

Do you know what happens to your milk?

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Have you ever stood in the barnyard with a younger brother or sister watching the milk truck pull out, and the little one asked, "What will happen to our milk?" Were you able to explain what happens to it, where it goes, or how long it would be before you could buy it in the store?

Much happens to milk before it reaches the store and is sold to consumers.

Because milk is such a fine food for all ages, especially the young, it must be a clean, disease-free product. The consumer takes milk for granted, and does not realize the health regulations connected with a half gallon in the store. Effective health regulations in every state protect the milk supply from disease.

Healthy cows produce healthful milk. Good sanitation practices insure that clean milk leaves the farm. Providing a clean product to the household is as much the dairyman's responsibility as it is the dairy's.

When the milk truck leaves your barnyard, it is heading for more farm pickups or for the dairy. If your farm is on Grade A, more than 50 per cent of your milk will be consumed in the fluid form.

Let us pretend that all of your milk will be used for fluid consumption. When the milk truck is loaded, it will head for the dairy where the milk will be unloaded into large storage tanks. If your farm has a bulk tank, you will be paid for the amount of milk that the driver read off of your dipstick and the milk fat samples that are collected daily. Can milk is weighed at the plant and sampled before being pooled with any other milk.

Before milk is put into the bottle, it must be clarified, a process that removes any sediment or foreign material which may have gotten into the milk. The clarifier operates on the principle of centrifugal force, throwing sediment, which is heavier than the milk, to the outside of the bowl. The foreign material adheres to the inside of the bowl cover or shell.

The clarifier is very much like the large separators, but it has only one outlet so that the cream is not separated. Milk is clarified when cold. It enters at the bottom of the bowl near the outer edge of the discs, traveling upward between the discs. Foreign materials are thrown out into the sediment space. The operation is carried out in the line, either between the receiving room and the storage tank, or between the storage tanks and the pasteurizing units.

The dairy wants to sell a uniform product from day to day and week to week. Since the milk coming into the plant may vary in milk fat seasonally, and sometimes daily, it is standardized. Your herd's milk will be mixed with other milk in large storage tanks. This combining of milk is, in a sense, the beginning of the standardization process.

Most states have standards which stipulate the minimum amount of milk fat allowed in milk sold in the stores. The percentages range from 3.0 to 3.8. Also, standards for the minimum amount of solids-not-fat and total milk solids prevail. These standards are in effect to protect the consumer from buying a watered-down product.

Since milk fat is worth money to the processor, the per cent fat in the sold is very close to that stipulated in the state code.

If the milk has a higher percent of butterfat than is needed to meet the state code or that normally bottled by the plant, skim milk is added to lower the milk fat content to near the standard. If the fat percent is too low in the raw milk, cream is added to raise it. Subjected to high temperatures...

Once the raw milk has been clarified and standardized, it is ready to pass into the high-temperature, short-time (HTST) pasteurizer. While passing through the system of tubes, the milk is subjected to a temperature of 161 degrees for 15 seconds. Older plants may still use the batch process of pasteurization. The milk is heated to 143 degrees for 30 minutes.

HTST pasteurization was adopted because of its many advantages:

1. Less floor space is required in the plant.
2. The original cost of equipment is lower than with the batch method.
3. The capacity of the equipment is greater and more easily expanded.
4. Labor can be better utilized because bottling can start almost as soon as pasteurization begins.
5. Equipment is more easily cleaned and sanitized by cleaned-in-place (CIP) procedures.

The equipment associated with the HTST pasteurization unit is very sophisticated to assure that every drop of milk is subjected to the right temperature for the correct length of time.

Before entering the HTST unit, the raw milk is fed into a constant level supply tank. From there it is pulled through a regenerator section by a positive pump with a carefully adjusted speed. The cold milk passed very closely to the warmed milk leaving the pasteurizer and is warmed from the heat given off by that milk. The milk leaving the pasteurizer is cooled by the ingoing milk.

The heater section is where the temperature is increased to 161 degrees. Hot water on the opposite side of the milk flow plates increases the temperature.

The holding tube of the HTST unit is of such diameter as to give a flow speed of one to two feet per second. The length of the tube is carefully adjusted so that the milk will take exactly 15 seconds to travel through it. The holding tube ends with a flow diversion valve which is very sensitive to heat. When the temperature of the milk is not high enough for pasteurization, the valve automatically reroutes the milk back through the pasteurizer again.

If the milk is up to pasteurization temperature, it flows to the regenerator section where it gives up heat to milk which has not yet entered the unit and is cooled by the raw milk, as was explained previously.

Vacuum equipment has been installed with the latest pasteurization equipment. Any volatile gases which might produce off-flavors in the milk are removed. A uniform product...

Milk is not a perfect emulsion of butterfat. The fat globules vary in size with an average of about five microns. (A micron is 0.000254 of an inch.) When milk is forced at pressures of 2,000 to 5,000 pounds per square inch through a tiny valve, the process is known as homogenization. The fat globules are reduced in size to two microns or less, depending on the amount of pressure used.

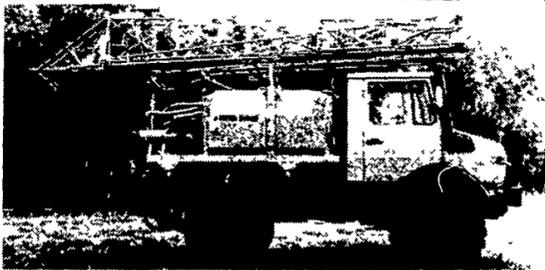
Cream will not rise on homogenized milk, or will the butterfat churn out. The product tastes richer than unhomogenized milk, is more uniform, and is somewhat more easily digested due to the softening of the curd by the process.

After passing through the homogenizer, the milk passes into large storage tanks where it is cooled to around 40 degrees, ready for bottling.

Most homogenized milk contains added vitamin D at the rate of about 400 units per quart. The vitamin is very carefully added in the storage tank so that just the right amount is put into the tank. Thorough agitation is necessary before bottling begins. Other additives may be present to improve the nutritional quality of the milk.

The bottling and cartoning of milk is probably the most refined process in the route from the farm to the consumer. All steps are automated to preserve labor and time. After bottling, the milk can go either into storage at the plant for a short time, or it can go the stores or home delivery trucks.

WHAT'S NEW



FIELD SPRAYER

Farmland and horticultural orchards in rows up to 82 feet wide can be sprayed at a time with chemical pesticides and fertilizers by a new type of field sprayer operating with a special pump which has a 55-gallon per minute output.

Manufactured by Hoegen Dijkhof Machinefabriek B.V. of Emmeloord, the Netherlands, the new field sprayers can now be ordered through the J.I. Case Co. of Racine, Wis. The sprayer is designed for mounting on a Mercedes-Benz "Unimog", an all-terrain four-wheel drive vehicle used for specialized applications in agriculture, construction and other industries. J.I. Case Co. has exclusive North-American distribution rights for the Unimog, and has offered to install the spraying equipment on the vehicle.

The field sprayer can be dismantled from the Unimog in 15 minutes, thus making the vehicle ready for other work. In addition, the boom can be folded lengthwise above the cabin, enabling the combine to travel safely by road.

Besides permitting

greater control of insects and grass diseases, the sprayer can increase grass yield in the great open spaces of America through the application of liquid fertilizers. This can be of considerable benefit to livestock growers and the dairy industry.

Easy adjustment of the spray height from 1½ to 6½ feet above ground level allows the boom to be effective on many types of crops. Each of the spray heads is equipped with a non-return valve to prevent leakage. If one or more of the boom sections is closed off, the spray pressure in the other sections remains constant.

Still another feature of the Hoegen Dijkhof field sprayer is a slow-running three-cylinder plunger pump with a porcelain coating on the cylinders which guarantees a long life. The pipe system is simple to clean. In order to prevent blockage of the chemical mixtures, the liquid is filtered five times.

For further details on the new sprayer, readers may write to the Netherlands Consulate General, Commercial Division 600, One Rockefeller Plaza, New York, N.Y. 10020.

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