



## PRODUCING PURE MILK

**W**ITH Canadian agricultural production a matter of vital concern, the quality of our milk and dairy products becomes of special importance. High quality products come only from high grade milk and cream. The quality of milk and cream depends almost entirely upon the care taken on the farm. The reputation of Canadian dairy products therefore rests primarily with the farmer.

Not only does a high quality product find a market more readily; it also returns more money to the farmer, either directly through the higher price offered, or indirectly by avoiding loss through spoilage or rejection of poor quality milk or cream. One bad can of milk or cream may lower the grade of an entire vat, causing considerable financial loss. It is, therefore, decidedly in the farmer's best interests to produce milk and cream of good quality.

The term "quality" in milk or cream includes a number of factors. Milk should be safe for human consumption—free from disease germs; have satisfactory food value as indicated by a proper content of butterfat and other milk constituents; be free from visible dirt, and from unpleasant odours or flavours, and it should keep sweet for a reasonable length of time.

Milk is a highly nutritious food for bacteria as well as for humans and domestic animals. Bacteria grow in milk, causing souring, bad flavours, ropiness, or other defects. The problem of the farmer is to prevent this spoilage by (1) keeping bacteria out of the milk, and (2) checking the growth of the few that do enter.

The three factors of outstanding importance are:—

1. **Clean, healthy cows.**
2. **Clean, sterilized utensils.**
3. **Prompt cooling and storage at a low temperature.**

### 1. CLEAN, HEALTHY COWS

Even where cows are groomed daily, the long hair on udders and flanks kept clipped, and the udders washed or wiped off before milking, some dust,

Published by Authority of HON. J. G. GARDINER, Minister of Agriculture, Ottawa.

AGRICULTURE CANADA

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dandruff, hair, etc., gets into the milk. When cows are filthy, considerable amounts of manure and dirt also enter. Manure and dirt contain harmful types of bacteria which cause such defects as "gassy" curd in cheesemaking, "stinker" cheese, "ropy" milk and cream, and various bad flavours. Again, if cows are infected with tuberculosis the germs of this disease may be present in the manure. If so, the milk may become contaminated with disease germs and be dangerous to human health.

Milk may come from a clean-looking cow and yet be unsafe. The germs causing tuberculosis or contagious abortion are often found in the milk from cows suffering from these diseases. Milk cows should be tested by a veterinarian at regular intervals to make sure they are free from these diseases. Udder trouble (garget, mastitis) due to bacterial infection changes the composition of the milk, often giving a salty taste. Such milk is generally undesirable either for use as bottled milk or for manufacturing into cheese, evaporated milk, etc. Occasionally garget, or mastitis, is due to infection of the udder with germs able to infect humans, coming from an open wound or sore, or from the throat of the milker. Unless such milk is pasteurized, persons drinking it may become infected with septic sore throat, scarlet fever, etc. Only healthy persons of cleanly habits should handle milk or cream.

Garget, or mastitis<sup>1</sup> of the chronic type is harder to diagnose or control than tuberculosis or contagious abortion. Where the milk from one quarter is watery, thick, bloody or contains clots or flakes, it is obviously unfit for human food. The more active infections can generally be detected by daily milking of the first few streams onto a fine mesh screen (strip cup) where flakes and clots are easily seen. The presence of hard areas in the udder tissue also points to mastitis infection. Cows giving these indications should be segregated and milked last, and disposed of as soon as possible.

## 2. CLEAN, STERILIZED UTENSILS

Dust carries bacteria and should be guarded against, but the utensils are the really important source of contamination. Bacteria are able to grow rapidly on the moist surfaces of strainers, pails, cans, etc., and millions of organisms may be picked up by the fresh milk at the next milking. Open seams, cracks, dried-on milk or "milk stone" make it much harder to clean utensils and to remove or kill bacteria, so that such defects greatly increase the chances for serious contamination.

First of all, then, utensils must be in sound condition, with smooth impermeable surfaces. Galvanized or wooden pails are unsuitable, and their use leads to trouble. Open seams and cracks should be filled with solder and rough surfaces smoothed off. Dried-on milk or "milk stone" should be scrubbed off with fine steel wool, and utensils kept free from this condition by being washed *at once* after using, before the milk has a chance to dry on. Rinse with cold or luke-warm water, then scrub all surfaces with a brush—a cloth won't do the job properly. Use washing soda or other cleanser in hot water. This is far better than soap and will rinse off more easily. A final rinse with clean hot water will warm up the metal so that it will dry out faster. Do

<sup>1</sup> See Spec. Circular No. 31. "Mastitis and Milk Production."

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not use a cloth which may only recontaminate the utensils, but place them upside down on a draining rack to dry. A screened rack exposed to the sun is very useful to hasten drying.

If the surfaces of the utensils dried immediately, there would be little further difficulty. Unfortunately, they often remain moist for long periods, and millions of bacteria grow in the moisture. A quick, simple and cheap method of killing these bacteria is to rinse the utensils with a hypochlorite solution just before the next milking. This is done as follows:—

1. Obtain a supply of hypochlorite, which is sold under various trade names in either liquid or powder form.

2. Add sufficient hypochlorite to a pailful of clean water to give a strength of 100 parts per million of chlorine. (Most products give directions on the package.)

3. After the solution has been mixed by stirring in the pail for fifteen seconds, pour into a second pail. Continue with other pails, shipping cans, etc., making sure the solution comes in contact with every surface the milk touches. Drain the utensils thoroughly before using them, and use the remainder of the solution for wiping off the cows' udders. Never save the solution to use again.

Good results can also be obtained by treating utensils with pressure steam, boiling water, etc., when these are available, but they are more expensive and less suitable for use on the average farm.

With the exception of poorly cared for milking machines, there is probably no other utensil which may add so many bacteria to milk as the shipping can. Even where shipping cans are washed and steamed at the plant or factory, some moisture generally remains in the can. When the can remains with the lid on in a warm place, millions of bacteria grow in the moisture and seed the milk at the next milking. Lids should be removed and cans placed upside down on a draining rack as soon as possible, so that they will dry out and bacterial growth will be checked. As a further precaution, if they are not dry and sweet-smelling at milking time, they should be rinsed with hypochlorite.

Cans used to carry skim-milk or whey back to the farm should be emptied and washed without delay, then treated as outlined above.

*Separators* require careful attention. If they are left unwashed, enormous numbers of bacteria grow in the residue in the bowl, etc., and are picked up by the cream at the next separating. This is one of the chief reasons for poor quality cream. For best results, the separator must be thoroughly washed and scalded after each run. Where for any reason this is not done, the keeping quality of the cream may be greatly improved by the following treatment: With the bowl turning at full speed, pour a pailful of hypochlorite solution into the supply tank. Brush the inside of the tank with this solution, then allow it to run through the machine. This will rinse out and destroy many bacteria and prevent them seeding the cream when the milk is run through the machine.

*Milking machines*, with their yards of rubber hose, need a different type of treatment. After the remaining milk has been flushed out by drawing cold or luke-warm water through under vacuum, the tubes are filled with a solution

which prevents bacteria from growing. A number of solutions have been tried, but the one giving best results in being both cheap and effective, consists of one-half of one per cent (0.5%) of common lye. The teat-cup clusters and long milk tubes are hung on a solution rack and filled with fresh solution after each milking. The lye solution is drained out before the next milking. It is not necessary to rinse the tubes to remove the remaining traces of lye solution.<sup>1</sup>

*Strainers*, especially cloth strainers, often do more harm than good. Straining will never undo the harm done by dirt getting into milk. It is better to *keep* dirt out than to try to *strain* it out. Single service cotton disk strainers, which are thrown away after use, are best. If cloth strainers are used, they must be rinsed out thoroughly, then washed in hot water and cleanser and rinsed in clean water. Then boil them for 15 minutes, wring out, and hang up to dry, preferably in the sunshine. Never use a strainer cloth unless it smells sweet and fresh—if it has a strong odour it should be replaced.

### 3. PROMPT COOLING

The temperature to which milk should be cooled will vary according to the use for which it is intended. Milk for a cheese-factory may be quite satisfactory when cooled to 60° or 65° F. Milk intended for the city milk trade may have to travel a hundred miles or more by train or truck. It therefore needs to be cooled to well below 50° F. to keep it in good condition.

Cooling should be started immediately. Even an hour's delay in starting the cooling means a definite loss of keeping quality.<sup>2</sup>

In addition to the "key" factors discussed, there are others which may affect the quality of milk. Every farmer knows that strong-smelling feeds should not be fed within two hours before milking, that manure should be removed and flies controlled as well as possible, that the stable should be clean, well lighted and ventilated and free from dust at milking, that milk should be removed from the stable promptly, etc. The point to be emphasized is that the three "key" factors should be considered first, and that care to prevent contamination from the minor sources is wasted unless at the same time contamination from the chief sources is prevented. A modern barn and up-to-date equipment make it easier to keep cows and utensils clean, but in themselves they are no guarantee that quality milk will be produced. Success will depend far more upon the individual producer and the methods he employs rather than upon the barn and dairy equipment he possesses.

### SUMMARY

The chief factors in the production of quality milk and cream are clean, healthy cows and milkers; sound utensils, properly cleaned and sterilized; and prompt and adequate cooling. Attention to these factors will prevent loss due to spoilage and will help raise the quality of Canadian dairy products.

<sup>1</sup> For details concerning this method, as well as for further information on the care of farm dairy utensils, send for Farmers' Bulletin 65.

<sup>2</sup> For a full discussion of milk cooling and directions for building insulated cooling tanks, see Bulletin No. 165, "Cooling Milk on the Farm."

*Division of Bacteriology and Dairy Research, Science Service,  
Dominion Department of Agriculture*