

CHAPTER 35: CAKE MIXING AND BAKING

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 Toughners - 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, 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 tougheners 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 volume. The top crust will be thick and greasy. An increase in fat must be balanced by an increase in the tougheners

(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.

Common Problems/Faults in Cakes

1. **Cakes rise and fall during baking:** An unbalanced formula is commonly responsible for this condition. Too much liquid or sugar will weaken the structure. Less flour or weak flour will not produce the structure required to support the leavening action. An excess of baking powder will produce excess gas that will weaken the structure and cause collapse. Too much aeration caused by over beating will also stretch the cell structure causing it to weaken. Excess fat may overburden the flour and egg structure causing the cake to rise initially and then collapse. Also, if during baking, the cake in the oven is shifted about before the it is fully set, it will tend to fall back.
2. **Cakes sink after baking:** Cakes that are rich in sugar and fat but not supported by sufficient flour and egg will tend to sink after baking. Excess moisture in the in the cake may cause shrinkage. Too rapid cooling of freshly baked cakes can also cause shrinkage.
3. **Cakes have Peaks:** Peaks are often caused by too strong a flour. A high gluten content will ause the batter to become stringy and binding. Lack of liquid results in a firmer batter that does not expand evenly and peaks

are formed from the forced breakthrough of the expanding gas and steam.

4. *Fruits sink to the Bottom of the Cake:* A moderately strong flour must be used to make fruit cakes. There should be sufficient amount of gluten developed to hold the fruits in suspension. Some amount of extra gluten can be developed by mixing the batter well, after the addition of the flour. This will provide a structure that is strong enough to hold the fruits and the nuts. A weak flour will allow the fruits to sink to the bottom as the fat melts and liquifies and sugars are in a syrup form. Also, large pieces of fruits will settle as they are too large to be supported. Fruits which come in a sugar syrup must be drained properly. Excess liquid will act like a lubricant and allow the fruits to move rapidly through the batter during the baking process.

5. *Cakes crumble when sliced:* An open grain and a weak structure are the primary cause for cakes getting crumbly. It may be due to over creaming, excess shortening or sugar or even improper mixing. A weak structure is caused because of a weak flour or lack of the flour - egg combination. An excess of sugar creates a very open grain that will not hold the fruits. Fruits that are not soaked and are dry will absorb the moisture and make the cake crumble.

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