

The manipulation of the cream from separator to churn comprises: cooling, tempering, use of starters etc.

(a) **Cooling.** Directly the cream leaves the separator it is run over a cream cooler (in warm weather), inside which is placed (or in some coolers) flows cold and iced water and outside which flows the cream. As above stated the whole milk is raised to a temperature of 90° F. and raised still higher during the actual process of separating. When the cream reaches the cooler it is 63° to 67° F. Around the cream vat iced water is kept in warm weather.

If the cream is to be churned the next day, a temperature of 56° or 58° F is required when all the cream is through the separator. If it is not to be churned for two days after, a temperature of 55° F should be reached.

(b) **Tempering:** The ice, if any, is taken out of the water surrounding the vat and the water heated to such a degree to allow the cream to ripen at the degree it is set at. e. g. The cream is cooled to 55° and it is to be set at 63° subtract 55 from 63, the result being 8; add on 8 to 63 and the result is 71; 71° F is the temperature to set the cream (Usharming! Ed.)

In warm weather, the water will be warm enough to melt the ice without being heated by steam. To set the cream then, the ice taken out when the cream is about 50° F.

(c) **The use of starters.** There are several different kinds of starters: viz. B. 41, butter milk from the previous day's churning, Hansen's Ferment, sour skim-milk, ripened cream of the previous day, whole milk of a new calved cow, tempered and cooled to a certain temperature. These should be put into the cream about 20 hours before the cream is to be churned. If the butter is off flavour, neither the ripened cream nor the buttermilk of the previous day should be used as a starter, as they only continue the bad flavour. These all assist to hasten the ripening and the action of the lactic acid in the cream.

(d) **Straining.** The object of straining is to prevent any lumps of casein or curd getting into the churn, and to aerate the cream as it flows from the vat to the churn.

(e) **The acidity of ripened cream** should be about 36 c. c. of sweet cream 7 c. c. (119) 1 c. c. - 0.17. The acidity (1) is subject, nevertheless, to variation according to the quality of milk supplied.

(f) **Among other things to be mentioned in connection with the manipulation of the cream are these.** Never stir or touch the cream with the hand or person. It is not clean: the heat of the body is higher than that of the cream, and will therefore heat the cream. Provide a wooden paddle 18 to 20 inches long for stirring the cream and a dairy floating thermometer for finding the temperature of the cream.

The old way was to dip a finger in to the cream to see if it was cool or hot enough; but, since there are thermometers, they should be used, for they are exact, if made by reliable manufacturers and are the cleanest way of testing heat or cold.

Another item: stir in the frothy cream that is made by the separator. A loss of butter is thereby prevented because this froth contains butter fat just as much as the rest of the cream.

Again; attention must be drawn to the fact that no creamery, dairy, or cheesery will succeed if utensils, churn, butterworker, vats, etc, are not kept free from dirt. If things are dirty, smells arise and harbour in the cream, and so in the butter, and consequently poor prices are realized in the market.

The sooner the utensils are washed and scrubbed after being used, the easier will they be to wash and cause less trouble to everybody in the building.

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(*) The acid referred to is lactic acid (4 c 3 d 6 o 3) and it is this that is the actual part that ripens the cream,