

Leaflet Y.

Principles of Farm Buttermaking.

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The Station receives many inquiries in regard to trouble in churning and poor flavor of butter. So many conditions may produce troubles of this kind that it is impossible in most cases to tell the the direct cause without personal inspection. We can diagnose the trouble only in a general way. The making of butter is an art that can not be acquired from printed instructions, but possibly the butter maker who has a good general knowledge of the business and is a good observer may avoid some troubles by careful study of methods that are usually successful in securing uniform, well-flavored butter.

The making of good dairy products **Cleanliness** must begin with healthy cows, **essential.** intelligently fed and housed in light, well ventilated stables. High grade dairy products can be produced only under the best of sanitary conditions. All utensils and everything that comes in contact with the milk must be kept scrupulously clean. That "cleanliness is next to godliness" is especially true in connection with the dairy.

The centrifugal separator will give **Handling** the most economical and satisfactory results if enough cows are **the cream.** kept to warrant its purchase. Any of the standard makes will do good work if handled according to directions. After separating, the cream should immediately be cooled. It should be brought down to a temperature of 50° F. or below as soon as possible, in order to check fermentation, and held at that tempera-

ture until a sufficient quantity for churning is secured. This should not be over three days. Fresh cream should not be mixed with the older, cold cream until cooled; and sweet cream should never be added to sour cream before churning. Sour cream churns in less time than sweet cream, so that much fat will be lost in the buttermilk when the two are churned together. If a separator is not used, the cold-setting method is next best. This gives very good results if the can of milk is submerged in ice water immediately after milking, while still warm, and enough ice used to reduce the temperature to 45° F. and hold it there for ten hours. The cream from this method will be thinner and require churning at a higher temperature than separator cream. Aside from this the cream should be handled the same as separator cream.

Ripening and starters. The ripening of the cream is the next step. This consists in the development of certain forms of bacteria that change the milk sugar over to lactic acid and induce other changes that give the characteristic odor and flavor of sour cream. Some buttermakers depend on natural souring; but if the change is not as rapid as it should be the chances are that the delicate flavor and odor that we prize in good butter will be lost and the unpleasant taste of old cream take its place. If this unpleasant flavor develops it can not be removed or hidden by any method of subsequent handling. For this reason it is always wise to use a lactic-acid starter. A quite common method on the farm is

to use buttermilk from the last churning. This may be all right if the buttermilk is kept free from undesirable fermentations; but this is not easy to do. If there is any tendency toward bad flavors, using the buttermilk in the cream will intensify it; and the chances are strong that the butter will be unsatisfactory in flavor to high class customers who are willing to accept only the best.

The safest way is to make a sour-milk starter. For this it is preferable to take the milk from a fresh cow, using every care to keep it free from any contamination. Set this in a warm place at about 70° F. and cover with a clean cloth. After twenty-four to thirty-six hours this milk should be thick, curdled by the lactic acid. Upon examination, if it does not show any other flavor except clean acid taste and smell, it may be used in the cream as a starter. By keeping a small quantity of this mother starter at a temperature below 50° F. it may be used to prepare starter for several churnings. As long as it can be kept so that no other flavor develops except that of clean lactic acid it is safe to use.

It is some trouble to prepare and keep a good home-made starter, so many buttermakers prefer to purchase a commercial starter. Of these there are several good ones in the market. Directions for use accompany the packages of these starters. When the cream has been kept uniformly cold and sweet and enough is ready for churning, it should be put together in a vat or can where a uniform temperature of 70° F. in

winter and 65° F. in summer can be kept. Add 10 per ct. of the sour milk starter and stir thoroughly at once and at intervals in order to insure even ripening. After standing from 8 to 12 hours, depending on temperature, the cream should become thick and show gloss on the surface when stirred. It should then be cooled back to the churning temperature, which will depend upon the richness of the cream. Heavy cream testing over 30 per ct. can be churned very much colder than thin cream—in summer as low as 50° or 52° F. and in winter 58° to 60°, while the thin cream may require 58° to 60° F. in summer and 61° to 66° F. in winter. When churned at as low a temperature as possible the quality of the butter will be better, other things being equal.

Use a churn of the barrel type and
Churning. just before churning scald it thoroughly with boiling water and then rinse with cold water. If the worker, ladles and all wooden utensils are treated in this way they will be fresh and sweet and the butter will not adhere to them. The cream should be put through a fine wire strainer to catch any lumps of coagulated milk that might make white specks in the butter. The cream should not quite half fill the churn and the motion should give the greatest amount of concussion possible. A speed of 50 turns to the minute will ordinarily give the best results. When the butter has collected in granules about the size of wheat kernels or a little larger, stop the churn and draw off the buttermilk. Then add wash water at a tempera-

ture of about 2° F. colder than the buttermilk ; give the churn a few turns and allow to stand a short time, then draw off water. This process should be repeated once or twice until the wash water drains off clear. This careful washing and rinsing when the butter is in small granules does much to prevent mottles or white streaks. If for any reason the butter has come soft, colder water should be used for washing, in order to harden it.

In salting, the amount used must **Working** depend on your market. It may **the butter.** vary from $\frac{1}{2}$ oz. to 1 oz. to the pound, to suit the taste of your customer. After the water is drained off the granulated butter, sprinkle the salt over it and mix it through ; then allow to stand for a short time until the salt is dissolved. The butter should then be placed on or in the butter worker and worked until the salt is evenly mixed, all surplus water pressed out, and the butter assumes a waxy condition. Do not overwork. The firmness of the butter will determine how long it should be worked. It is a good practice to let the butter stand in a cool place about twenty minutes when it is about half worked. This gives the salt additional time to dissolve and lessens the liability of mottles in the finished butter.

This trouble is more frequent in **Butter will** the fall of the year, especially with **not come.** cows that have been in milk a long time. The milk and cream are more viscous and the globules of fat harder, making them slower to unite into granules of butter.

The best remedy is to add some fresh cows to the herd. If this can not be done, the buttermaker must take especial care not to keep cream too long and to ripen it carefully, with special effort to maintain the correct temperatures. Thin cream is usually more difficult to churn. It should contain over 20 per ct. of fat and is better to have 30 per ct. Too thick cream sometimes sticks to the side of the churn and will not come from lack of concussion. Water or skim milk of proper temperature may be added to overcome this.

Old over-ripe, thin cream that froths when churned and smells rank is difficult to churn, and when the butter does come it is seldom of passable quality. **Bad flavors.** Bad flavors may also come from leeks eaten by the cows in the spring or from rag weed in the fall. Flavors of this kind can not be removed from the butter or successfully covered up, but must be prevented by keeping the cows where they can not get these weeds. If the bad flavor comes from the food it can be detected when the cow is milked.

Flavors that come from bacterial action will not be detected until later when the fermentations the bacteria produce have had time to develop. The only way flavors of this class can be controlled is by thorough sterilization, by steam or boiling water, of all utensils with which the milk and cream come in contact and using extra care that everything connected with the dairy work is kept in the best possible sanitary

condition. Where only a little cream is produced small churnings must be the rule. Holding too long for a "good churning" is dangerous; for the most common cause of poor flavor in farmer's butter is allowing the cream to become stale before churning.

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