

Lecture Five

Butter and Ice cream processing

(Theoretical part)

College : Agricultural Engineering Sciences

Department: Food Technology

Stage: Fourth stage (4)

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working the butter: the purpose of working butter is:

- 1-** He is getting rid of the butter from the remaining water with serum milk and the residue of water wash butter so that the water is in the butter . When the process ends not exceeding 16%.
- 2-** The move is also aimed at increasing salt homogeneity to butter in the previous step.
- 3-** The increased clumping and coalescence of the butter mass, which leads to an improvement in its consistency and a homogeneous distribution of the water inside the butter pan.
- 4-** Increasing the ability of butter to preserve by reducing the activity of micro-organisms in the butter, because after this stage the water becomes unavailable for bacteria to grow as it is dispersed between the scattered fat grains and becomes surrounded by them.

It can be said that the operation of the butter service is three stages:

The first phase after the laundry water is placed from the duration, where the danger is slowly rotated and for a period of time with open dump faucet open, this stage may take about 10 - 5 minutes and end with and ended with the exit of water through the tap.

The second phase: The undertaking and the closing of the discharge faucet and then restarting the duration, but faster than the first step, at this stage the water distribution is smoothed between the collected fat mass so that the butter appears dryly with no water drops on butter . At the end of this stage, a sample of butter is taken in the danger to the laboratory to crack down the moisture in the butter mold. If the amount of moisture in the mold is higher than the quantity Required to run by the same previous ways to remove another amount of water. **If** the amount of humidity in the butter is less than the required quantity; For example, if the amount of moisture is estimated in butter 12% and the required moisture amount is 16%

It has to add water to butter, according to the following law

$$\text{Amount of water Kg or L} = \frac{\text{Amount of butter prospective} \times (\text{Required ratio water} - \text{ratio water})}{100 - \text{Ratio water found in butter}}$$

After adding the water, the die closes and returns for a period of time for water distribution.

Packaging: It is the last step in the manufacturing steps of butter and in which butter is formed and packed is done with weights ranges from

(50 – 100) grams, sometimes it may be permitted for industrial purposes with large blocks up to (5) kg.

Start a step after the output of the butter from the dance where he leaves in refrigerators for 24 hours before forming and packaging where it is hardened

The butter in preparation for the process of cutting and packaging) because if the butter is encapsulated directly from the duration will be Not solid and may melt during the shear and packaging phase)

Usually, special casings are used for fertilization to be made up of several layers in order to nostalgia during the following stages of transport and storage:

1. The first layer shall be from the **waxy paper**, which prevents the adhesion of butter. During the storage period.

2. Aluminum Foil in order to exhibit the hardness of the package and the possibility of printing on it

The means of fertilization should be available in the following conditions:

1. Do not allow fats for fat especially during storage and during the confirmation.

2. Low moisture permeability to prevent dry fat

3. Low-access air and light to prevent or reduce oxidation of fat in the butter mold.

4. Easy to form and place the packaging machine.

5. With attractive forms.

6. The price is appropriate.

Continuous methods of making butter

It dates back to 1889 and the counting is designed from the devices and ways, but few are successful Which has spread to be used in a hand counting.

These methods are divided into two parts:

section One:

The concentrated sorting method where fat is first concentrated in cream to 80% or more where the proportion of fat is similar to it in the butter.

A middle where the granules and the rest of the serum components are spread, leading to the appearance of butter.

The most important ways of this section: **a-Alfa- Laval Process Swedish**

b-the Cherry Burelle Process c- New Way Process.

Section II:

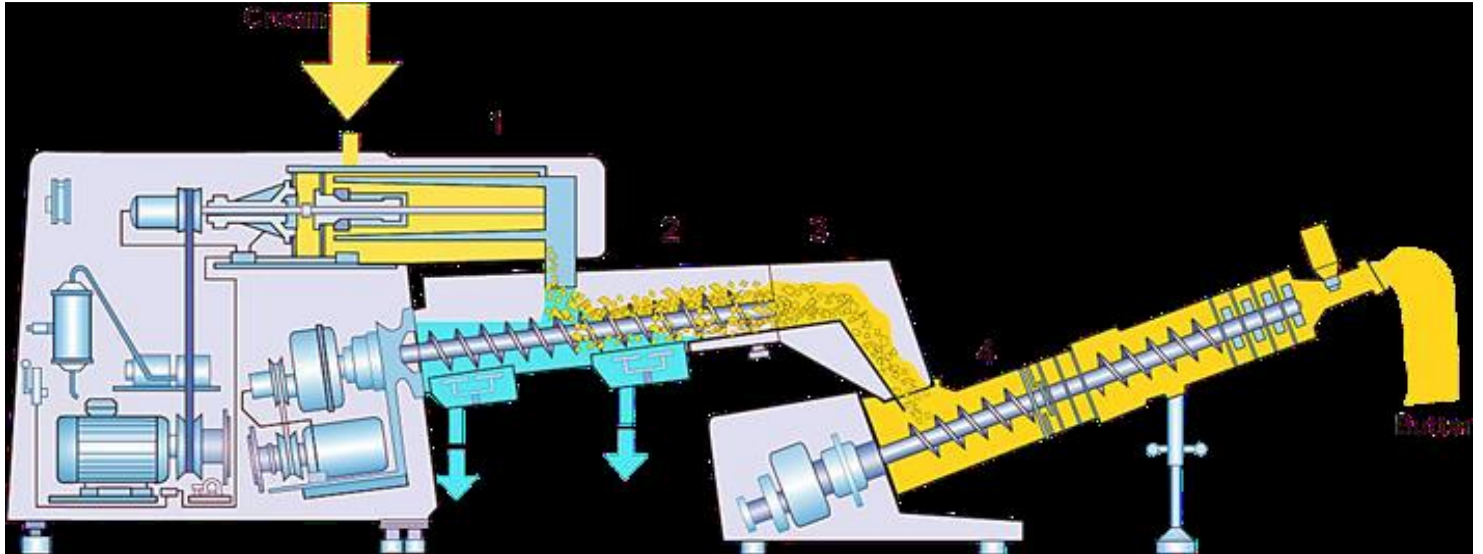
Shake fast: The devices of this section are designed on the basis of a quick sign of ordinary cream (35-40)% (After cooling and the vegetation is very high and the most important ways of this section is **a-fritz prdess German**

b-Senn Presets Sweet.

Alfa-Laval: The milk is heated (45 - 49) °C In principle and then surrounded by an arbitrator to a cream (25 -35)% Then the battle under the spice or using a flash pasteurization device or with Plates HTST at (95)°C Cream Cream to (54-57)°C is re-sorted with a special secret bar controls to give a fat in the cream similar to those required in the butter. The strength of the cream in this is a rubber condition where he pays a special pump to the compensation of the cream into a butter and called Trans mutator and then cool the cream consists of three converter Cylinders made from Double Jackets ST. The diameter of each of them is one footstep ,Tape is attached to it

The cooling solution is pushed through the cylinders through the walls of temperature (- 5, - 4)) and the direction is the same as the entry of cream and the cream temperature in the first cylinder when its exit 20 and the second is converted the center (heart of the emulsification) from(F / W) to(W / F)and leaves her butter on heat (11-9) °C the viscosity is tightened (butter milk comes out from the second cylinder). Either in the third folded butter is simple and considered these The stage serves as a service stage (14-11) °C until it comes out of the case of half a liquid and is filled in SAD or packages as desired and sends

to bands for hand to complete the sclerosis. The capacity of the device is about 1/3 tons per hour.



2-The Cherry Burrelle Process: Depends on obtaining a cream in two phases produces medium cream and the second to more than 80%, including a severe striking process by special strikes, impacting fats Fatty granules and liberating fat and a surprise cooling of output consists of butter mass. The steps are:

1. Milk has been produced to cream (40- 30%)

2. Heat the cream at a heat exchanger to 60 and then conveys into a basin containing rackets spinning speeds at (375) rpm (RPM) fits fat.

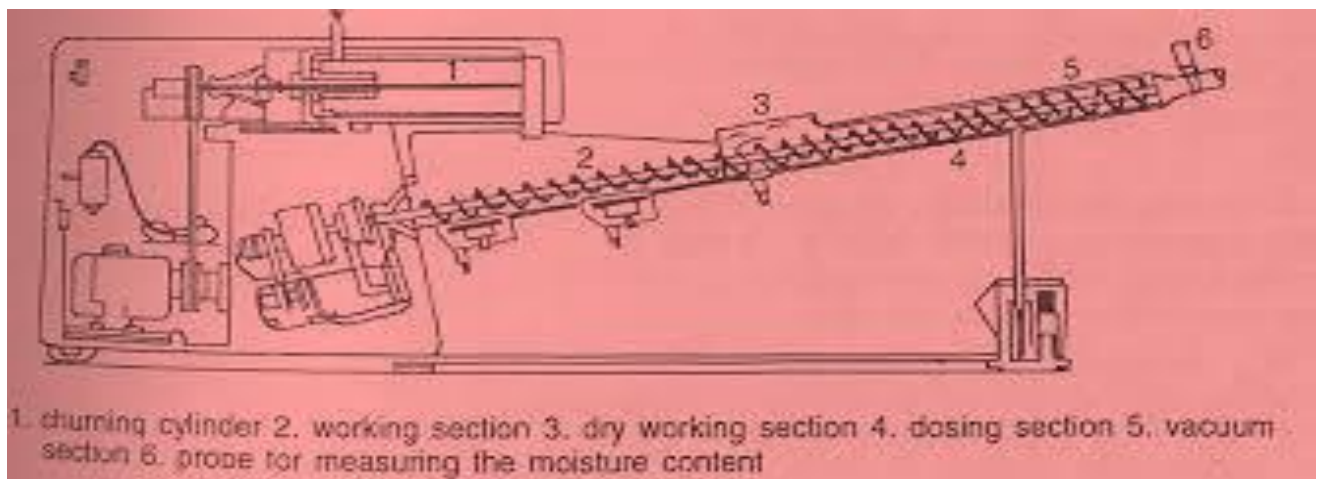
3. Re-sorting for a liquid for built contains (86-90) % fat and due to high fatty and liberalization is a golden liquid

Color so this method is called Golden Flow.

4. Pasteurization is under pressure to get rid of odors in a device called vacreator

5. The hand to (40 - 38) º and then transferred to tanks adjusted acidity and humidity (17 - 16) % then add salt (2-2.5) %First and color when needed.

6. The sudden limitation of the Chiller Worker is similar to the freezing device Ice Cream to reduce temperature to (8 º). The fat is crystallized



Fritz method: is invented by Fritz in 1939 in Germany. Sort by milk to a cream (45-40%). Then Pasteurization (95) then cooling (10-6) and assembling the cream in the reservoirs attached to the system. Then pump the cylinder into the cylinder (25.5 cm and diameter 25.5 cm) and double walls passed by cold water and there is inside the cylinder four rackets spread cream on the internal wall of the cylinder is a 1.2 mm thin membrane membrane. The room has two rhythms, which are reversed at 40 rpm and each 46 cm and diameter 15 cm and hugs to the top they raise the butter and press through a square slot that can be

controlled and this aperture is part of the service process and then part of the process the butter passes to two other lengths of 15 cm carries out butter. In this way there are three ways to control the fatty foam:

The percentage of fat is in cream.

The speed of the entity within the device is.

The heat temperature is.

The power of the device (500 – 2000) kg / h of its defects lack of possibility of high cream in acidity.

2- Swiss Senn Method: The CO₂ pump in the cream is a foam that helps in lack of emulsion stability fat fatty tank contains a 3000 RPM mixer with a CO₂ pump under 3 pressure shows butter granules

(0.5-2.0) Minute wash with cold water and solidify a spiral and convey the output butter to the slaughter and packaging

- The productivity is. (500 - 800) KG / HR and need one factor.

advantages of continuous methods in butter production:

- 1. Less chance of contamination with micro-organisms because the process is carried out under closed conditions.**
- 2. The accuracy of moisture distribution.**
- 3. Easy control of chemical installation for butter.**
- 4. Does not make many workforces.**
- 5. It does not occupy large areas in the lab.**
- 6. Providing energy and energy used.**
- 7. Lack of loss in fat.**

disadvantages of continuous methodes in butter production:

are in the **hardness** of the output **butter** so the cream needs prior transaction before turning it into a butter.