. There are also a number of imitations flavouring ingredients available at present. Due to variation in strength of flavours, it is not possible to set any given amount to be used. Flavouring agents seldom have any function other than to enhance the aroma and flavour of the cake.

Water

Water is present in sufficient quantity in cake batters to dissolve sugar, salt and other solid ingredients. Water adds moisture to the finished cakes and also regulates the consistency of the batter. It develops the protein in the flour to a very limited extent in order to retain better the gas produced by baking powder in the cake formula.

Storage of raw materials

Ingredients are received in both the quantity like in bulk and in small quantity. The largest volume ingredients in bakeries are flour, sweetener, shortening, oils and yeast and

other leavening agents. The dry ingredients need to be stored at dry place to avoid the humidity and the perishable items need to be stored at the cold atmosphere. After baking the product must be cooled to about 21°C prior to package. During cooling of the product the additional moisture loss firms the product to hold the handling charges.







Faults and remedies of cake :

These can be may be due to several reasons for the quality of cake to be affected. They can be

- (i) Improper formula imbalance
- (ii) Use of poor quality ingredients
- (iii) Improper method of processing like mixing, baking, sequence of addition of ingredients etc.

These can affect the cakes with fault like defects in shape, color, texture, flavour etc. In order to prepare good and consistent quality cakes, it is necessary to know the reasons for common faults that occur during day to day production.

Common cake faults are

-  Shape faults
-  Structural faults
-  Texture faults
-  Crust faults
-  Crumb faults
-  Miscellaneous faults

Shape faults and remedies

a. Too much sugar

Too much sugar in tile formula causes cake to collapse and leaves sugar particles to appear as white spots on the top surface of the cake. When too much sugar is added, cake expands beyond the structural limit of the flour and eggs and hence lapses towards the end of the baking period. To avoid this, the formula must be correctly balanced and the sugar correctly weighed.

Too little liquid

Under weighing liquid can also cause a similar fault.

b. Peaked top

Flour too strong

Soft flour is normally used for cake making. When a strong flour is used for cakes, the gluten develops. This has toughening effect on the batter, which causes peaking.

Insufficient aeration

This can be caused by incorrect mixing; either over or under mixing. Over mixing tends to drive out the air incorporated in the batter. This loss of air prevents the cake from expanding evenly and properly which causes cake with low shoulder and a peak in the center. While the under mixed cake batter will not have enough air to expand properly. Correct mixing time need to be given.

Too much top heat

Too much top heat in the oven will pull the cake up in the centre and set it early in the baking time. The crust will then burst as cakes expand during baking. This fault can be corrected by either reducing the top heat or baking under covers.

c. Cake with flat top**Excess of grain opening ingredients**

Too much of baking powder or sugar will cause the cake to expand beyond the holding powers of the structural ingredients, like flour and egg. This will result in a slight collapse giving a flat topped cake with an open texture. Correct formula balance and careful weighing of the ingredients will avoid the fault.

Too little liquid

This will create an imbalance between the liquid and the sugar and the baking powder. Too little liquid in the cake batter will close the texture of the cake.

Oven too cool

This gives a slower and more even expansion in the oven yielding a flat topped cake. A slightly cooler oven can be used to advantage where the layers of cake are to be sandwiched together. If a slight dome is required; the baking temperature should be raised by 5°C.

Incorrect balance between fat and egg

If the fat content is greater than the egg content, the latter will be unable to support the higher fat level and the cake will have a flat top. This fault can be overcome by observing basic rule of formula balance. The egg content must be equal to or slightly greater than the fat content.

Structural Faults

a) Underbaked area at the top crust

Under baking

The last part of the cake to set during baking is the part just under the center of the top crust. Under baking result in a higher moisture concentration which produces a damp or apparently unbaked area. If this occurs and the top crust is highly coloured, baking temperature should be reduced by 5°C and the baking time increased. If the unbaked area is accompanied by a discolouration of the lower part of the crumb, the baking temperature should be increased.

Bumping the cake during baking

If the cake is bumped in the oven before its structure has completely set, some of the cells towards the middle will collapse, resulting in a damp or apparently unbaked area. Cake should never be disturbed until the structure is set. If optimum baking time are established and adhered to it may not be unnecessary to move the cakes until they are properly baked. When cakes requiring different baking time are being baked together care must be taken in loading and unloading the oven so that any, partially baked cakes remaining in the oven are not disturbed.

Faulty testing

To test whether a cake is baked or not, the top if it is slightly touched with the fingers. If too much pressure is exerted this will cause the cake to dip in the center and have a damp area below the top crust. If the fingers are drawn gently across the cake surface, the minimum pressure is applied, cakes can be assessed for bake without unnecessary damage.

b) Tunnel-like holes in the cake

Toughening of the batter

This results from over mixing in the final stage. The flour should be carefully cleared until it is evenly distributed throughout the mix after which the mixing should be stopped.

Lumps of unmixed fat in the batter

This is due to under mixing or bad scraping down of the bowl and beater when the mixing is done with machine. Care should be taken to follow the correct mixing procedures and to scrape down efficiently.

Pockets of air entrapped during scaling

This occurs when batter is scaled in portion of portion. It is better to scale-in one large portion of batter and then remove the surplus to arrive at the correct weight. Fruits fall to the base of the cake.

Thin batter

When the batter is too thin, it will not hold fruits and hence sinks. Check should be made that liquids were weighed correctly, Under-weighing the flour, will give similar results.

Lack of structure

If the protein content of flour or egg is low, or the quality poor, the cake will not have sufficient structure to hold the fruits. This can be overcome by ensuring that the correct type of flour is used' i.e., medium strong flour for fruit cake. The-adverse effect of egg can often be corrected by increasing the amount of flour. When only slight fruit movement occurs, this can be overcome by extra mixing of the batter after the flour is added but before the fruit is mixed through.

Too much sugar

Sugar delays the setting of the cake structure. If excess sugar is included, the batter will not hold the fruits in position during the last part of the baking period. The fruit will then dips. Careful weighing of the sugar will prevent his fault.

Too much baking powder

Too much baking powder weakens the cake structure by its effect on the protein and also creates larger cells which are weak and will not hold fruits. Special care must be taken in weighing minor ingredients such as baking powder. Small weights should be checked regularly for accuracy.

Incorrect baking temperature

If the fruit cakes are baked at too low temperature, the time which is required for the cake to set increases. The risk of the fruit fall is, therefore, greater. The baking temperature should be checked before and during baking.

Texture faults**a) Texture too close****Insufficient baking powder**

The cake is under aerated and heavy. Again care must be taken when weighing baking powder.

Too much liquid

This will close the cake and cause it to lack lightness.

Too little sugar

Low sugar content allows the cake to set too early in the bake and give less time for it to expand.

Hot batters

If ingredient temperatures are high and batter hot, they are unable to incorporate sufficient air. This results in a loss of volume and a closing of the cake texture. The best creaming temperature is from 25°C Careful control of the temperature of ingredients is essential.

b) Coarse texture**Too much baking powder**

Too much baking powder gives over aeration and an open texture and also an acid taste. Careful observance of the cake formula will prevent over-weighing of the baking powder.

In sufficient liquid

This has much the same effect as too much baking powder. Liquid closes the cake texture and balances the effects of mechanical and chemical aeration and sugar. If too little liquid is used, the cake will open up and have a coarse texture.

Too much sugar

Sugar opens the texture of the cake and if used in excess will delay the setting of the cake so that the final volume will increase together with the cell size.

Too little mixing

When ingredients are mixed an emulsion is formed and a longer mixing time gives an even dispersion of ingredients and a better emulsion: If the mixing time is too short, the poorer distribution and emulsion and yields a more open, uneven texture in the baked cakes.

Oven too cool

As hot oven will restrict the expansion of the cake during baking, so also cool oven will allow too much expansion and open up the cake texture. Careful baking at the correct oven temperature will prevent this problem.

Crust Faults**a) Thick crust on cake****Too much sugar**

When a sugar solution is heated, the water is gradually driven off. When little water remains the sugar turns to carbon. This is known as 'caramalization' of the sugar. An increase of sugar in the cake batter will increase the density of sugar-water solution. Thus the rate of caramalization during baking will be more. This produces a thicker crust on the cake and is often accompanied by some discoloration of the lower half of the cake crumb.

Too little milk or other liquid

This will increase the density of the sugar solution, with similar results.

Baking fault

If the oven as a whole is too hot, a heavy crust will be produced around the cake. When only the top heat is excessive, the top crust will be thicker. When cakes are baked in a cool oven, the crust is formed over a longer period of baking and will therefore be thicker. Over baking will also give heavy crusting. Careful baking at correct temperatures will overcome problems of this type.

Cakes standing too long before baking

If the scaled batter is allowed to stand too long before baking, moisture will evaporate from the top surface and this will result in increased caramelisation and crust depth.

Crumbliness**Weak or wrong type of flour**

If the flour is weak cake will lack in structure, the texture will be weak and the fruit will be pulled out of the crumb as the knife passed through. High protein special cake flour must be used when high ratio fruit and cherry cakes are being made.

Imbalanced mixing

Too little egg in relation to the fat will give a weak texture. Too much sugar will cause the cake to be tender. A dry cake is usually made from a formula which does not contain sufficient liquid.

The use of dry fruit

If the fruit is not washed and cleaned, it will draw moisture from the cake crumb, leaving it drier and more crumbly. Careful preparation and conditioning of fruit ensures that fruit cake will mature well and improve with age. Lightly fruited cakes will be less moist in eating and will not dry out quickly.

Incorrect baking

If cakes are over baked or baked too slowly, a dry cake results. Careful baking is essential to the production of cakes which will cut and eat well.

Challenges faced by manufacturers

- The price-sensitivity of the market
- Rising prices of flour (Maida), the major ingredient, and other raw materials such as oil, fat and eggs

- Government Regulations
- Demand - supply chain

Measures to overcome the challenges

- ❑ Overcoming the challenges without sacrificing quality balance in the baking industry is crucial – and nearly impossible to achieve without the proper tools.
- ❑ The key for producers and manufacturers lies within their data – finding a way to accurately analyze, integrate and provide cross-functional support for the most complex aspects of recipe-based production development.

Technical specifications of planetary mixer

Electric version , set of three agitators

Capacity :15 liters

Batter capacity : 16 kg

Speed : Multi speed

Accessories like SS bowl, flat beater, whisk, dough hook scrapper and trolley

Motor phase : 3/1

Motor : Suitable branded motor

Technical Specifications of Rotary oven

Type : Rotary

Capacity : 100 kg

Trays :12 bread per load

Size : 3020(W) x 2250(D) x 2400(H) mm

Maximum temperature - 300 °C

Power: 4.5 KW

Technical Specifications of Weighing scale

Electronic Weighing Scale - 1 g to 10 kg and 10 to 120 kg

Avery make

120 kg x 20 g accuracy, with platform Size 600 x 600 mm – MS plate

PACKAGING OF CARROT CAKE

Packaging is important because it aids food distribution, and rapid and reliable distribution helps remove local food surpluses, allows consumers more choice in the foods available and helps to reduce malnutrition. Packaging also reduces post-harvest losses, which together with giving access to larger markets, allows producers to increase their incomes. Therefore, adequate packaging in developing countries has profound effects on both the pattern of food consumption and the amount of food consumed. It is declared that 10 to 25% of the entire cost of the product lies in the packaging.

Bakery products are becoming a major part of the international food market, the baking industry is undergoing a period of rapid change. Baking industry must try to satisfy the healthy eating trends and the consumer demands for fresh products. Food technologists have to select the suitable type of packaging that will ensure the necessary shelf life for bakery products. The success of the product in the market must be based on the design and the production both with the very best raw materials and advanced technology. The principal function of food packaging is to minimize reactions that affect the stability of the product. Mold spoilage is common in the bakery industry and in many cases; mold growth determines the product shelf-life of both high-moisture and intermediate-moisture baked. Baking destroys most molds. However, during cooling and packaging, recontamination can occur and cause growth to take place.

Classification of packaging

- 1) Primary packaging
- 2) Secondary packaging
- 3) Tertiary packaging

Functions of packaging

PRIMARY PACKAGING	SECONDARY PACKAGING	TERTIARY PACKAGING
<ul style="list-style-type: none"> • CONTAINMENT • PROTECTION • CONVENIENCE • STORAGE • TRANSPORT 	<ul style="list-style-type: none"> • COMMUNICATION • SERVICE • GUARANTEE 	<ul style="list-style-type: none"> • ADDITIONAL FUNCTIONS

Basic characteristics of cake

- ☞ Moist bakery products
- ☞ Moisture content (>12%)
- ☞ Water activity ($A_w = 0.60 - 0.85$)
- ☞ RH (10-15%)
- ☞ Low shelf life

Cakes are category of moist baking products with comparatively less shelf-life. These products have high moisture content (>12%), supple texture and high water activity between 0.6 to 0.85 with low resistance and tendency to crumble and go stale. Their basic characteristics are given in Table below.

Properties	Basic Characteristics of Products
General Physical – mechanical	Foodstuff for medium to long storage Fragile Light Low resistance Varied sizes and shapes
Organoleptic	Supple and creamy texture Distinctive flavours Flavours that may change (loss of flavour or fixation of foreign orders) Flavours that may deteriorate (go stale or soapy) Appearance that may change (drying out)
Physico-chemical	High moisture content High A_w Sensitive to : <ul style="list-style-type: none"> • Oxidation • Enzymatic reactions • Microbiological alteration

Changes in cake during storage

Cake contain hydrated starch and are prone to staling. Staling is a complex process that starts soon after baking and involves several physicochemical changes. These are mainly related to an increase in crumb firmness and a resulting loss in product freshness, which is further linked to a loss of eating quality due to color, flavor, or texture deterioration.

The predominant role has been assigned to starch retrogradation, as starch is a major component of the system, which involves the progressive association of gelatinized starch segments from an amorphous to a crystalline form (a more ordered structure), the latter binding considerably less water than the former. This change leads to a rapid hardening and to shrinkage of the starch granules with consequent development of crumbliness and loss of texture.

Moisture migration is of particular importance in composite bakery products. These consist of a dough component and one or more filling components baked together as in the case of fruited cakes, or those prepared by introducing the filling into the already baked product as in the case of sandwich biscuits. These products contain components with very different appearances, textures, eating characteristics and moisture contents. When placed in contact with one another, moisture diffuses from the wetter to the drier phase to achieve equilibrium, leading to irreversible changes in the texture, sensory, and microbiological quality of the product, and to the reduction of its shelf-life.

Packaging requirements of cake

- ❖ Be attractive
- ❖ Maintain adequate shelf-life
- ❖ Run on automatic machinery
- ❖ Be strong
- ❖ Be inexpensive
- ❖ Be an adequate moisture barrier, and
- ❖ Protect the shape of the product
- ❖ Prevent microbial spoilage

Packaging materials used for cake

Cake products are available in various sizes, shapes and forms. Since these products contain high moisture content they are prone to mould growth and hence the packaging material selected should not encourage mould growth. The packaging material used is Polypropylene (PP), Cast polypropylene (CPP), Poly Vinyl Chloride (PVC), cellulose acetate and thermoformed trays of poly styrene. While the choice of the film depends upon the machinability and economics required.

ADVANTAGES OF FLEXIBLE PACKAGING FOR CAKES

- ✓ Sealability characteristics
- ✓ Water vapour and oxygen permeability
- ✓ Clarity and anti-fog properties
- ✓ Weight and strength
- ✓ lower cost
- ✓ printability
- ✓ Microbial safety and prolong shelf life
- ✓ savings in freight and other such factors

Quality parameters checking of cakes before packaging

- Weight of the cake
- Dimensions : Length, Width and diameter
- Colour top and bottom
- Moisture content
- Crumb and crust

Shelf life extension techniques for preservation of cakes

Traditional packaging concepts are reaching their limits in extending shelf life. Although MAP can be used to extend shelf life and keep the quality of food, aerobic spoilage can still occur in these packaged products, depending on the level of residual O₂ in the package. This residual level can be due to a number of factors such as O₂ permeability of the packaging material, ability of the food to trap air, leakage of air through poorly sealed seams, and/or inadequate gas flushing. The highly porous texture of bakery products does not permit

complete O₂ elimination. Even packaging film of low O₂ permeability allows gas accumulation over time to a sufficient level to support mold growth, when not containing a fungistatic agent.

MAP for Cakes				
CO ₂	N ₂	Storage temperature	Shelf life MAP	In air
20-40	60-80	20 to 25	1 year	Some weeks

Active packaging (AP) is an innovative concept that can be defined as a type of packaging that changes the packaging condition, extending shelf life and improving safety or sensory properties while maintaining food quality. It involves incorporating a chemical into the packaging material. Examples are

- ✓ Oxygen absorbent and
- ✓ Antimicrobial agents.
- ✓ Ethanol emitters

Innovative recent techniques employed in bakery industry to retard mold growth in cakes are:

- Ultraviolet radiation
- Intelligent packaging
- Infra red radiation

PACKAGING STYLES

- Cakes are packed using the following two wrapping styles. Cakes must be sliced of common size and shape with a certain consistency and rather narrow tolerances in their dimensions.

1) End fold wrapping

2) Pillow pack wrapping

End fold wrapping

- ☐ A portion of cakes standing on edge is roll – wrapped or fold wrapped into a heat sealable film. The longitudinal packet seal is sealed tightly in a fin seal style.
- ☐ The packet ends are folded neatly and heat-sealed.

- ❑ Due to the neat and tight surrounding of the film, this packet gives utmost mechanical protection and acceptable barrier properties.

Pillow pack wrapping

- In this type of wrapping configuration, cakes are packed in a primary wrapper and are over-wrapped by a carton to improve presentation and acceptance.
- Offers flexibility and accuracy
- Tightly wrapped than enfold wrap.



PACKAGING MACHINE



**FLEXIBLE BAKERY LABELING SYSTEM,
BAKERY SYSTEM**



WIPE-ON,HIGH-SPEED LABELER

PACKAGING MATERIAL SPECIFICATIONS FOR CAKE**PACKAGING MATERIALS USED FOR CAKE**

Packaging material	Thickness	Gas permeability (cm ³ /m ² .day.atm)	Packaging conditions
OPP/(PE-LD/EVAL/PE-LD)/PELLD	95 µm	O ₂ = 2 WVP = 1	Different MAP
PA/PE	90 µm	O ₂ = 19.9 CO ₂ = 164.9 WVP = 2.6	Air; Different MAP +/- O ₂ -absorbers

LABELLING LAWS FOR CAKES PACKAGING**LEGAL REQUIREMENTS**

- ❖ Manufacturer's name and contact details
- ❖ Name of the product
- ❖ Description of the product
- ❖ Weight (some foods are exempt)
- ❖ Ingredients (listed in descending order of Weight)
- ❖ Cooking/heating instructions (if necessary)
- ❖ Storage instructions
- ❖ Shelf-life
- ❖ Place of origin
- ❖ Allergy information.

NOT LEGAL REQUIREMENTS

- ❖ Illustration of product
- ❖ Price
- ❖ Nutritional values of the product
- ❖ Customer guarantee
- ❖ The batch-code and bar-code numbers
- ❖ Opening instructions.

FSSAI 7.2 Fine bakery wares (sweet, salty, savoury) and mixes

Includes sub-categories for ready-to-eat products (7.2.1 and 7.2.2) as well as mixes (7.2.3) for preparing fine baked goods.

FSSAI 7.2.1 Cakes, cookies and pies

The term “sweet cracker” or “sweet biscuit” used in this category refers to a cookie-like product that may be eaten as a dessert such as butter cake, cheesecake, fruit-filled cereal bars, pound cake, moist cake (type of starchy dessert), western cakes, moon cakes, sponge cake, fruit filled pies (e.g. apple pie), custard types, oatmeal cookies, sugar cookies and British “biscuits” (cookies or sweet crackers).

Food Additives for Cake

BAKERY PRODUCTS					
Food Category System	Food Category Name	Food Additive	INS No	Recommended maximum level	Note
7.2.1	Cakes, cookies, biscuit, cracker and pies	Acesulfame potassium	950	1,000 mg/kg	165,188

		Allura red AC	129	100 mg/kg	
		Aspartame	951	1,700 mg/kg	191,165
		Aspartame acesulfame salt	962	1,000 mg/kg	77, 113
		BENZOATES			
		Beeswax	901	GMP	3
		Brilliant blue FCF	133	100 mg/kg	
		CAROTENOIDS		100 mg/kg	
		CHLOROPHYLLS AND CHLOROPHYLLINS, COPPER COMPLEXES		75 mg/kg	
		Candelilla wax		GMP	3
		Caramel III - ammonia caramel		50,000 mg/kg	
		Caramel IV – sulfite ammonia caramel		1,200 mg/kg	
		beta-Carotenes, vegetable		1,000 mg/kg	
		Diacetyltartaric and fatty acid esters of glycerol		20,000 mg/kg	
		HYDROXYBEN ZOATES, PARA-		300 mg/kg	27

		IRON OXIDES		100 mg/kg	-
		Indigotine (Indigo carmine)		100 mg/kg	
		Neotame		80 mg/kg	165
		PHOSPHATES		9,300 mg/kg	229,33
		52[omit]	
		RIBOFLAVINS		300 mg/kg	
		SACCHARINS		170 mg/kg	165
		SULFITES		50 mg/kg	44
		Shellac, bleached	904	GMP	3
		Sucralose (Trichlorogalactosucrose)	955	700 mg/kg	165
		Sucroglycerides	474	10,000 mg/kg	
		52[Omit]	
		Sucrose esters of Fatty acids	473	GMP	
		Tartaric acid	334	GMP	
		Benzoyl peroxide	928	40 mg/kg	
		Curcumin	100 (i)	GMP	
		Canthaxanthin	161 g	GMP	
		Annatto	160 (b)	GMP	
		Carmoisine	122	100 mg/kg	
		Erythrosine	127	50 mg/kg	
		POLYSORBATES		3,000 mg/kg	
		Tartarazine	102	100 mg/kg	

		Potassium iodate	917	GMP	
		52[Poly glycerol esters of fatty acid	475	10,000 mg/kg	
		TOCOPHEROLS		200 mg/kg	389
		TARTRATES		5,000 mg/kg	45
		Propylene glycol Alginates	405	3,000 mg/kg	

FSSAI's Food Safety Management System for Bakery and Bakery Products

The guidance on a food safety management system for bakery and bakery products is based on Part II of Schedule 4 of Food Safety & Standards (Licensing & Registration of Food Businesses) Regulation, 2011 but is not intended replace any legal provision of Food Safety & Standard Act, 2006 & regulations thereunder. The bakery sector comprises the largest segment of the **food processing** sector in India. There are more than 2,000 organized or semi-organized bakeries producing around 1.3 million tonnes of the bakery products and 1,000,000 unorganized small-scale bakeries producing 1.7 million tonnes. Bread and biscuits are the most popular bakery items and account for 80% of the total market. Key issues that the industry is facing include the need for improvements in hygienic practices as well as technology apart from the availability of skilled manpower at all levels of bakery operations.

The Scope of the guidance includes : This document is applicable for food businesses involved in the bakery sector. The major activities in the bakery industry comprise of the following:

- Receiving & storing of raw material.
- Manufacturing & packing of bakery products.
- Storage/Warehousing & Transportation of bakery products

All the above activities may or may not be carried by the same facility. Hence, based on their position in the food supply chain, a bakery industry could use the guidance document accordingly as per the operations applicable to them. This document provides guidance for

FSMS implementation for the following bakery products.

1. a) Biscuits
2. b) Bread
3. c) Cakes & Pies

The specified requirements where **compliance is essential** and obligatory for food businesses and in such cases the word “shall” is used. In addition, certain good **practices are also strongly advised** for food safety operation & in such case “should” is used.

ESTABLISHMENT – DESIGN AND FACILITIES

Location and surrounding

Potential sources of contamination need to be considered before deciding on the location for a bakery as there is a need to minimize contamination and environmental pollution so it must be away from

- industrial activities that produce disagreeable or unpleasant odor, fumes, excessive soot, dust, smoke, chemical or biological emissions and pollutants that pose a serious threat to food safety
- areas subject to flooding
- the boundary must have access control so as to avoid entry of stray animals
- an external area must be free of debris, solid or liquid waste, stagnant water
- maintained grass/planted area inside and outside the premises especially insect repellent plants must be planted like marigold, neem, basil, etc.
- no access to a residential area in case residential area is in same premises

Premises & rooms

Construction, design & layout has been given in detail below are the main highlights

- Building material must be safe for use near food and must not release toxic substances and any material that sheds paint, plastic, plaster or fibers shall not be used.
- Access for cleaning of equipment or use of moveable equipment
- Where steam or excessive humidity occur some form of natural or mechanical ventilation/extraction should be provided.
- Where condensation occurs and where ventilation is impractical affected areas shall be cleaned and redecorated regularly

- Wall and floor junctions should be covered and overhead cables kept to a minimum.
- Services, light units should be mounted flush to ceilings/ roofs or on rods or cables and preferably not chains.
- Pipework should not be boxed in because of the risk of infestation.
- The layout must provide sufficient space to allow high-risk foods to be prepared safely.
- Possible entry points for pests should be proofed.
- External openings or doors may require proofing against insects (e.g. insect-proof screen doors, plastic strip curtains, rapid rise doors)

Internal structures & fittings

It includes floors, walls, ceiling, doors, windows, partitions, overhead fixtures, working surface, stairs, elevators & similar structures for which construction material shall be

- Durable
- Impervious to food particles, grease & water
- Non-toxic in the intended use
- Facilitate easy and effective cleaning and maintenance and not become a source of contamination

Walls & partitions: Walls & partitions shall be provided to separate operations, wherever required

Ceiling & overhead fixtures: ceiling including false ceiling shall be provided where they are necessary to protect food from contamination.

Floors: Floors shall be non-slippery but facilitate cleaning

Windows: good ventilation, the material used must minimize accumulation of dust and be fitted with insect-proof screens and remain closed during operations

Doors: smooth and non-absorbent material

Food Contact Surface (including working surface): must be inert to food and cleaning chemicals and free from cracks and open seams with nuts and bolts.

Equipment & containers

Food handling equipment

- Equipment and containers shall be hygienically designed, constructed and maintained in good order and repair. A material of construction shall be non-corrosive, non-toxic and impervious to grease, food material, cleaning agents etc. The material of construction shall be in accordance with **Food Safety & Standards** (Packaging & Labelling) Regulation, 2011.
- The equipment shall prevent the contamination of the product
- Fixtures, fittings, and equipment that use water for food handling or other activities and are designed to be connected to a water supply must be connected to an adequate supply of water.
- Equipment should be self-draining in wet process areas. And where appropriate, connected directly to drains. Where possible, CIP (Cleaning in Place) method should be followed.
- Containers must be provided with proper fitting cover/lid or with a clean gauge net or other material of texture sufficiently fine to protect the contents completely from dust, dirt etc. Where chemical additives have to be used to prevent corrosion of equipment and containers

Food Control and monitoring equipment

- The equipment used to cook, heat treat, cool, thaw, store or freeze food shall achieve the temperature as rapidly as necessary & maintain the same.
- The equipment shall also be designed to allow temperature & other characteristics (such as RH%, air flow) to be monitored & controlled, wherever required.

Container for holding waste, non-food chemicals & hazardous substance shall be

- Clearly identified for their intended purpose
- Suitably constructed of impervious material
- Easy to clean
- Leak-proof
- Provided with cover, preferable foot operated
- located in a designated area
- No pest harbourage

Non-food chemicals & hazardous substance shall be closed when not in use and stored separately under lock with access to only authorized personnel.

Chemicals & other hazardous substance should be stored in original containers with label intact.

FACILITIES

Detailed guidelines have been provided in the document for the following but the highlights are as follows

Water Supply: potable water supply must be adequate and meet IS: 10500 standards. Only potable water shall be used for processing/cooking, preparing ice & steam which is used as an ingredient; handling raw food or cleaning food contact surfaces/equipment/plant cleaning.

Waste disposal and drainage: Waste disposal systems & facilities shall be provided so that there is no risk of contaminating food or potable water supply

Cleaning: There shall be adequate, preferably separate facilities provided for cleaning food, utensils & equipment to prevent contamination

Personal hygiene and employee facilities: shall be provided in adequate number & size. It shall be suitably designated & located.

Hand washing facilities: includes basins, wash bins, drying facilities, soap, disinfectant, temperature controlled water supply

Toilets: Sufficient number and separate hygienically designed toilets with proper flushing facilities shall be provided for male & female at the ratio of 1:25. Shall not open directly to the food production area and shall be maintained in clean & hygienic condition.

Restroom & refreshment room: adequate space to consume foods and rest during breaks including hand washing facility

Changing Room: must have locker facilities, appropriate PPE, a receptacle for dirty work wear.

Temperature control: facilities shall be available for achieving & maintaining temperatures required for heating, cooling, chilling, cooking, refrigerating & freezing food.

Air Quality & ventilation: Food premises where operation result in a release of fumes, smokes or any vapor shall be equipped with an exhaust system or ventilation to minimize airborne contamination, ambient temperature, odor and humidity

Lighting: Adequate natural or artificial lighting shall be provided to enable the personnel to operate in a hygienic manner. Light fittings should be located so as to minimize the risk of

contact and damage. FSSAI has recommended the adequate lighting according to location and size of the pastry shop and a baking area in a table.

Storage facilities: shall be designed and constructed to provide protection from dust, condensation, waste, pest access and harbourage and other sources of contamination. Storage space should be physically separated or segregated for –

- Raw material
- Packaging material
- Returned material
- Recalled material
- Allergens
- Semi-processed material
- Final product
- Hazardous chemical (used in engineering)
- Cleaning & disinfection chemical
- Engineering tools
- Waste material (both biodegradable & non-biodegradable)

Storage areas shall be maintained at temperatures, required by the products. It includes –

- Freezer maintained at -18°C
- Refrigerators maintained at 5°C
- Room Temperature at 37°C
- Hot holding unit maintained at or above 60°C

Compressed air and gases like carbon dioxide, nitrogen and other gas systems wherever required used in manufacturing &/or packaging shall be constructed & maintained so as to prevent contamination

CONTROL OF OPERATION

Food Receipt

- Raw material shall be procured from supplier having **FSSAI** license. Mandatory document such as Form E shall be procured. As a good practice, Certificate of Analysis (COA) should also be procured from the supplier mentioning its batch

number, date of manufacturing, expiry date and testing parameters (physical, chemical and/or biological)

- Raw material shall meet the requirements of food product & food additives standards as laid down in regulation
- For imported ingredients &/or products, operators should verify that the suppliers are capable of providing food products that comply with regulations laid down under Food Safety & Standard Act, 2006.

Vehicle inspection

- The vehicle should be clean & free from pest or dirt/dust etc.
- Jute bags are not allowed

Inspection of raw material

- No material containing chemical, physical or microbiological contaminants will be accepted unless it is possible to reduce them to acceptable levels through sorting and processing
- Receiving temperature of potentially hazardous food must be 5°C or below; or 60°C or above. Receiving temperature of frozen food shall be -18°C or below.
- Where necessary, laboratory tests should be made to establish fitness for use
- The packaged raw material must be checked for expiry date/best before/use by date,
- Ingredients containing allergens should be clearly identified & stored to prevent cross contamination

The product-specific recommended practices have been given for the following eggs:

- shells shall not be cracked, dispose of cracked eggs
- store in chiller until they are needed at room temperature they must be used and replenished daily
- washing hands, utensils and surfaces after handling eggs and before contact with other foods

Dry ingredients like wheat flour, sugar, milk powders, minor ingredients and cocoa powder:

- Sampling and test of incoming raw materials by appropriate test sieves.
- Raw material should be stored in a room that has the required humidity and temperature control.

Ready-to-eat products containing lightly-cooked or uncooked eggs (e.g. butter, cream, icing, mayonnaise, mousse, condensed milk)

- Only small batches should be procured of what is required
- Use a liquid egg or egg powder instead of shell eggs where possible.
- Cleaning of drums containing liquid/semi-liquid raw materials for removal of debris and droppings before taking into FBO storage
- Storage of finished products in covered containers in the chiller at 4°C and below.
- Storage of finished products on separate shelves above raw food (including shell eggs).

Wet ingredients like Oils and Fats

- Material carried by tanker with a broken seal or without the seal is not acceptable
- For preventing physical contamination, 30 BSS sieve and magnet to be put in the hose at the point of unloading
- Use of proper plunger for homogenizing the material in tanker or barrel before sampling

Specialty Ingredients like Nuts and Dry Fruits

- Nuts received are free from fungal or insect infestation
- Nuts are stored below 4°C

Allergen handling and Control and Management

- Display all the allergens at the relevant places in the processing and storage areas for awareness among all the employees.

- All raw materials that are allergens should be labeled with a tag that states “Allergen.”
- Products containing non-allergen ingredients should run before the product containing allergic ingredients.
- Store all allergic foods or ingredients at a designated area and dedicated scoops, utensils shall be used for specific allergens.

Detailed guidelines have been provided for the following areas

- Storage (Raw material and final product)
- Food processing along with major critical points
- Food packaging
- Rework & control of non-conforming products
- Food Transportation
- Food traceability & recall
- Quality Control

ESTABLISHMENT – MAINTENANCE & SANITATION

Under this heading detailed guidelines have been provided for

- Clean and sanitation of premises and equipment
- Maintenance
- Pest Control System
- Waste disposal management

ESTABLISHMENT – PERSONAL HYGIENE

Health Status

Food handlers shall undergo a medical examination by a registered medical practitioner as follows

- Physical examination
- Eye test
- Skin examination
- Compliance with schedule of vaccine to be inoculated against enteric group of disease

- Any test required to confirm any communicable or infectious disease which the person suspected to be suffering from, on clinical examination

Illness & injury: Food handlers suffering from of a disease shall not be allowed to handle food or material which comes in contact with food

Personal cleanliness: Food handlers shall maintain high degree of personal hygiene and wear work clothing, head covering & footwear that is fit for the purpose,

Personal Behaviour: shall follow good personal behaviour by avoiding smoking, chewing, eating, unprotected sneezing or coughing and spitting, scratching nose, rubbing eyes, mouth and ears, touching hair, beard or body parts.

Visitors shall wear protective clothing, footwear and adhere to all the personal hygiene requirements

PRODUCT INFORMATION AND CONSUMER AWARENESS

Product information & Labelling: All packaged food products shall carry a label and requisite information as per provisions of Food Safety and Standards Act, 2006 and regulations

Consumer awareness and Complaint handling: Information shall be presented to consumers in such a way as to enable them to understand its importance and make informed choices.

ESTABLISHMENT-TRAINING & MANAGEMENT

Training: All personnel should be aware of their role & responsibility in protecting food from contamination or deterioration

Management & Supervision: Technical managers and supervisors must have appropriate qualifications, knowledge, and skills on food hygiene principles and practices to be able to ensure food safety and quality of its products, judge food hazards, take appropriate preventive and corrective action, and to ensure effective monitoring and supervision.

ESTABLISHMENT – AUDIT, DOCUMENTATION AND RECORD KEEPING

Self-Evaluation and Review: FBO shall conduct a self-evaluation through internal and external audits

Documentation & Records: Appropriate documentation & records including incoming material checks, inspection and testing, calibration of food safety equipment, water testing, operational controls (such as temperature, pressure, time etc.), product recall and traceability, storage, cleaning and sanitation, pest control, medical examination and health

status of food handlers, training etc. shall be maintained in a legible manner.

HACCP IMPLEMENTATION

Hazard Analysis Critical Control Point (HACCP) is essential to carry out to identify the weakness of the production line and to suggest critical limits in compliance with legislation and therefore the preventive and corrective measures.

HACCP Implementation steps

- Assemble HACCP team
- Describe product
- Identify intended use
- Construct flow diagram
- On-site confirmation of flow diagram

Principle 1: List of all potential hazards associated with each step, conduct a hazard analysis, and consider any measures to control identified hazards

Principle 2: Determine Critical Control Points

Principle 3: Establish Critical Limits for each CCP

Principle 4: Establish a monitoring system for each CCP

Principle 5: Establish corrective actions

Principle 6: Establish Verification Procedures

Principle 7: Establish Documentation and Record Keeping

As a sample the document contains

- HACCP Plan for Biscuits & Pies
- HACCP Plan for Bread
- HACCP Plan for Cakes

INSPECTION CHECKLIST

The checklist has the date, FBO name, Food Safety officer and representative, FBO license number and address.

Audit questions along with score about

- Design and facilities
- Control of operations

- Maintenance and sanitation
- Personal hygiene
- Training & Complaint Handling

FSSAI Labelling Requirements

Essential information for Display

According to the FSSAI Packaging and Labelling Regulations (2011), there are certain labelling requirements which need to be met before distribution can be carried out. The following information is in the consumer's interest and ensures their safety -

- The complete name of the food item to be written, in clear font and format, on the packaged product
- Complete list of key ingredients used to produce the final product
- Net quantity or weight of the product
- Code No. or Batch No. which helps in recognizing the product during the distribution process
- Date of manufacture and the date of expiry of the product
- Nutritional information (amount of calories, proteins, trans fats, sugar, other dietary nutrients) per 100 g of the product
- Vegetarian or Non-vegetarian mark where a green dot stands for vegetarian and red dot stands for non-vegetarian products
- Names of all food additives (if any)
- The country in which the product was manufactured, in case of imported food items
- Detailed instructions on how to use the product and the necessary precautions and contraindications (if any)
- Name of the manufacturer with the full address