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SPECIAL PRECAUTIONS FOR PRODUCING PURE MILK IN HOT WEATHER.

Without doubt more filth is consumed in milk than in any other article of food. When taking a glass of it how frequently something is found at the bottom that is anything but inviting, speaking all too plainly of the methods of the dairyman.

But not all contamination is sediment and milk may be far from pure even though there be no foreign matter visible to the naked eye. Milk sours because of the presence of certain kinds of bacteria, which, acting upon the sugar of the milk, change it into lactic acid. Other organisms cause different changes, some offensive to taste and smell and a few dangerous to health. These bacteria are living organisms, though so extremely minute that 250 of them placed side by side are equal only to the thickness of ordinary writing paper. While thorough straining will remove all visible filth the finer particles and the bacteria will be washed through even the best of strainers.

Milk in the udder of a healthy cow is both pure and sterile, and if it could be drawn and handled without contamination would remain sweet and wholesome for an indefinite length of time. However, bacteria accumulate and multiply in such places as mud holes, manure heaps, seams of utensils not thoroughly cleansed, or where animal or vegetable matter not living is exposed to warmth and moisture. They are present in dirt and dust of every description,

and because of their great numbers and their wide diffusion no practical method has yet been devised by which milk may be drawn absolutely free from contamination with living germs. Yet they are unnecessarily numerous in milk as ordinarily drawn because it contains a thousand times more bacteria than that which may be obtained by using extreme care in regard to cleanliness. Hence the necessity of keeping everything about a dairy scrupulously clean, particularly in hot weather when conditions are especially favorable to bacterial growth. Clean milk will not only remain sweet longer, but as every one knows is a more wholesome food. If it were more fully realized that milk is a food and not simply a commercial commodity it would seem that dairymen would not allow so much filth to get into it. There are four principal ways by which milk becomes impure, and it is subjected to all of these before it leaves the stable.

THE COW.—This is the greatest source of contamination. When cows are kept in a filthy stable, as is frequently the case, they are often covered with dust at milking time, and their sides, flanks, bellies, and udders are sometimes plastered with manure. Cows in this condition cannot be milked without seriously contaminating the product. They should be kept clean at all times, and this is not so difficult to do if the mangers are properly arranged, the stalls of the right length, and a fair amount of bedding is used. All loose dirt should be brushed from the cows and the udders should be washed and wiped before milking.

THE STABLE.—After seeing cows crowded in certain dungeons of filth, which are called stables, containing only one or two small windows for light and ventilation, it is not surprising that so much impure milk is produced, and that diseases, especially tuberculosis, have gained a foot hold in so many herds. Often the sides of the stable and stalls are plastered with dung and not cleaned for years at a time. Frequently the old bedding in the stalls and the refuse in the mangers are not thoroughly removed from one year's end to another, leaving a quantity of dust to be repeatedly stirred up. If the cows are in the stable a greater part of the time, the dung should be removed at least twice a day, and the stable should be so arranged that there is an abundance of light and good ventilation, even in coldest weather, without causing a draft directly upon the animals. The floor and mangers should be cleaned frequently, and the walls and stalls scrubbed and whitewashed as often as they become dirty, but bedding and dry fodder should not be moved just previous to milking, as this makes a dust which settles into the milk carrying with it many bacteria. The air outside is usually

comparatively free from germs, and the better the ventilation the fewer germs will the stable air contain.

THE MILKER.—Many times the milker goes to his task after brushing horses or doing other dirty work, with his hands soiled and his clothing thickly covered with dust. Both soiled hands and dusty clothing are loaded with germs that injure milk. Before commencing to milk the milker should cleanse his hands and slip on a clean suit and cap which are used for no other purpose, and which may be easily washed. He should always milk with dry hands and never allow his hands to come in contact with the milk.

THE DAIRY UTENSILS.—These are often simply rinsed, the milk remaining in the seams and corners and more or less over the whole surface. If utensils in such condition are allowed to stand in a warm place bacteria will develop in them very rapidly, so that by the time of the next milking a good crop will be ready to take possession of the new milk. Often when utensils are washed they are not properly rinsed and the water together with the cloths used in washing and wiping are heavily loaded with bacteria, so that after the utensils are to all appearances clean they may even yet be covered with a layer of bacteria.

They should be rinsed first with cold or luke warm water, not hot, as this coagulates the albumen of the milk, causing it to adhere to the vessels. After rinsing they should be washed in hot water using some cleansing substance as soap or salsoda, again rinsed and sterilized thoroughly either by means of steam or boiling water and placed in the sun where dust cannot blow on them.

Fresh milk is easily removed, but if allowed to become dry or sour it is difficult to get off. If the utensils cannot be cleansed immediately after using, fill them with water to prevent drying.

Utensils should be heavily tinned, and should be discarded as soon as the tin is worn off; the fewer seams the better, and what there are should be filled with solder, leaving no place for dirt to collect. Wooden pails cannot be properly cleaned. Cans in which milk is hauled to the factory should be washed and sterilized at the factory and the skim milk returned in other vessels. Milk cans should not be tightly closed when put away, for the free circulation of air will keep them dry and prevent the growth of germs.

Pure milk can be obtained only from healthy cows fed on good wholesome food and supplied with pure water. Damaged food, such as rotten silage, mouldy hay, or musty grain, will give the milk or products made from it, a disagreeable taste; and any food that is likely to impart an odor to the milk, such as silage, turnips, etc., should be fed after milking and not before. As soon as the milk is

drawn it should be removed from the stable to protect it from dust and to prevent absorption of odors, and immediately strained through a sterilized cloth strainer.

These remarks apply to the production of all milk whether it is to be made into butter on the farm, hauled to a creamery or cheese factory, shipped to the city for direct consumption, or delivered to the consumer. If it is to be set at the farm for creaming, either with the shallow-pan or deep-setting system, it should be set at once. If it is to be used for any of the other purposes, it should be aerated and cooled immediately to 60° F., or below is possible, and held at this temperature until it reaches its destination. If milk is allowed to stand an hour before cooling, this shortens its keeping quality several hours, because the temperature of milk just after drawing is the best for the development of bacteria; while if the milk is cooled to 50° F. their development almost entirely ceases.

Troublesome as it is at all times to produce pure milk it is doubly difficult in hot weather when conditions are favorable for bacterial growth. To make good dairy products requires pure milk, and the question of how to obtain it will doubtless continue to trouble both the consumer and wide-awake butter and cheese maker until there is a revolution in the methods of the average dairyman.

ELEVEN DAIRY RULES.

1. Keep the cows clean and wash the udders before milking.
2. Keep the barn clean, with walls and ceilings whitewashed; have it well lighted, ventilated, and free from dust at milking time.
3. Always make a clean toilet before commencing to milk.
4. Keep utensils clean and bright.
5. Remove the milk from the stable as soon as drawn and strain and cool at once.
6. Never expose milk to bad odors.
7. Do not mix fresh warm milk with that which has been cooled.
8. Give the cows only good wholesome food and pure water.
9. Never add anything to milk to prevent its souring: Cleanliness and cold are the only preservatives needed.
10. Milk regularly, quickly, quietly and thoroughly.
11. Always treat the cows kindly and never excite them by loud talking, hard driving, or abuse of any kind.

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