

## Chapter 4

### CAKE MAKING

#### 4.1 Factors to be considered while cake making- (Combining ingredients, Forming of air cells and developing texture)

**Combining Ingredients into a Homogeneous Mixture** Two of the major ingredients in cakes—fat and water (including the water in milk and eggs) are, by nature, unmixable. Therefore, careful attention to mixing procedures is important to reach this goal. A uniform mixture of two unmixable substances is called an emulsion. Part of the purpose of mixing is to form such an emulsion. Properly mixed cake batters contain a water-in-fat emulsion; that is, the water is held in tiny droplets

#### MIXING

Surrounded by fat and other ingredients. Curdling occurs when the fat can no longer hold the water in emulsion. The mixture then changes to a fat-in-water mixture, with small particles of fat surrounded by water and other ingredients. The following factors can cause curdling: 1. Using the wrong type of fat. Different fats have different emulsifying abilities. High-ratio shortening contains emulsifiers that enable it to hold a large amount of water without curdling. You should not substitute regular shortening or butter in a formula that calls specifically for high-ratio, or emulsified, shortening. Butter has a desirable flavor but relatively poor emulsifying ability. Butter is, of course, used in many cake batters, but the formula should be specifically balanced so it contains no more liquid than the batter can hold. Also, remember that butter contains some water. Egg yolks, as you will recall, contain a natural emulsifier. When whole eggs or yolks are properly mixed into a batter, they help the batter hold the other liquids. 2. Having the ingredients too cold. Emulsions are best formed when the temperature of the ingredients is about 70°F (21°C). 3. Mixing the first stage of the procedure too quickly. If you do not cream the fat and sugar properly, for example, you will not form a good cell structure to hold the water (see “Forming Air Cells,” below). 4. Adding the liquids too quickly. In most cases the liquids, including the eggs, must be added in stages—that is, a little at a time. If they are added too quickly, they cannot be absorbed properly. In batters made by the creaming method (p. 381), the liquid is often added alternately with the flour. The flour helps the batter absorb the liquid. 5. Adding too much

liquid. This is not a problem if the formula is a good one. However, if you are using a formula that is not properly balanced, it might call for more liquid than the fat can hold in emulsion.

**Forming Air Cells** Air cells in cake batters are important for texture and leavening. A fine, smooth texture is the result of small, uniform air cells. Large or irregular air cells result in a coarse texture. And recall that air trapped in a mix helps leaven a cake when the heat of the oven causes the air to expand (p. 96). When no chemical leavener is used, this trapped air, in addition to steam, provides nearly all the leavening. Even when baking powder or soda is used, the air cells provide places to hold the gases released by the chemical leavener. Correct ingredient temperature and mixing speed are necessary for good air cell formation. Cold fat (below 60°F/16°C) is too hard to form good air cells, and fat that is too warm (above 75°F/24°C) is too soft. Mixing speed should be moderate (medium speed). If mixing is done on high speed, friction warms the ingredients too much. Not as many air cells are formed, and those that do form tend to be coarse and irregular. Granulated sugar is the proper sugar for creaming-method cakes. Confectioners' sugar is too fine to produce good air cells. In the case of egg-foam cakes (sponge, angel food, chiffon), the air cells are formed by whipping eggs and sugar. For the best foaming, the egg and sugar mixture should be slightly warm (about 100°F/38°C). Whipping may be done at high speed at first, but the final stages of whipping should be at medium speed in order to retain air cells.

**Developing Texture** Both the uniform mixing of ingredients and the formation of air cells are important to a cake's texture, as we discussed in the preceding sections. Another factor of mixing that affects texture is gluten development. For the most part, we want very little gluten development in cakes, so we use cake flour, which is low in gluten. Some sponge cake formulas call for cornstarch to replace part of the flour, so there is even less gluten (the high percentage of eggs in sponge cakes provides much of the structure). In contrast, some pound cake and fruit cake formulas need more gluten than other cakes for extra structure and to support the weight of the fruit. Thus, you will sometimes see such cake formulas calling for part cake flour and part bread flour.

The amount of mixing affects gluten development. In the creaming method, the sponge method, and the angel food method, the flour is added at or near the end of the mixing procedure so there is very little gluten development in properly mixed batters. If the batter is mixed too long after the flour is added, or if it becomes too warm during mixing, the cakes are likely to be tough. In

the two-stage method, the flour is added in the first step. However, it is mixed with high ratio shortening, which spreads well and coats the particles of flour with fat. This coating action limits gluten development. It is important to mix the flour and fat thoroughly for the best results. Observe all mixing times closely. Also, keep in mind that high-ratio cakes contain a high percentage of sugar, which is also a tenderizer

#### **4.2 Methods of cake making:**

1. Sugar batter method
2. Flour batter method (two sponge method)
3. Blending method
4. Boiled method
5. Sugar water method
6. All in process method
7. Foaming method (sponge method)

##### **1. Sugar batter method**

- ⊙ In this method all the fat is creamed until it gets light white color. Then the sugar added gradually continuing the creaming process. when adequate aeration is achieved, the fat & sugar mixture will be light & brighter in appearance. Then add beaten eggs gradually into the mixture. The beaten eggs should be added into the batch wise. If more eggs are added at a time, it will curdle. Other liquids can be added at this stage. Next, fold the prepared fruits into the mixture. Add sieved flour into the mixture. After adding the flour, if the batter is very stiff, add some quantity of water or milk to adjust the batter consistency

##### **2. Flour batter method**

- ⊙ In this method, cream the fat & a quantity of flour not exceeding the weight of fat till it becomes light & fluffy. At the same time in other machine, beat the egg & equal quantity of sugar, till it becomes stiff & frothy. Then add this mixture into the first mixture. At this stage, second mixture should be added in small quantity at a time. It should be mixed thoroughly & then only the next portion should be added. The remaining sugar is dissolved in milk or water & added to the mixture. Any color or flavor is added along with this liquid. Lastly the remaining flour is sifted with chemicals & mixed.

- ⦿ This method is suitable for lean cakes. Because lean cakes acquire most of the aeration due to baking powder & there is no risk of losing aeration achieved in fat.

### **3. Blending method**

- ⦿ In this method fat, flour, baking powder & salt are whipped together till it comes to a very light & fluffy condition.
- ⦿ Sugar, milk or any other liquids, color & essence are mixed together & added into the previous mixture.
- ⦿ Eggs are added & the whole mass is mixed to a smooth batter
- ⦿ This method is suitable for high ratio cakes. High ratio cake means the quantity of sugar is more than the quantity of flour.

### **4. Boiled method**

- ⦿ In this method, butter or fat is heated with water till it reaches the boiling point. Then remove from the fire & add 2/3 of flour & mix it thoroughly. Beat the eggs & sugar until it becomes stiff & add color & essence. Then this mixture is added into the previous mixture gradually. It is mixed thoroughly & remaining flour can be added at this stage. This method is used for making Madeira cake & Genoese sponge

### **5. Sugar water method**

- ⦿ In this method, all the sugar & half the quantity of water is agitated in a bowl till all the sugar is dissolved. Then the remaining ingredients, except egg are added & the mixture is well agitated to achieve aeration. Lastly, egg is added & the mixture is cleared. Due to more aeration & better emulsification obtained in this method, the cakes so produced have better texture & longer shelf life.

### **6. All in one process**

- ⦿ In this method, all the ingredients are mixed together into the mixing bowl. Aeration of the mixture is achieved by controlling the speed of the mixture as well as mixing time. Wire whip is used for this method, because it ensures a faster break down of ingredients & it helps to achieve good aeration
- ⦿ After adding all ingredients in mixing bowl, mix on slow speed for one minute, then high & medium speed for two minutes & again on slow speed for one minute
- ⦿ This method is mainly used for gel sponge. If the formula contains oil it should be added in the last stage

## **7. Foaming method**

- ⦿ In this method, beat the egg till it becomes fluffy & frothy. During beating, the small air cells are incorporated into the mixture. This air incorporation helps to increase the volume. Then add sugar gradually in continuous beating till it becomes thick & creamy. Essence & color can be added at this stage. The flour should be sifted with baking powder & added with just necessary movements of hand without disturbing the foam. If you give rough folding or uneven mixing, the incorporated air will escape. Then the finished product will be of very poor quality & flat one.

### **4.3 Scaling, Panning, Baking and Cooling**

**Pan Preparation** Prepare pans before mixing cake batters so cakes can be baked without delay as soon as they are mixed. For high-fat cakes, layer pans must be greased, preferably with a commercial pan-greasing preparation. If this is not available, dust the greased pans with flour and tap out the excess.

For sheet cakes, line the pans with greased parchment. For thin layers, such as for Swiss rolls, it is necessary to use level pans without dents or warps. Silicone mats are especially good to use for lining pans for thin layers. ## For angel food cakes and chiffon cakes, do not grease the pan. The batter must be able to cling to the sides so it doesn't sink back into the pan after rising. ## For sponge cake layers with little or no fat, grease the bottoms but not the sides of the pans. Scaling For consistency, cake batters should be scaled into prepared pans by weight, as explained in the Procedure for Scaling Cake Batters. This is the most accurate method for all types of cake

batters. However, some chefs prefer alternative methods for certain batters because they believe those methods are faster. Because two-stage and one-stage batters are pourable, some bakers prefer to scale them by volume, as described in the Alternative Procedure for Scaling Two-Stage and One-Stage

Batters. This method is quick and also fairly accurate. Foam batters should be handled as little as possible and baked immediately to avoid deflating the beaten eggs. While these cake batters may be scaled by weight as in the basic procedure, some bakers prefer to eyeball them in order to minimize handling, as described in the Alternative Procedure for Scaling Egg-Foam Cakes. Creaming method batters are thick, and so do not pour easily. Thus, they should always be weighed, as in the first procedure.

Baking and Cooling Cake structure is fragile, so proper baking conditions are essential to produce high-quality products. Follow these guidelines to help you avoid cake failures. ## Preheat the ovens. To conserve expensive energy, don't preheat longer than necessary. ## Make sure ovens and shelves are level. ## Do not let pans touch each other. If pans touch, air circulation is inhibited and the cakes rise unevenly. ## Bake at the correct temperature: Too hot an oven causes the cake to set unevenly with a humped center, or to set before it has fully risen. Crusts will be too dark. Too slow an oven causes poor volume and texture because the cake doesn't set fast enough and may fall. ## If steam is available in the oven, use it for creamed, two-stage, and one-stage batters. These cakes bake with a flatter top if baked with steam because the steam delays the formation of the top crust. Do not use steam with sponge and angel food cakes. ## Do not open the oven or disturb cakes until they have finished rising and are partially browned. Disturbing the cakes before they are set may cause them to fall. Cool angel food and chiffon cakes upside down in their pans, so they won't collapse back into the pans. Because they are baked in ungreased pans, they won't fall out of their pans. When completely cool, they are sturdy enough to be pulled out of the pans without breaking.

Tests for Doneness ## Shortened cakes shrink away slightly from sides of pan. ## Cake is springy. The center of the top of the cake springs back when pressed lightly. ## A cake tester or wooden pick inserted in center of cake comes out clean. Cooling and Removing from Pans ## Cool layer cakes and sheet cakes 15 minutes in pans and turn out while slightly warm. Because they are fragile, they may break if turned out when hot. ## Turn out layer cakes onto racks to finish cooling. ## To turn out sheet cakes: 1. Sprinkle the top lightly with granulated sugar. 2. Set a cake board on top of the cake, and then set an empty sheet pan on top, bottom side down. (If a cake board is not available, just set the upside-down sheet pan on top.) 3. Invert both pans. 4. Remove the top pan. 5. Peel the parchment off the cake. ## Cool angel food cakes and chiffon cakes upside down in pans so they do not fall back into the pans and lose volume. Support the edges of the pan so the top of the cake is off the bench. When cool, loosen the cake from sides of the pan with a knife or spatula and carefully pull out the cake. Errors in mixing, scaling, baking, and cooling cakes result in many kinds of defects and failures.

## **FAULTS & REMEDIES**

Its	ses
<i>ume and shape</i>	
r volume	little flour much liquid little leavening n too hot
ven shape	roper mixing er spread unevenly ven oven heat n racks not level e pans warped
st	
dark	much sugar n too hot
light	little sugar n not hot enough
st or cracked	much flour or flour strong little liquid roper mixing n too hot
gy	er baked ling in pans or with enough ilation pping before cool

ture	
se or heavy	little leavening much liquid much sugar much shortening n not hot enough
rse or irregular	much leavening little egg roper mixing
mbly	much leavening much shortening much sugar ng kind of flour roper mixing
gh	r too strong much flour little sugar or tening rmixing
r flavor	r-quality ingredients r storage or sanitation alanced formula

#### 4.5 Cake Improvers

A cake improver is a special enzyme based technology that enables you to improve a functionality of your batter or final cake. It acts as the missing piece of your cake puzzle that allows you to attain excellence.

The key functionalities of cake gel are:



1. Boost cake volume through improved aeration of cake batter, increased cake batter viscosity and preventing coalescence of air bubbles during batter floor time and during baking.
2. Provide quick whipping properties.
3. Allow the use of a single step process or 'all-in-method' in industrial cake production, in comparison to the conventional two-stage cake making method.
4. Improve cake batter stability through increased cake batter viscosity to extend batter floor time.
5. Improve emulsification of oil and water in cake batter.
6. Impart a uniform and fine crumb structure.
7. Improve softness of cake products and extend shelf life.

#### **4.6 Characteristics of a Good Cake**

Chief characteristics of cakes can be classified as internal and external characteristics. The external characteristics include volume, crust colour, symmetry of form and character of crust. The internal characteristics include grain, crumb colour and sensory parameters such as taste, aroma and texture.

##### External characteristics

- Volume: It depends on consumer preference. It should be well risen with slight convex top surface and should not appear too small or too large for its weight.
- Crust colour: Pleasing golden brown colour is desirable. 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 symmetrical appearance. Peaking, crack on top surface, low sides, sunken or high centre, burst, caved in bottom or uneven top are undesirable characteristics of cakes.
- Character of crust : Crust should be thin and tender. It should not be rubbery, sticky or over moist, too tender, tough or busy crust indicates poor quality of cakes.

##### Internal Characteristics

- Grain: The grain is the structure formed by the extended gluten strands including the area they surround. Grain will vary according to type of cake. Uniformity of the size of cells and thin cell walls are desirable qualities. Coarseness, thick cell wall, uneven size of grains, large holes and tunnels are indicative of poor grain. Grains should not be too open or too close.
- Colour of Crumb: It should be lively, lustrous and uniform colour. It should be free from any streaks or dark patches. Grey, non uniform, dark, light or dull colour crumb are undesirable.
- Aroma: Pleasant, rich, sweet and natural aroma is desired. Flat, misty, strong or sharp aroma is indicative of poor quality of cake.
- Taste: It should be pleasant, sweet and satisfying without any after taste or foreign taste. Salt and soda in excessive amounts affect the taste adversely.
- Texture: Texture denotes the pliability and smoothness of the crumb as felt by sense of touch. It depends on the physical condition of crumb and type of grain. A good texture is soft and velvety without weakness and should not be crumbly. Rough, harsh, too compact, lumpy or too loose texture is not