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## Clean and Hygienic Milk Production

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### Abstract

The primary output of a dairy business is milk, which is primarily produced as food for human use. Therefore, a dairy farmer must strive to increase the amount of milk produced by his or her dairy herd. In order for the milk to be fit for human consumption, the farmer must also make sure that it is produced in a clean and hygienic environment. From the perspective of public health, milk is an excellent medium for the development of bacteria and other microorganisms. As a result, milk that has been contaminated during production, handling, or marketing can readily offer a risk of disease to the general public.

**Keywords:** *Disease, Hygiene, Milk, Shed*

### Introduction

In many parts of the world, milk-based products make up a sizable portion of the average person's diet; hence, their contamination with potentially hazardous compounds may be of concern. India's rise to the top spot as the world's top producer of milk is primarily due to village entrepreneurship. There is so little room for automating milking processes, yet this does not preclude India from producing pure milk (Saroj, et al., 2020). Certain sanitary practices, such as correct sanitation and disinfections of the teats, dairy utensils and equipment, properly good quality water and mastitis control methods; are fundamentally necessary at dairy farms in order to obtain high quality milk. The entire process (from animal production to human use) determines the final quality of dairy products given to consumers. The procedures for milking make sure that milk is produced and stored in hygienic conditions and that all tools and equipment used in the production of milk are kept in good working order in accordance with recommendations.

## Principles of Clean Milk Production

The term "clean milk" refers to milk that comes from the udder of healthy cows, has a pleasant flavour, is free of dirt, has comparatively fewer bacteria, and has no bacteria that are hazardous to human health. Milk of high quality should keep for a longer period of time, be nutritiously adequate, have normal flavour, colour, and aroma, and be free from debris and sediment, low in bacterial counts and free of antibiotics and chemical residues (Barbuddhe et al., 2008).

### 1. Animal management

#### 1.1 Clean and healthy cows

If any annual testing for tuberculosis and brucellosis should be done, the animals that appear to be in excellent condition should only be purchased and confined. Testing for communicable diseases should also always be done. Additionally, routinely check for udder and other infections. To prevent the spread of infection, infected animals should be treated by a licenced veterinarian and separated from the rest of the herd.

Regularly trim long hair from the udder, teats, and sides. Daily grooming and washing of the animal are also necessary to prevent airborne dirt from getting into the milk. Before milking, the udder and teats should unquestionably be gently cleaned with antiseptic treatments so as to avoid damaging the orifices and clefts between the quarters of the udder.

#### 1.2 Animal housing management

In order to have healthy animals that will give sanitary milk at the farm, a nice and clean house is quite vital. Often, animal shelters serve as the nesting grounds for flies and mosquitoes that assault animals and infect them with a variety of bodily aches and diseases. The health of the animals living there as well as the workers' health will be negatively impacted by improper animal shed design, which prevents the release of metabolic gases like methane, moisture, and carbon dioxide produced by the animals and ammonia gas produced by microbes acting on the dung. As a result, the sheds required to be created using the following guidelines:

- Animal stalls must be situated on high land with a sloppy natural drainage system.
- Have a concrete floor that is water-proof, sturdy, and simple to maintain.
- Drains that have been built have a respectable width, depth, and slope.
- Make sure that dung and urine are properly drained into the sewer

- Make sure the shed is adequately ventilated and that there is 500 cubic feet of air space per animal to ensure the utmost comfort of the animals.
- Have a plan in place for a consistent supply of pure, fresh water. Periodic lime washing is required.

### **1.3 Feeding management**

- Always provide the animal a diet high in nutrients because a healthy animal will produce milk with fewer impurities.
- A healthier diet for the animals will decrease the likelihood of disease development.
- To prevent microbial growth, clean the water tubs and the feeding manger frequently.
- Never feed concentrates made of dusty feed. Feed either pellets or feed that has been slightly moistened.
- Never feed the animal any leftover feed that could be ruined with mould or other microorganisms while it is milking. Avoid giving silage and hay.
- Never let the animal drink contaminated water because it could cause waterborne diseases.

### **1.4. Personal hygiene**

- Always wear spick-and-span attire, including clean caps.
- To prevent any microbiological contaminations, the milker should also maintain proper personal hygiene, including regular haircuts, beard trims, and nail cuts.
- Any cuts, boils, or blisters should be covered with a clean bandage.
- Hand washing with soap and a clean towel are required prior to hand milking.
- Never chew gum, drink alcohol or spit and avoid sneezing and coughing while milking.
- Health should be a priority for the milker, who should be free of contagious diseases like typhoid, cholera, scarlet fever, and tuberculosis.

### **1.5 Milking management**

- It's preferable if the animal released milk without the calf.
- Before milking, clean the shed and remove the manure from the shed.
- Wash the animals with fresh water and clean the udder.
- Use a clean, dry serviette to properly wipe and dry the udder after bathing.

- Use utensils preferably made of stainless steel without any crevices that are easy to clean and wash your hands with soap and water after.
- To avoid any damage or injury to the teats, use proper milking techniques. Carry out gentle, quick, and thorough milking.
- For the animal's restraint, use a milkman's rope.
- For mastitis detection, use a strip cup.
- It is advised to use different utensils for washing the udder and for milking.
- Milking should be done as quickly as possible because the animal's excitement only lasts for around 7 minutes.
- Always make careful to finish milking since germs can grow on leftover milk in the udder and cause mastitis.
- Milk should always be covered to prevent airborne contamination.
- After milking, disinfect the teats with a teat dip (with disinfectants like iodophor, etc.) to prevent microorganisms from entering the teat canal.
- Always discard milk from animals that have received antibiotic treatment for the recommended number of days since the milk may include antibiotic residues that could compromise the product's quality, cause a starter to fail, or harm a consumer's health.
- Never air tighten a milk can's lid with paper, fabric, etc.

#### **1.6 Management during collection**

- To avoid any microbial contamination, the milk collection area needs to be kept immaculately clean.
- The equipment/vessels used for milk collecting and transportation should be thoroughly cleaned and sanitised.
- Sanitizers ought to be maintained away from the location where milk is collected.
- Can lids should not be left on the ground and should be secured firmly to the can in order to prevent spills.
- Avoid using hay, grass, or other materials to give the lid a tight fit. Milk must constantly be protected.

- Before loading them into the truck, make sure the milk cans are stored in the shade. It is not advisable to utilise trucks without hoods or covers because doing so will expose the milk to sunlight, which will hasten the growth of bacteria.
- It is best to avoid transporting other items along with the milk cans since this could cause contamination.
- Careless handling of cans causes dents, which serve as growth sites for microorganisms and make cleaning them exceedingly challenging. The majority of the microbial development happens between the time milk is collected and when it is received at the port. To the greatest extent possible, this period must be cut short in order to prevent microbial growth.
- A person who produces and handles milk should make every effort to avoid microbial contamination.

### **1.7 Hygiene of milking utensils**

The milking implements ought to be the same size. Tiny mouths to prevent contamination from the outside. Preferably, these should be constructed of materials that won't rust and won't absorb moisture, such as aluminium or galvanised iron. Although expensive, stainless steel is suitable. There shouldn't be any dings, fractures, or fissures on any of the kitchenware. Before and after every milking, the utensils should be cleaned and scrubbed. The detergents and chemicals used should not harm the environment and should not be abrasive. It is advised to use washing soda on farms along with solar exposure or detergents-cum-disinfectants (iodophores). In order to completely drain the water after milking and prevent contamination from the air, insects, rodents, reptiles, etc., clean vessels should be placed upside down.

### **1.8 Straining of Milk**

The mouth of the milk-collecting jar should be covered with a clean muslin cloth to strain out all the extraneous material. However, straining would lessen the amount of germs by removing all the particle matter, enhancing the milk's visual attractiveness to consumers.

### **1.9 Cooling of Milk**

To stop the growth of microorganisms, it is best to promptly cool the strained milk to 4°C. Bulk can coolers are the best options in locations where milk is transported in cans after being stored there. Other cooling techniques that may be used include air, water, ice, and



mechanical cooling. Household refrigeration, a direct expansion surface cooler, an expansion bulk tank, an ice bank, and chilled water are the most often used cooling aids. Mesophilic and thermophilic microbial growth can be stopped by an efficient cooling system.

### **1.10 Transportation of Milk**

To ensure that the initial quality of milk is good, all the suggested methods for clean milk production at the farm should be properly followed. Generally speaking, transporting uncooled milk can only be justified if it was produced with extreme care (micro-organisms 100,000/ml) and if it was processed or refrigerated to a low temperature within 3 hours after creation. A fundamental cooling system ought to be installed in the collection centre. A surface cooler or plate chiller with a tank storage system is advised for greater quantities of milk, especially if the holding period between receipt and shipment to the dairy is lengthy. At the chilling facility, the milk must be refrigerated to 4°C. When milk is received in road tankers at a dairy, its temperature should not be higher than 4°C. Immediately after emptying, all used equipment, including small containers, cans, and road tankers, should be cleaned and sterilised. In processing dairies, the tankers are typically cleaned manually or on-site.

### **Conclusion:**

A significant number of people consume milk, which is a fundamental good. Quality maintenance is crucial from a health and financial standpoint. While there are certain areas where farmworkers' knowledge is appropriate, there are some that relate to producing milk in a hygienic manner. However, it is crucial to create minimal standards that should be communicated to workers at all levels and well enforced. To ensure the quality of milk, public health officials should inform them and proactively monitor their behaviour. By taking little steps in this direction, the public can be protected against a variety of zoonotic diseases and health problems by ingesting milk.

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