The Production, Care and Marketing of Cream in Montana

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INTRODUCTION

Dairying is fast becoming one of the principal branches of agriculture in Montana. Since the World War the production of creamery butter in this state has been trebled. Our natural conditions, especially in the irrigated sections are very favorable to the economical production of high grade butter.

But a large part of Montana's butter does not grade as high as it should and, hence does not command a satisfactory price on the markets of the Pacific coast and in the east, where it meets competition from butter from all parts of the United States and foreign countries. This lowers the price that is paid by the manufacturer for our butter fat. There is no known method whereby inferior cream can be made into high grade butter of good keeping quality. The quality of the finished product will depend upon the quality of cream that the producers deliver.

While inferior cream is given as the reason for most of our low grade butter, faulty handling of cream in the creamery is not uncommon. Cream also deteriorates while in transit on the railroad, or while being collected at the receiving station. In many cases the farmers have not been financially encouraged to produce a better quality of cream, due to the lack of an effective system of cream grading. Laws that regulate sanitary conditions at cream stations have, however, cut down the loss in these places to a great extent.

Because there is a great need for improvement of the quality of cream delivered to the creameries in this state, this circular is issued to suggest practical methods in producing and marketing better cream.
The Milker

The milker must be clean about his person in his wearing apparel, clean about his person, in his wearing apparel, and in his habits, for upon the milker rests most of the responsibility of producing a good, clean, wholesome product. He should always milk without wetting the teats. Naturally, he should be free from all transmittable diseases.

Figure 1—Note the covered milk pail and the type of stool used to carry the cloth for wiping the udder.

The Cows

It is quite important that the cows be free from tuberculosis and other diseases. Milk from diseased or infected udders should never be used. Disease organisms in the milk may not affect the flavor of the product, but are extremely dangerous to the health of the consumer.

The cows should be kept clean. The cleaning of the stables at least once a day, and the use of a liberal amount of straw for bedding, both keeps the cows clean and adds to their comfort. Before the cows are milked, the ud-
der and flanks should be wiped with a brush or cloth to remove the dust, straw or loose hair. A milk stool that is made with a pocket of some sort under the seat is convenient for carrying the brush or cloth. When the udder and flanks have become filthy, they should be washed and then wiped dry before milking. The clipping of the long hair from the udder and flanks helps in keeping the cows clean.

**The Barn**

To produce clean milk, it is necessary that the barn in which the cows are milked be constructed so that the cows may be kept clean and healthy. It is essential that there be sufficient light and ventilation to keep the air pure and fresh, and that there be good drainage. Well constructed gutters and stalls, made to fit the length of the animals, are big factors in the producing of clean milk. (For details on barn construction, write to the State College, Bozeman, for circulars.)

**Feeding The Cow**

The cow should receive only good, wholesome food. Dusty roughages and feeds with strong odors and flavors should be fed after milking. If the odors are bad, this feed should be limited in amount and fed out of doors. Farmers of Montana lose thousands of dollars each year because of weedy flavors in the butter. This is difficult to avoid since there are wild onions, fanweed and other such plants in the native pastures and sometimes in the hay crop. This condition is made worse where the grass is pastured too early in the spring, or where grazing is too close. This difficulty may be reduced by rotation of pastures and by keeping of stock off the pasture until the grass gets a good start. The carrying capacity of the pasture is also increased in this way.

Much of the strong pasture flavor of milk may be avoided by keeping the milking herd off the pasture two or three hours before milking time. Rye, sweet clover or a good grass mixture, will furnish an abundance of good pasture for the herd. Hay that contains strongly flavored weeds should not be used for the milking herd if better hay is available.
Milking Machines

Milking machines must be properly cleaned and scalded with hot water or steam after each milking. Between milkings, the rubber parts should be kept in a sterile solution of lime or chloride of lime. (A good commercial solution may be used, if desired). Clear water should be pumped through the machines before they are used. Before the machines are attached, the udder and teats should be cleaned and examined for any abnormal condition. It is essential that the machine, especially the rubber parts, be kept in good repair.

Utensils

Covered milk pails are recommended to prevent, as far as possible, the dust, hair and straw from falling into the milk during the milking process. All pails, cans and strainers should have soldered joints to give a smooth surface which will prevent accumulation of dirt and make cleaning easier.

Straining

The milk should be strained, immediately after milking, through a good cloth strainer, or preferably through a cotton filter strainer. A new cotton filter pad should be used at every milking period.

Separating

The separator should be located in a clean and well ventilated room that is free from odors and which has plenty of sunlight. The time for separating the milk should be as soon after milking as possible and before the animal heat has escaped from the milk. A separator will generally skim closer if the milk is warm. In addition, there is greater danger of contamination the longer milk is left standing before separating.
The separator should be washed after each separation. It is a common practice with many housewives to wash the separator once a day, only rinsing it after the evening milking and washing it after the morning milking. This practice lowers the quality of butter made from the cream and causes an excessive loss of fat in the skim milk.

The separator first should be rinsed well to remove the milky substance and slime. The rinsing should be done with cold or lukewarm water. Hot water would cause this milky substance and slime to harden and make the separator parts more difficult to wash. The separator parts should be washed in warm water that contains some washing compound such as Wyandotte, Gold Dust, etc., or with a little soap where these compounds are not available. After washing, the parts should be well rinsed in clean water. Then all parts may be sterilized with live steam or hot water. They should be dried in a well ventilated place.

Care of The Cream

Cream should always be cooled immediately after being separated, whether it is to be used for market cream, ice cream making or butter making. The quicker the heat is taken out of the cream, the better it will be. No cooling agency is better than water for the cooling of milk and cream. Water will take the heat out of cream forty-nine times faster than air of the same temperature. Since water is recommended for the cooling of cream in both summer and winter. It is important that some sort of cooling system should be arranged in connection with the farm water supply, or from a nearby stream or spring.

Warm cream never should be mixed with cold cream, but should be cooled before mixing. Morning cream should always be cooled before mix-

Figure 4—A cheap and serviceable cooling tank. A tank similar to this for a small dairy may be made from a barrel.
ing it with cream produced the previous evening.

To allow ventilation, the cream can should be covered with a fine screen, cheese cloth, or the lid placed on loosely.

Care of the Utensils

The milk pails, cans, and other utensils should be washed carefully and sterilized after each milking. The same care should

Figure 5—An inexpensive home made rack for drying and holding utensils
be taken as when washing the separator,—first rinsing off the milky substance with cold water and then washing in warm water that contains some washing powder. A wash cloth should never be used for utensils, a stiff bristle brush being recommended. After being washed, utensils should be rinsed and then sterilized with live steam or hot water. After sterilization they may be placed in a well ventilated place where they will dry. Sunlight can be used to dry utensils but care must be taken that dust does not blow into them. The drying of utensils is a feature in favor of sanitary milk production. Airing also is beneficial.

Delivery of Cream

Frequent delivery of cream means a better resulting product. The best butter is made where cream is kept sweet and delivered every day. However, in some localities it is not convenient to deliver cream so often, and it may be delivered every other day, or at least twice a week. Even though cream will remain sweet several days, an old flavor develops which is imparted to the butter. It sometimes is convenient for several farmers to cooperate in hauling cream. This is applicable, however, only where the farms are reasonably close together and where each farmer may deliver in his turn. In hauling cream over routes in the summer, it is always advisable to cover the cans with wet burlap or other suitable covering to protect them from the sun. The rise in temperature of cream while on the route increases the acidity and is therefore detrimental to the manufacture of first class butter.

Why Cream Tests Vary

1—Position of the cream or skim milk screw. It is evident that the changing of the cream or skim milk screw will materially affect the test of cream. However, this factor does not puzzle the farmer as much as other conditions which may cause a change in richness of cream.

2—Speed of the separator. Experiments show that the richness of the cream materially increases with the increase in speed of the separator, but that the volume of cream is less. Because the speed is often changed by the operator without his noticing and marked change, a speed indicator is recommended for the
Figure 6—Water heater and sterilizer. Capacity four ten-gallon cans or the equivalent. Suitable for dairies too large to wash and handle the utensils in the kitchen. For larger dairies, a steam boiler may be more desirable.

The body should be made of No. 14 or No. 16 gauge galvanized iron. However, the bottom may be made from heavier material. A furnace made of brick or an oil heater may be substituted for the stove. A sufficient amount of water is put into the tank and a fire built beneath. When the water is hot it is drawn off for washing, leaving in the tank only what remains below the level of the faucet. After the utensils are washed and rinsed, they are placed in the sterilizer and the lid closed. Sufficient steam is generated from the remaining water to sterilize the utensils in twenty minutes.

hand operated separator. Where a motor driven separator is used, the mechanism should be kept in good condition to insure uniform speed.

3—Temperature of the milk. Cold milk will produce richer cream, but in less volume, than warm milk. It is always well to separate as soon after milking as possible, when the temperature of the milk is about 90 degrees Fahrenheit or near the natural animal heat. Cold milk may result in excessive losses of fat in the skim milk even though the separator is designed to skim milk at a low temperature. From a sanitation standpoint, also, it is desirable to separate the milk as soon after milking as possible.

4—Richness of the milk. In general, rich milk means rich cream. This factor is generally overlooked by farmers when the cream test changes due to the seasons of the year and the subsequent variation in richness of milk obtained from the herd. Experiments show very clearly that changes in feed will only temporarily affect the richness of the milk.

5—Rate of milk inflow. The separator always should be operated with the supply tank opened to full capacity. Richer cream, but in less volume, is obtained when the rate of inflow is decreased. There is no reason for operating a separator on less than the normal inflow.

6—Vibration of the separator. Vibration decreases the richness of the cream. Furthermore, fat loss into the skim milk may be excessive, due to a vibrating bowl.

7—Dirty separator bowl. Slime in the separator bowl re-
roduces its diameter, thus reducing the centrifugal force exerted upon the milk and causing a thinner cream.

8—Water or Skim Milk Used to Flush the Bowl. An excessive amount of water or skim milk results in a thinner cream. The authors recommend one-half gallon of the warm skim milk, or one-half gallon of water a little warmer than the skim milk. The cream container may be left standing under the spout as long as any cream is being emitted. Boiling water never should be used to flush a separator as it cooks the slime on to the discs and makes the separator bowl difficult to clean.

Does Sour Cream Test More Than Sweet Cream?

There seems to be a mistaken idea that sour cream tests higher than sweet cream. There is no scientific proof for this belief. If cream is properly sampled and tested, the correct amount of fat will result, whether the cream is sweet or sour. Cream that is extremely sour is a little more difficult to sample. This may be the cause for slight errors in the test, but the chances are equal for a lower as well as for a higher test.

Cream Grading

It is a well known fact that the quality of cream, plus the skill of the butter maker, determines the quality of the butter. In other words, the butter can be of no higher quality than the cream from which it is made. A few cans of sour, bad flavored cream mixed with several cans of good cream will result in butter of the same grading as if made from all poor cream.

The grading of cream, and payment on a basis of quality, are the principal means by which the creameryman can improve the quality of butter. Cream grading, therefore, should be an inducement for producers to take better care of their cream and to deliver it to the creamery in the best possible condition so as to receive the highest market price for butter fat.

Important Points in the Production of Good Cream

1—Clean, healthy cows.
2—Clean, careful milkers.
3—Clean, well-lighted, and well-ventilated barns.
4—Suitable feeds, fed at the proper time.
5—Clean, sterile and well constructed utensils.
6—Milk strained and separated immediately after each milking.
7—Cream cooled immediately after separating.
8—Frequent delivery of cream.