

Thesis

Sanitary Milk
for City Consumption
by

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Outline

Stock

Selection - treatment - health

Barn

Ventilation - light - warmth - comforts
stalls - sanitary cleaning - conveniences

Feed

Cautious in feeding - purity of water
cleanliness in feeding

Utensils

Sanitary care - selection

Milkers and Milking

Cleanliness of milkers - prevention of
disease - regularity of milking

Handling of the Milk

Care in milking - aeration - cooling
freedom from bacteria - bottling - delivering
Sterilization & Pasteurization

Works Consulted

Miles Stock Breeding, Russells Dairy
Bacteriology, Gurler's American Dairying,
Noll's Hand Book for Dairymen, Hards Dairymen
Rural New Yorker, and Prof Cottrell.

Stock

The first thing to consider in the production of sanitary milk, is the stock. All animals should be free from the slightest trace of disease; They should be tuberculinized tested, as this is the only certain way to detect this dread disease; one seventh of all people die of tuberculosis, or consumption as it is called in man.

Tuberculosis of cattle is communicable to man thru effected milk; and all cattle are liable to be effected; the Kansas Experiment Stations purchased 20 common cows in western Kansas, and had them tested for tuberculosis; the State Veterinarian, Dr Fisher, had not the slightest ground for suspecting tuberculosis, yet 20% of them were shown to be effected; if these cows were diseased when they were kept in the open air all their lives, what could be expected of city cows that live in filth and on offals?

After guarding against Tuberculosis, all other diseases should be watched for very carefully; during the period of estrus, severe diarrhea, or any inflammatory state

the milk should not be used.

All animals should be kept clean, groomed daily, fed and milked regular, and treated kindly at all times.

Milk from fresh cows is more palatable than from strippers, because of the larger fat globules that it contains, which are composed of soft fats. For this reason one twelfth of the herd should come fresh every month.

For sanitary milk no cow should be milked 8 weeks before, or 9 days after calving, and every cow should remain sterile the first twenty four months of her life, so as to not decrease her vitality by early breeding.

Cows should be selected for the richness of their milk. Ordinary milk contains 3.2% butter fat, while sanitary milk should contain from 4 to 5% butter fat. "The fat in milk is the most easily digested of all fats that can be obtained in food; Rich milk is the best kind of food for consumptives and debilitated persons, and

Practical Hygiene p 218

for babies you must have rich milk and dilute one half with sweetened water.

Sick people must have tempting food, and the rich golden Guernsey or Jersey milk is delicious to the eye and taste, hence chalk and water will not do to tempt sick people.

The herd should be inspected monthly or oftener by a competent veterinarian, and any animal with the slightest ailment should be separated from the herd and her milk not used.

The cows should never be excited or beaten, as this effects the composition of the milk.

Strict cleanliness, proper shelter and food, especially grooming, are all necessary for the production of sanitary milk.

Barn

The most essential thing in a sanitary barn is pure ventilation; pure air is the best medicine for most animal diseases, and especially tuberculosis - like the ship's doctor with his salt water, "it's safe and costs little".

² Practical Hygiene p 227

The air space in a barn should be one cubic foot for every pound of live weight in the barn. Not more than this should be allowed because the heat of the barn cannot be kept up in winter.

Changing the air is very essential and regular ventilation should be provided by air shafts, not leaving this important thing to chance such as cracks in the doors and windows; The ventilating shafts for taking in the air should start at the outside of the building near the foundation and lead up above the cows; the shafts that takes away the foul air should start near the cows' heads and pass up throw the roof.

The next important thing is light. There should be four square feet of glass to each cow, and on the darkest day you should be able to read anywhere in the stable.

The stable floor should be laid with cement or asphaltum; the latter is better but costs more and must be put down under pressure; Cement must be well bedded to keep the stock warm. In the passage ways it should be corrugated to prevent slipping.

The stalls should be the length of the

cow, and not more than 3 ft 8 in wide for dairy cows, this prevents the cows from turning sidewise in the stall and getting dirty. The gutter should be 8 inches deep and 2 feet wide; it should be covered with an iron grate. The slope of the floor of the stalls should be one inch in ten feet.

No barn is sanitary without a steam or hot water pipe running around the walls so that all parts can be scalded frequently.

No storage of any kind should be kept above the cows, because it will odors and germs from the air of the stable.

The stable should be cleaned twice daily, and bedding supplied in plentiful quantities.

Since the stalls are so narrow, great care is necessary to prevent over crowding, and for two rows of cows the stable should be not less than thirty six feet wide and forty feet will be even better.

For convenience in feeding, a carriage way should be put down through the stable with one overhead track in front of each row of cows. By means of switches

this should lead to all parts of the stable, feed bins and to the gutter behind the cows; this contrivance is not very costly and materially reduces the amount of work

Feed

Pure milk cannot be produced without pure food. Succulent food must be provided the year around, - in the drouth of summer as well as in the cold of winter.

Digestibility and wholesomeness in milk should be aimed at, not cheapness, hence cotton seed cannot be fed because it produces a hard indigestible fat. The refuse of starch factories, or dried brewers grain should not be fed as they have an unfavorable effect upon the digestibility of the milk; most dairymen feed the above because these feeds increase the yield and cost but little.

The most neglected part of dairy feeding is water. Milk is largely composed of water and the cows must have pure water, only fresh spring or deep well water should be used; The plan of some would be dairymen, who have patent watering services

is detectible; these devices should be kept clean and the water from one cow should not communicate to any other.

All parts of the mangers should be frequently cleaned and occasionally scalded.

Utensils

The greatest source of milk pollution is the milk pail. Only the most advanced dairymen pay sufficient attention to this utensil. Wooden pails are unsanitary because the germs get into the food and they cannot be cleaned out.

Only heavily tinned ware should be used and all seams, crevices, creases and corners should be flushed with solder to keep prevent the germs from getting a hiding place; special note should be taken of the pail on the out side around the top. No benches, shelves, or any implements whatsoever, should be used in the dairyroom except those that are capable of being taken apart or taken from the wall and thoroly cleaned with scalding water.

A steam oven capable of holding live steam under pressure is essential to

every sanitary dairy; in this oven all glassware and tinware should be steamed daily.

Milkers and Milking

In addition to having well kept cows and stables and sterilized tinware, the cow's udder must be cleaned with a damp cloth before milking.

The hands and nails of the milker should be washed in soap just before milking; The milker should be dressed in white clothes so as to readily detect any dirt.

Contagion of diseases should never be allowed by milkers being affected or coming from affected families. This precaution is especially desirable in case of typhoid fever, diphtheria, tuberculosis or consumption.

Milking should be done at regular hours or the cows will become feverish and the digestibility of the milk impaired.

Handling of the Milk

Milking should be done in covered pails through wire mesh, 75 or more wires to the inch. After milking the milk ~~should~~ should be removed immediately to some room away from the regular stable where it should be strained thru at least two thicknesses of fine cloth which should be sterilized twice daily. After straining the milk it should be put into air tight cans and conveyed to the dairy.

In the dairy, aeration is the first step and this is the most important operation of the whole sanitary milk handling. Aeration is the pumping or blowing of pure air thru milk or cream; the air for aeration should be drawn thru absorbant cotton and from the top of the building. The nasvating odor given off from fresh milk when it is being aerated is enough to convince any one that bottled stink and impurity, and bottled pure milk are two entirely different things.

At Hon. Levi P. Morton's farm at

Rhinecliff, N.Y., it was found that aeration was absolutely necessary to make milk digestible for some diseases while all other handling was of no avail; Such is also the experience of the pioneer and renowned dairymen, S. Francisco of Caldwell, N.J.

After aeration the milk should be cooled to 50°F and kept at this temperature until used. The time from milking until ~~used~~ cooled must not be more than ten minutes, positively no variation can be allowed in the extension of this time limit.

Dr. H. L. Russell of the Wisconsin Experiment Station showed that milk handled in a sanitary way as above cited, contained 300 bacteria per cubic centimeter and milk drawn under ordinary conditions, 100,000 bacteria per cubic centimeter - a cubic centimeter is about a thimble full, under winter conditions, the contrast is similar; Sanitary milk 210 bacteria per cubic centimeter, and ordinary milk 7600 per cubic centimeter.

Immediately after cooling, the milk should be bottled and sealed ~~in~~ air tight with paper or pulp caps. Patent wire

fasteners cannot be used because they cannot be cleaned well. The date of packing should be put on every bottle. A local dairyman sold milk in sealed jars, and he was observed to stop at a house, fill the jars, seal them and march up to the house and deliver sanitary(?) milk. All that he accomplished was to squeeze in a few thousand more bacteria during the sealing; as has been said, the milk must be kept at fifty degrees up to the time of consumption; - a change of temperature, either lower or higher, will injure the keeping quality of the milk.

All employees handling sanitary milk should neither use tobacco nor liquor, and should not collect bottles from houses where there is known to be contagious diseases.

Every day all wagons that haul sanitary milk, should be thoroughly scalded inside and out: Especially should this apply to the city delivery wagon.

Milk handled in the above manner is fit for consumption, and it is the best known food known for any sickness; while

poor, filthy milk is dangerous to the health of anyone. Backhaus recently estimated that "the city of Berlin consumed daily 300 pounds of excrement in its milk."

Sterilization & Pasteurization is the heating of milk to a high temperature to destroy the bacteria. This improves rotten milk - yet all will concede that this is not a desirable food, besides this heat destroys the milk sugar and renders the fat of the cream and casein less digestible.