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Popular Article

Management practices for clean milk production

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Milk

Milk is defined as whole, fresh, clean lacteal secretion free from colostrums, obtained by the complete milking of healthy milch animals excluding that obtained 15 days before or 5 days after calving and containing prescribed % of fat and SNF.

Clean milk

It is lacteal secretion practically free from colostrums and extraneous material like dust, dirt, flies, hay, manure etc. Clean milk has a normal composition, possesses a natural milk flavour with free from bacterial count and is safe for human consumption.

Criteria of clean milk

- Free from dirt debris and any sediment
- Free from off-flavours and colour
- Free from pathogenic organism
- Free from antibiotics and chemical residue
- Low somatic cell counts
- Normal composition and slightly acidic in nature

Composition of milk

The average composition of cow's milk is around 87 % water, 4.0-4.5 % milk fat, 3.5 % protein, 4.9 % lactose, and 0.7 % ash (minerals). Composition of milk varies according to breed, species, stage of lactation and stage of milk removal. Milk fat is most and lactose is least variable component of milk. Quality milk is essential for production of high quality dairy products, taste and flavour and long keeping quality. Good quality dairy products cannot and can never be made from poor quality raw milk. As such, it is essential that the milch animals should be adequately protected from diseases because the causative agents of these diseases may be either excreted into milk or they may contaminate milk through environmental contamination.

Table 1. Average composition of milk of different mammals.

Breed	Water	Fat	Protein	Lactose	Ash
Cow	86.50	4.39	3.30	4.44	0.73
Buffalo	83.18	6.72	4.52	4.45	0.80
Goat	87.00	4.25	3.52	4.27	0.86
Sheep	80.71	7.90	5.23	4.81	0.90
Camel	87.61	5.38	2.98	3.26	0.70

The factors affecting the production of clean milk

i) Internal factors

1. Animal : - Udder infection
2. Foremilk – First few streams of milk contains a large number of bacteria

1. Animal: - Udder hygiene is very important factor for clean milk production. The microorganisms present on the teat skin can contaminate the milk during milking or through the teat tip will penetrate the teat canal increasing the possibility of mastitis. Hence it is necessary to implement hygienic-prophylactic measures in maintaining cleanliness and udder health before and after milking of dairy herds, with the aid of disinfecting agents. The animals should necessarily be free

from systemic diseases whose causative agents such as *Mycobacterium tuberculosis*, *Coxiella burnetii*, *Brucella abortus*, which can be transmitted to man through milk.

2. Foremilk: - The first few streams of milk may have a higher bacterial load as a result of bacteria that enter the udder through the teats. So removal of foremilk is necessary during milking process.

ii) External factors

1. Animals body
2. Milking area
3. Milker
4. Method of milking
5. Milking and storage utensils
6. Feed and Water
7. Milk testing
8. Milk transportation

Animal body: - The animal body is one of the major sources of contamination, presence of dirt, debris and dung from hind quarters and tail region of animals. Care and management of the animal and its health is important for clean milk production. Animals suffering from any contagious disease should be separate out from the healthy cow.

Milking area: - The milking area of the shed deserves hygienic attention. The floor of the milking pen should be clear with clean water and disinfected with bleaching powder solution to remove cross contamination and spreading of undesirable odours.

Milker: - Milker should be properly clean and hygienic during milking. Milking should be carried out under good person. He should not be suffering from any infectious diseases, especially cough and cold, should wear clean clothes, wash hands properly and cut nails periodically before milking. Milker should be free from contagious diseases like cholera, typhoid, diphtheria and tuberculosis and should be monitored for these diseases rigorously on regular basis. Milker should avoid the wrong milking practice like knuckling and incomplete milking, which leads to multiplication of organisms in the left over milk. They should wash and sanitize their hands before milking. Clothes should be clean, head should be covered; new mask should be worn each time. The milkers should avoid coughing, sneezing at the time of milking.

Method of milking: - After cleaning the udder & teats the next step is milking. During milking the first few ml of milk should be discarded, as it contains a large number of microorganisms. The initial milk should be collected in a cup or a utensil and should not be thrown on the floor, so that flies and other insects may not be attracted towards it. The milking should be complete, with no milk left in the udder after milking. Milking should be done with full hands, quickly and completely, followed by stripping, if so required. In farms with more than 8 high-yielding cows, it is preferable to use a milking machine. If the herd exceeds 100, a separate milking parlour will ensure better hygiene. Unhygienic practices such as dipping the fingers in milk and then wetting the teats to soften them should not be permitted. Milking with the full hands and not with the knuckles is preferred as the knuckling leads to more chances of teat injury. Sick cows should be milked at the end to prevent infection. The animals should be dried off 60-70 days before calving.

Milking and storage utensils: -The clean milk production practices are futile if the clean milk is to be stored in contaminated utensils. Milk being a perishable and easily carried off flavours has special requirement with regard to storage infrastructure and the milking. The milking utensils should be uniform, clean, and narrow mouths to avoid external contamination. They should be made of a non-rusting and non-absorbent material such as aluminium or galvanized iron. Stainless steel would be ideal. The use of vessels such as empty paint buckets, dalda tins, pesticide/insecticide containers, teapots etc. should be avoided. The utensils should be free from dents, cracks and crevices. The utensils should be scrubbed and cleaned before and after each milking. The detergents and chemicals used should be non-injurious to health, and non-abrasive to hands. At farm level, use of washing soda coupled with exposure to sunlight or rinsing with scalding water or use of detergents-cum-disinfectants such as iodophor is recommended. The cleaned vessels should be placed inverted for complete drainage of water after milking, so as to avoid contamination from bacteria of the air, insects, rodents, mosquitoes, reptiles etc. In villages where milk collection is carried out by co-operative societies, the use of community milking byres/parlours with facility to clean and disinfect udders/teats as well as milking equipments under the supervision of the society officials is recommended. Milk should immediately be transferred from the barn to an appropriate place.

Feeding the cows for clean milk production:

The feeds and fodder of the animals should be not introduced directly or indirectly microbiological or chemical contaminants in the milk in amounts that is unacceptable to health. Feed fodder and silage should be procured from a reliable source and should be stored properly.

Feeding is a central activity in dairy animal management. When designing the feeding schedule, ensure that the animals get adequate rest between feeding and milking (at least one hour). The animal feed should be clean and nutritionally sound with all the required nutrients in the right proportions and free from contamination.

Management for clean milk production

- Milking pen should be clean thoroughly before and after milking with disinfectants.
- Udder and teats should be wash with lukewarm water and wipe with towel.
- Screening of animal for mastitis or udder infection by employing "strip cup" method before milking.
- If the animal is suffering from mastitis, flakes of milk will be seen on black cloth and milk from affected quarters shall be totally discarded.
- If mastitis is detected, do not mix the milk of that animal in milk can containing milk from healthy animals.
- Immediately after milking, the teat should be dip in cup containing disinfectants.
- Milker should be free from any infectious diseases. Cut his nails regularly, wash his hands and legs before milking and wear cap or head gear.
- During milking the hand should not wet water or milk or saliva of calf/cow.
- Milking container should be made up of stainless steel or aluminum.
- Milking cans should be thoroughly washed with detergent and sun dried every day immediately after milking.
- Milking should be full hand method only avoid knuckling and stripping, It cause injure and wounds on treats.
- Filter the fresh milk using clean dry muslin cloth
- The milking machine and milk storage equipment such as milk churns are kept clean and are in good condition.
- Immediately after milking, the milk must be cooled preferably to 4°C.

Milk Testing: he milk samples to be drawn using an appropriate and cleaned sample device as per the Quality Control guidelines.

Transportation: The Milk cans to be transported in a Covered /protected hygienic Milk Vans.

Conclusion

Clean milk production involves a set of preventative practices that helps in keeping the animal healthy and free from diseases like mastitis, proper care monitoring of individual animal to get the best quality milk without compromising with animal's productivity.

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