**Experiment No 12: Preparation of Butter**

**Objectives:**

1. To study different types of churns.

2. Churning principles.

3. Washing, working and packaging and storage of butter.

4. To judge the quality of butter.

**Introduction:**

Butter is defined is a fat concentrate product obtained by churning, cream, gathering fat into a compact mass and working it. Butter is made exclusively from milk or cream with or without common salt and coloring matter and contains not less than 80% fat. In butter, fat is present in continuous phase and water is present in dispersed phase. This phenomenon is known as phase inversion.

The essential feature of churning involves destabilization of lipid phase emulsion by means of mechanical agitation. Churning is initiated by agitation and the incorporation of numerous small air bubbles. Partially denatured fat globules gather at the fat/plasms inter face, where they form, small clumps. A portion of this hydrophilic fat spreads over the surface of air bubbles causing them to collapse.

Prior to working of butter granules in the churn, approximately 80% of the fat phase exists as globular fat. As the butter granules are worked more and more fat globules are crushed causing the release of liquid fat. This free fat constitutes the continuous phase. Fat globules and finely dispersed droplets of the aqueous. Phase represent the dispersed phase**.**

**Precautions:**

1. Maintain proper temperature daring churning to obtain proper grain size.

2. Over ripening of cream should be avoided.

3. End to end butter churn should be used for better results.

4. Butter should be prepared by adopting hygienic conditions.

**Material required:**

1. Ripened cream

2. Chilled and Luke warm water

3. Annatto color. It is extracted from the seeds of Bixa Orellana.

**Apparatus:**

1. End to end butter churn

2. Cream ladle

3. Butter scoop

4. Diary floating thermometer

5. Scotch hand pair

6. Butter worker.

7. Weighing balance

8. Butter print**.** evenly in the milk. The smaller globules will not rise to form cream during normal storage conditions.

**Procedure:**

**End to end butter churn:**

It is cylindrical vessel prepared from oak wood plants. The vessel may be balanced on central axis or diagonal axis, around which it revolves. Because of the end-to-end revolution the cream inside the vessel (not called as churn) receives agitation during butter preparation. The butter churn is resolved by a handle. It has a glass window to observe the stage of butter formation inside the vessel. It is provided with a value on one side and through which gasses formed during churning process could be expelled out of the vessel. The other types of churns are a) swinging churn b) Rotating churn and butter worker c) Metallic churn.

**Preparing the churn:**

The wooden churn should be filled with cold water for soaking for 24 hours. Soaking leads to close up the slits and it became leak proof. The water is then drained out to give thorough washing to churn, so that any odors present in the wooden material are removed. After adequate soaking the churn should be thoroughly scrubbed with hot water. Persistent odor in the churn is removed by the use of chlorine solution. Washed, repeatedly with hot water. The churn should be scrubbed with common salt using a brush. The salt acts as a wood preservative.

**Preparing cream for churning:**

Weight the required quantity of ripened cream. Note its temperature the temperature of cream is adjusted between 9 to 11 0 C (48-54 0 F) depending upon the season. This is called as churning temperature. The churning temperature in summer is at the lower range and little higher in winter in the above range. If the temperature is low, the fat globules become harder and coal eases each other with difficulty resulting in the delayed churning. If higher temperature is used the butter produced will be soft, greasy, but the churning will be quick. The temperature is adjusted by adding clean chilled water or ice water (45 0 F) to the cream depending upon the demand of season. While adding chilled water the cream is slowly agitated with cream ladle to break clots and to make the consistency like honey. If needed, the scotch hand pair is used to break the cream clots.

**Churning of Cream:**

Transfer the prepared cream to the churn. The churn filled up to half of its volume otherwise the churning process will be prolonged. The churn is ventilated frequently by opening the value, this helps to escape the gasses from the churn. Fast churning leads to form small grains of butter. Hence uniform churning is required. The glass observing window becomes yellowish or whitish when it comes in contact with cream. The clearance of glass indicates the formation of granules. At this stage small butter granules are formed. Add some quantity of chilled water having temperature about 45 0 F. This is called as break water. It brings down the temperature of cream, which has increased due to the friction and outside temperature. Continue the churning till fat globules attain the size of pea which is observed through the glass window.

**Washing, salting and working of butter:**

As soon as the churning is completed, the butter milk is drained off from the bottom of the churn with the help of butter scoop. Add equal quantity of wash water whose temperature is the same as that of butter milk and give few revolting’s. Take out the water. Two washings are usually sufficient to remove curd content and extra acidity of the mass. The butter is spread over the butter worker, salt is sprinkled over the butter to prolong its keeping quality and improve its flavor. Easily soluble, fine-grained worker has wooden corrugated roller. The object of working is to a) remove extra water b) to render the butter compact and c) to distribute the salt evenly.

Packing of butter:

When butter is ready is molded in various shapes. Butter is filled in special butter prints with butter knife. Food grade quality butter paper is used for packing. Packing should be attractive. Butter should then be kept in refrigerator for hardening.

Over run-in butter:

The weight of butte obtained from a given lot of cream exceeds the amount of fat in the cream. That amount of butter which exceeds the fat present in cream is called over run. This is because in addition to fat the butter contains some amount of water. Salt and curd.

 B —– F

Formula % OR = ——————— x 100

 F

Where.

OR = Over run-in butter (Usually expressed as %)

B= Butter made (kg)

F= Fat in churn (kg)

Judging the quality of butter: Butter is graded according to its flavor body, color etc. A standard score card is used.

Score card for butter