

Lecture Six

Butter and Ice cream processing

(Theoretical part)

College : Agricultural Engineering Sciences

Department: Food Technology

Stage: Fourth stage (4)

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Butter Yield & Over run

Butter Yield: is the difference between the amount of fat in the cream and the amount of butter produced. It can be defined as the amount of butter that yields a certain amount of fat.

The basis of the structure of the butter is the amount of fat in the cream and then other materials such as water, table salt, milk proteins and the remains of the shells of fatty granules, and the standard specification for butter allows the presence of 80% of fat in the butter cake (as a minimum). And as it was. Fat is the most expensive compounds found in butter, the manufacturer is keen not to increase it in butter mold for the minimum allowable, any increase in the proportion of fat in the mold, for example, if the fact that butter Htoa on (83%) fat These (3%), its loss and loss of fat because The factory could turn it into another amount of butter to add to the new batch.

If we assume that we have 100 kg of cream and want to manufacture butter from it so that the proportion of fat in the mold is 80%, then the resulting amount of butter is

$$\begin{array}{r}
 100 \quad 80 \\
 X \quad 100 \\
 \hline
 \end{array}
 \quad X = \frac{100 \times 100}{80} = 125 \text{ Kg butter}$$

That is, the amount of 100 kg of fat produces for us 125 kg of butter, and the increase here (25 kg of water and other materials)

That is, the amount of butter produced can be calculated on the basis of the amount of fat and according to the following equation

$$\text{The amount of butter} = \text{the amount of fat} \times \frac{100}{\text{The percentage of fat in butter}}$$

$$\text{It is called} \quad \frac{100}{\text{The percentage of fat in butter}}$$

By the conversion factor, which results in a decimal fraction, which varies according to the percentage of fat in the butter) 1.25 If the percentage of fat in the butter is 80%), (1.23% if the proportion of fat in the butter is 81%), and 1.25% if the percentage of fat in the butter is 80%) ... and so on. Assuming that the amount of butter produced was in proportion to fat 83% instead of 80%, and in the same mathematical manner above, it will be quantitative The resulting butter is 120.5 kg, and this means that the extra amount is only 20.5 kg, and this means that we lost 3.5 kg of butter by marana if we produced it. With 80% fat, if it becomes available with us, an internal flow of 3 kg of fat

As we said, the resulting butter contains, in addition to the fat, other compounds such as water, salt, and residue of whey, and therefore the use of a quantity of fat in the manufacture of butter leads to the production of a higher amount of butter than the amount of fat entering into manufacturing, and this increase is what is known as over run (The butter containing 80 grams of fat has a weight of 100 grams because it contains components other than fat, such as water and salt. The difference between 80 and 100 is what is called butter refining. The sifting, the more fat In the butter mold, the butter is less than 80%, meaning that the butter mold has become more than 80% fat (the permissible limit within the butter standard), which means a loss for the manufacturer.

$$\text{Yield\%} = \frac{100 - \text{Fat percentage in butter} \times 100}{\text{Fat percentage in butter}}$$

From here it becomes clear that the high fat in the butter is a loss of fat that goes to the consumer, and the factory loses it, and accordingly, this butter is called an internal loss) that is, the fat was lost inside the butter mold, meaning that the fat remains in the mold, but it is not calculated as butter and it was possible for the maker to increase the amount of butter If only he used that amount of fat)

But if what happened was a loss of fat during manufacturing processes, for example during washing or service operations, or if the shaking process was not so efficient that we lost part of the fat with the milk shaking. Then this loss is known as external loss. In short, external loss is

The amount of fat that has not turned into butter or it is that which has turned into butter but is lost during the manufacturing processes, and this matter is very likely and natural during the manufacturing process, but the excellent factory is the one that works to reduce this amount to the least possible.

When we say an external loss, when calculating the butter clearance, we must calculate it on the basis of the amount of fat after the loss and not the amount of fat received, then after that the resulting amount of butter is calculated according to the previous equations.

Example: A factory received 85 kg of fat and the percentage of loss during the manufacturing process was 1 kg. This means that the calculations will be based on 84 kg of fat. If we say that the factory produced 80% butter, this means that the amount of butter produced is.

The resulting amount of butter = $85 - 1 \times (100/80) = 105$ kg of butter

Of course, all the previous laws are used if we have a known amount of fat, but if we have a specific amount of fat in the amount of cream or milk, then we must first extract the amount of fat, that is, convert the percentage to butter according to the following equation:

The amount of milk or cream x the percentage of its fat = the amount of butter x the percentage of fat in it

If we take into account the loss of fat in the shaking milk, the law becomes as follows:

The amount of milk or cream (the percentage of its fat - the percentage of fat in the butter milk) = the amount of butter (the percentage of fat in the butter - the percentage of fat in the butter milk)

As for the butter **run over**, what is meant is the difference between the amount of butter and the amount of fat, and an account is made for every 100 kg of fat, and from here the factory can calculate the profit and loss accounts in the manufacturing process. That is, it is a relationship

between the quantity of fat purchased, its price, the quantity of butter produced and its price, and from here profit can be calculated

Or lab losses.

Education is of two types:

The first: is the **theoretical over run:** it is what the factory expects when starting the manufacturing process, i.e., the expected production amount from the amount of materials included in the manufacturing process. The method of calculating the theoretical rent is done by the following equation:

$$\text{Over run} = \frac{100\text{-gram butter} - \text{The amount of fat in 100 g of butter}}{\text{The amount of fat in 100 g of butter}} \times 100$$

If we assume that the expected percentage of fat in the resulting butter is (80)%, then the profit will be (1.25), where the decimal fraction (0.25) represents the rent of this type of butter, while the number 1 represents the amount of fat. This means that every 1 kilogram of fat will give us a yield of 250 grams, meaning that 100 kilograms of fat will become 125 kilograms of butter.

The second: It is the **factory over run**, the reality of the situation, or the actual amount of butter that was collected after the completion of the manufacturing process, and it is always less than the theoretical rent calculated.