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Need of Clean Milk Production in Dairy Sector

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Clean Milk Production is a socio-economically important management practice emphasizing management methods, information distribution, and capacity building concerning hygienic practices through multi-stakeholder involvement includes dairy farmers, scientists and extensionists, and public health officials in dairying sector. Raw milk from healthy animals that is produced and managed in a hygienic manner with a minimal amount of beneficial bacteria and no dangerous chemical residues is known as "clean milk". It must be of a good quality without being heated up, produced by a healthy animal and handled by a healthy milker in a safe environment free of physical or biological risks. In order to produce milk of the good quality without compromising the animal's output, clean milk production involves a variety of preventive measures that helps to keep the animal healthy and free of important infectious disease condition like mastitis.

Benefits of Clean Milk Production

Clean milk production is beneficial to producers, manufacturers and consumers owing to the following reasons:

A. Producers' benefits: Clean milk production offers defense mechanism against septic sore throats, which are often established in cows' udder but have human origins. Typhoid, Diphtheria, Dysentery, etc. are typical human diseases that are directly passed to milk through human contact. Mastitis can be transmitted from an infected udder to a healthy udder. Therefore, farmers should pay more attention to produce clean milk for safe consumption and disease prevention. Milk gets contaminated by other germs through cow body dust, polluted water, contaminated air, contaminated utensils, etc., which shortens milk's shelf life and makes it harder for producers to dispose of the raw milk.

B. Manufacturers' benefits: Clean milk has a significant commercial value since it aids in the production of goods with better keeping qualities. It directly impacts on increasing sale, consumption and profit to manufacturers.

C. **Consumers' benefits:** Better keeping quality and fewer chances of spoilage are expected by clean milk production. Moreover, it provides customers with protection from milk-borne infectious disorders like typhoid, diarrhoea, dysentery, etc.

Source factors of contamination of milk

The sources of contamination of milk can be classified into two major categories according to their origin like internal factors or external factors.

A. Internal factors

- Udder infection like mastitis
- Fore-milk contains more bacteria

B. External factors

- Cow/animal's body
- Udder and teats
- Milker' hygiene and habits
- Method of milking
- Milking utensils
- Milk storage utensils
- Feed and water
- Milking environment

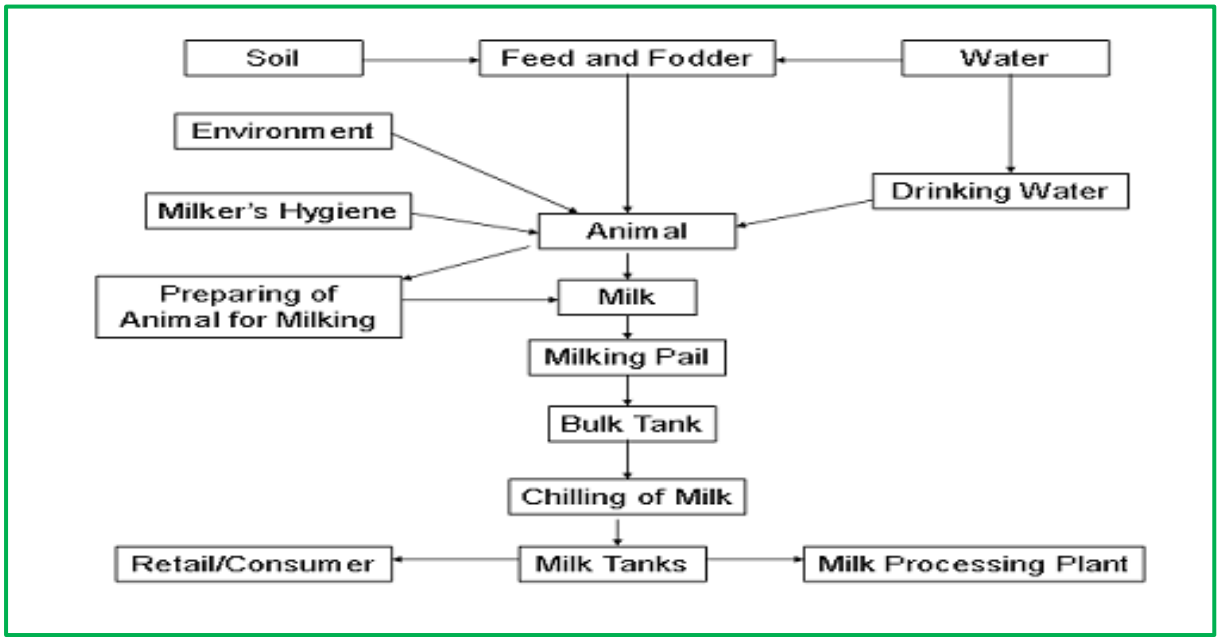

Fig. Sources of contamination of milk

Farm level important practices for clean milk production

1. Animal management

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. Ideally, this should be done before milking. The animal's tail, udder, and hind legs should frequently be shaved. This is crucial in the case of buffaloes because they frequently wade in filthy ponds and have mud and other debris on their bodies. Before milking, the udder and teats should be gently cleaned using antiseptic treatments. When used properly, the readily available Dettol or Savlon can be used to clean the udder and teats on the Indian subcontinent. Until, the animal has fully recovered from the disease, milk from the affected animal should never be combined with bulk milk.

2. Animal housing management

Animals are frequently kept indoors where people reside, which could be harmful to both the animal and people. Either from the surroundings or when the cow flips while being milked, flies and mosquitoes will also find their way to the milk. Hence, the sheds needed to be designed along the following recommendations:

- Stables for animals must be situated on high elevation with a natural drainage system.
- Have a pucca (concrete) floor that is water resistant, durable, and simple to maintain
- Verify that faeces and urine are properly drained into the sewer or are regularly removed.
- Mangers ought to be rounded without any acute angles.
- Verify that the shed is properly aerated
- Plan for a consistent supply of fresh and clean water
- Regular lime washing is required.

3. Feeding management

- Healthy foods for the animals will decrease the possibility of disease development.
- To prevent microbial growth, clean the water tubs and the feeding manger frequently.
- Prevent from feeding hay and silage while milking.
- Avoid giving animals any leftover food that may be contaminated with mould or other microorganisms.
- Avoid letting the animal drink contaminated water since it could cause waterborne diseases.

4. Personal hygiene

A. Healthy milker

The milker should not have any open wounds, sores, boils, or infected wounds because these conditions would undoubtedly cause microbial contamination of the milk. Never allow the milker to milk the animal if they have stomach problems. This will stop milk from becoming contaminated and udder illness from spreading. Health should be a priority for the milker, who should be free of contagious diseases like typhoid, cholera, scarlet fever, and tuberculosis.

B. Cleanliness

- Milkers should always assume neat, hygienic equipment, including helmets.
- Clean dressing must be applied to any cuts, blisters, or boils, if present.
- Hand washing with soap and drying with a clean towel are requirements before hand milking.
- Avoid eating, drinking, and spitting while milking.
- Prevent from sneezing and coughing when milking

5. Milking management

- It is preferable if the cow releases milk without the calf.
- Clean the shed before milking and remove the waste from the shed.
- Clean the animals and wash the udder with clean water.
- Using soap to wash your hands and drying them
- Employ easy-to-clean utensils, preferably made of stainless steel with no cracks.
- Appropriate milking techniques should be used to avoid any harm or injury to teats.
- Employ a milkman's rope to tie the animal up.
- Throw away the foremilk
- Use a strip cup to check for mastitis.
- Milking should be done as quickly as possible because the animal's stimulation lasts just around 7 minutes.
- To prevent airborne infection, always keep the milk covered.
- Teat dipping should be used to disinfect the teats after milking to prevent the invasion of microorganisms into the teat canal.
- Always discard milk from animals given antibiotic treatments after the recommended number of days has passed since the milk may include antibiotic residues that could impair the milk's quality, cause a starter to fail, or be harmful to a consumer's health.

6. Cooling of Milk

To stop the growth of microorganisms, the separated milk should generally be cooled to 4 ºC right away. 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.

7. Transportation of Milk

If the surfaces that come into contact with the milk are not properly clean and the milk is at a high temperature that encourages the growth of microorganisms, then quality of the milk will decline during transit. 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. Milk should be kept on the farm as long as possible at room temperature. In general, transporting uncooled milk can only be justified if it was produced with extreme care (microorganisms below 1,00,000/ml) and if it was processed or refrigerated to a low temperature within three hours after processing.

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 centre, the milk needs to be refrigerated to 4 ºC. When milk is delivered in road tankers to a dairy, its temperature should not be higher than 4 ºC. Immediately after emptying, all used equipment, including tiny containers, cans, and road tankers, should be cleaned and sterilised. At processing dairies, the tankers are typically cleaned manually or on-site.

Conclusion

Milk is a necessary good that is consumed by many people. Quality preservation is crucial from a health and financial standpoint of view. Experts in extension must raise their knowledge of the technique of producing clean milk and its benefits for farmers and consumers. Farmers' participation is very important in a need-based, long-term multi-stakeholder strategy in order to Clean Milk Production to be implemented and effectively spread at the field level.

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