



*OTC
Document*

FAQs on Effective Mastitis Control at Dairy Farm



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1 Disclaimer

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2 Introduction to SMEDA

Small and Medium Enterprises Development Authority (SMEDA) is an apex SME development agency working under the Ministry of Industries and Production (MoI&P), Government of Pakistan. In pursuit of its mission, SMEDA has adopted an integrated strategy that comprises SME sectors & clusters development, Business Development Services (BDS), and Policy advocacy to protect and promote SME interests.

SMEDA offers a broad spectrum of business development services to SMEs which include prefeasibility studies, identification of experts and consultants, delivery of need based capacity building programs in addition to business guidance through help desk services.

3 Purpose of the Document

This document is a demonstrative set of information in the form of Frequently Asked Questions (FAQs) for new / start-up entrepreneurs with queries regarding 'Effective Mastitis Control at Dairy Farms', particularly those categorized as Small & Medium Enterprises (SMEs).

The list of FAQs in this document includes information regarding mastitis control and maintenance of udder health of milking cattle at dairy farms. For more information about dairy farming, please visit SMEDA website at www.smeda.org.pk.

4 Frequently Asked Questions

4.1 What is Mastitis?

Mastitis refers to inflammation of the mammary gland caused by microorganisms, usually bacteria, that invade the udder; multiply and produce toxins that are harmful to the mammary gland.

This is one of the most dangerous contagious diseases of dairy animals. The udder of the animal inflames and one or more than one teats are affected. The udder becomes hot and the animal may suffer from fever thereby decreasing milk production.

4.2 What are economic losses of the farm due to Mastitis?

The daily milk production of the animals suffering from mastitis or inflammation of the udder decreases considerably, upto 50%. The quality of milk is adversely affected and it cannot be used or sold. It is estimated that nearly 25% milking animals suffer from Mastitis.

This disease spreads very quickly and destroys milk producing cells i.e. alveoli. The cells which are lost once cannot be recovered or regenerated and the affected animal will always yield less milk. The treatment of mastitis is expensive and potential delay in treatment causes permanently decreased value of animals which results in great devaluation of an elite animal.

4.3 What are common causes of spread of Mastitis?

Some common causes of mastitis spread at the dairy farm are;

1. Easy transmission of microorganisms into the teat from unhygienic sources in surrounding environment.
2. Insufficient sanitary conditions in Internal and external areas of dairy shed.
3. Accumulation of debris such as urine and dung in the shed area. Grazing of animals in unhygienic field conditions.
4. Milking procedures carried out by untrained persons.
5. Milking the animals with dirty hands.
6. Use of dirty utensils, clothes and equipment kept on rough dirty floor.
7. Lack of attention to minor teat injuries and leaving them untreated.
8. Letting calves suckle the animals shortly after their milking.
9. Offering contaminated feed with fungal growth to milking animals. Please refer to OTC,' Feeding and Nutrition management of Dairy Cattle' available on www.smeda.org.pk.

4.4 How does an infection occur in animal's udder?

The teat opening remains open for about 30 minutes after milking operation. Microorganisms enter the udder through the teat canal and grow in the udder in the form of a colony. After growth, they excrete poisonous material which destroys milk-producing cells, hence affecting the production and quality of milk adversely. The udder inflames due to these microorganisms and their excretions, hence animal may suffer from fever or swelling of teats and/ or udder.

These microorganisms grow rapidly in affected udder exposed to unhygienic environment or close contact with debris such as dung, urine, mud and rain water in or around the shed. The situation gets worst when animal sits continuously for longer hours in these shed areas.

For further information on good dairy farming practices, please refer to sector 4.3 of OTC,' FAQs: Commercial Dairy Farming on Environmental Controlled Housing (ECH) System' available on www.smeda.org.pk.

4.5 What are different types of Mastitis?

Generally, there are two types of Mastitis:

1. Clinical Mastitis

Following signs may be seen;

- a. One or more than one teat or whole udder is inflamed.
- b. Udder turns reddish and animal feels pain.
- c. Milk production decreases considerably, clots or flakes in milk are visible and animal suffers from high fever. Milk turns saline in taste.
- d. Sometimes, there is absence of milk production.
- e. If not treated on time, one or more teat suffers from fibrosis, causing the udder to shrink.
- f. Severe signs include abnormal secretion; hot, swollen quarter or udder; high fever, rapid pulse, loss of appetite, dehydration and depression. Death may occur hence there is need to consult the veterinary doctor immediately.

2. Sub-clinical Mastitis

Clinical mastitis causes the greatest financial loss to dairy farmers through lowered milk production. For every clinical case of mastitis at a dairy farm, 15 to 40% subclinical cases may occur. This kind of Mastitis is more dangerous than Clinical Mastitis because there are no visible signs. There is no inflammation on udder and milk-production does not stop.

Following indications are important to consider as there are no visible signs of the disease;

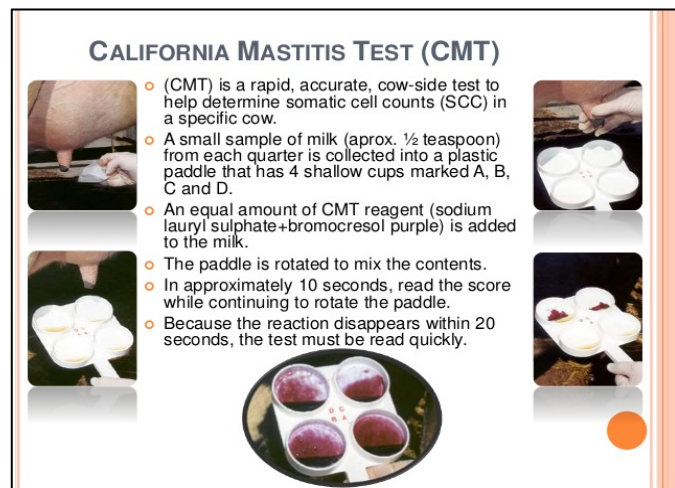
- The somatic cell count (SCC)¹ of the milk will be elevated. Bacteriological culturing of milk detects bacteria in the milk.
- The animal does not suffer from fever in Sub-Clinical Mastitis yet it becomes sluggish and lethargic and milk-production decreases considerably.
- The quality of milk is not affected but it tastes saline.

Although its diagnosis is easy, yet farmer may not know the presence and intensity of this disease. The best diagnosis can be done with the CMT (California Mastitis Test).

4.6 What is the procedure of California Mastitis Test (CMT)?

The steps to carry out California Mastitis Test are given below;

- Remove the plastic tray consisting of four cups from the CMT kit which is easily available from any veterinary medicines store.
- Mark the plastic tray according to the four teats so that the affected teat can be recognized later on.



- Pour some milk in the plastic tray from each teat before milking the animal.
- Take about 2 ml milk from each teat into each cup.
- Do not mix the milk from different teats.
- Remove the lid from the bottle of the solution and pour it into each cup.
- Mix the milk in the tray with the CMT solution.
- The change in colour and the condition of the milk show the presence of Mastitis.
- Compare the colour of the milk with the given chart to determine the intensity of Mastitis

¹ Somatic Cell Count (SCC) refers to number of leukocytes or white blood cells per milliliter of milk. Normal milk has less than 200,000 cells per milliliter. An elevated SCC is an indication of inflammation in the udder. The bulk tank SCC reading directly indicates the level of subclinical Mastitis and the loss of milk production in a herd

4.7 How Mastitis spread may be prevented on the dairy farm?

Mastitis usually spreads due to careless behavior of farmer in taking care of animals. It can be eradicated if following steps are taken on regular and daily basis;

- Shed and the utensils of daily use should be cleaned and washed regularly. Keep heaps of dung away from the shed. Animals should not be milked at a dirty and muddy place. The animal should be milked completely, with a closed fist.
 - Wash and dry the udder and teats well after milking the cow. Do not allow the animal to sit on the ground soon after milking. Remove rings from fingers before milking the animal. Feed calves before milking. Time span or gap between two milking operations should be about 12 hours.
 - The person milking the animal should have clean clothes, hands and clipped nails.
 - Apply iodine solution such as Depal solution to teats each time the animal is milked as Iodine is useful for killing microbes. Depal² is applied (as teat dip) to each teat after each milking to protect it from the disease. Fill the dip cup up to the mark of 50 ml with the Depal solution. Add 250 ml water in the dip cup. Mix it well. Now the solution is ready for use. A sort of membrane appears on the teat when Depal is applied after milking. It remains in place for 45 minutes, preventing microbes from entering the teats.
 - The affected animals should be separated from the healthy ones. They should be milked in the last. The milk of affected animals should not be mixed with that of healthy animals.
 - Take special care of the teats of pregnant animals. Insert antibiotics which have long-lasting effects because this would protect the animals from mastitis in future milking. Consult the doctor immediately in case of injury on teats.
 - Do not let the milk fall on your hands during the milking of the animal. Also do not apply the milk of any other teat or milk from the bucket or cream to any teat. In case of a cut on the teat, apply Vaseline ointment on it.
10. For adequate immunity against Mastitis and other microbial diseases, provide balanced feed to all animals. Please refer to OTC,' Feeding and Nutrition management of Dairy Cattle' available on www.smeda.org.pk.



² Depal is a solution of iodine. The teat is dipped into it to stop the entrance of microbes.

4.8 How to maintain udder health of dairy cows and buffaloes?

Persons suffering from contagious diseases such as respiratory and intestinal problems are carriers of pathogenic microorganisms which may be harmful to farm cattle. To prevent the spread of such diseases, it must be assured that no person with illness, working or visiting a dairy farm, should handle farm animals and milking operations. Diseases to look out for are:

- Sore throat – cold, flu, fever
- Stomach problem – diarrhea, vomiting, fever
- Skin infection – boils, septic pimples, rashes etc.
- Prolonged illness such as Tuberculosis, Hepatitis etc.
- Any other disease that may be transmitted to other persons and cattle

To reduce the likelihood of milk contamination, milk handling staff should be properly aware of bad or unconscious habits also. They should avoid the following;

- Scratching any part of the body, face, nose, mouth, ears or hair
- Coughing or sneezing directly onto milk or by-products
- Touching, picking or squeezing pimples, boils or sores
- Using spittle as a lubricant when hand milking (use hand cream if necessary)
- Tasting milk or dairy products by using the fingers or a tool that is returned to the product.

The key to prevent bacterial contamination of milk is to keep hands clean. The staff should wash hands and forearms by:

- Pre-rinsing with water to remove dirt
- Washing with soap and water
- Brushing under nails
- Rinsing and drying with disposable towels

Smoking should be strictly prohibited at dairy farms while handling milk as it causes coughing, contamination of food by cigarette ash or left over filters and food contamination through dirty fingers.

The use of hair covering caps and gloves is recommended to keep hair and skin particles out of milk and prevent cross contamination. It is better to routinely use disposable gloves and caps at each milking.

For further information, please refer to the OTC,' FAQs on Good Practices for Milking Hygiene at Dairy Farms' available at www.smeda.org.pk.

4.9 What are the measures to ensure environmental hygiene for milking operations?

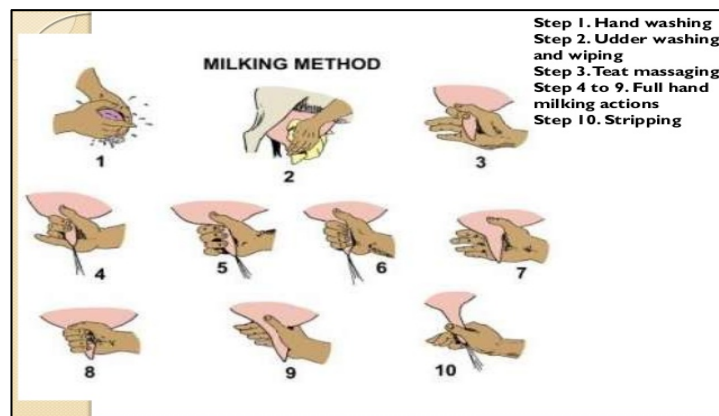
Environmental hygiene relates to both internal and external environments. The external environment includes areas outside milk production area, while the internal environment refers to areas where milk is procured, stored or packaged. Following measures should be adopted to ensure the cleanliness of environment;

- Clean surrounding area of the farm. Farm waste such as manure, mud, water etc. should be effectively disposed off through regular (once or twice per week) removal and spreading into fields.
- Provide sufficient quantity of clean water supply: it should be available for drinking purposes as well as washing of milking utensils and farm cattle.
- Implement effective ways for rodent and insect control. This may be done by a reduction of food and habitat, vermin proofing, trapping and prudent use of chemical baits and rodenticides. Insects transmit many diseases to humans; hence, their control means elimination of their breeding and feeding places. Insect-repellent chemicals, infrared lights and sticky pads may be used for this purpose.
- Implement effective measures to control bird invasion. Birds may carry harmful germs which may contaminate buildings, water supplies and equipment through droppings.
- Regularly groom farm animals including dairy cattle as they may be a source of contamination themselves, if not kept clean. Grooming and clipping is important for reducing contamination from their hair and dust. Animals should always be handled quietly and gently to avoid upsetting them as this may result in more dust and manure. Calves, young heifers or other animals (ducks, chicken etc.) should not have access to the milking shed.
- Implement effective biosecurity measures for farm workers and visitors. Contamination may be brought to farm through their clothing, footwear and sickness.
- Implement an effective cleaning program for milking area. There should be a purpose-built area, dedicated for milking operations only. Feed, chemicals and medications should not be stored in this area. Roughages should not be fed during milking. Dust and spillage of milk should be minimized. The floor of milking area should be an impervious surface, preferably made of concrete to avoid cracks and crevices. Milking equipment and facilities such as water tubes and drainage racks should be made of non-absorbent and corrosion-resistant materials such as stainless steel.

For further information, please refer to the OTC,' FAQs on Good Practices for Milking Hygiene at Dairy Farms' available at www.smeda.org.pk.

4.10 What are standard procedures for ensuring Mastitis control at dairy farm?

- Implement effective Mastitis Control Program at Farm. Animal's teats should be striped into a strip cup to check for mastitis/abnormalities in the milk for at least a month (and preferably longer) into the lactation period.
- Teat cleanliness is an essential part of milking operations. Dirty teats should be washed with clean running water (at low pressure) and then dried with clean, individual towels, paper or cloth.
- Gently massage the teat for at least 30 seconds before milking to initiate 'Milk let-down' response. Milking should be complete within 5–7 minutes with hand milking in a quick yet gentle manner through the squeezing action rather than pulling or stripping the teats. Milking staff may use mild hand creams if needed.
- Apply recommended hand milking techniques. Hand squeeze milking method is better than hand strip milking method. The hand squeeze milking method is natural and closely resembles calf sucking.



- Avoid strip-milking technique because it leads to additional bacterial load to milk as udder and teats are wet. Strip milking also leaves the teats moist, loosen the bacteria around the teat skin, bringing it close to teat openings. The absence of teat dipping means there are always bacteria readily available to enter the teat post-milking. Strip milking is more likely to cause epidermal micro erosions that promotes mastitis bacteria.

For further information, please refer to the OTC,' FAQs on Good Practices for Milking Hygiene at Dairy Farms' available at www.smeda.org.pk.

4.11 Why should milk from sick animals be collected in the end?

As a priority, milk should be collected from animals that are in good health. Milk from animals showing signs of udder disease should not be used for human consumption to avoid any risk of food-borne diseases. Also, milk from animals undergoing any veterinary treatment must not be used for human consumption before the end of the prescribed withdrawal period. Sick animals should be milked in the end, preferably with separate buckets. Their milk should be stored for further examination as directed by your veterinary professional or should be discarded.

4.12 Where can I find detailed good practices for Mastitis control?

The international framework to ensure safety and suitability of milk and milk products is contained in the Codex Recommended International Code of Practice General Principles of Food Hygiene (CAC/RCP 1- 1969, Rev. 4, 2003)³ together with the Codex Code of Hygienic Practice for Milk and Milk Products (CAC/RCP 57-2004)⁴

4.13 What are the Regulatory & Compliance Requirements for milk collection?

In Punjab, food safety is regulated under the Punjab Food Authority (Amendment) Ordinance, 2015 and Punjab Pure Food Rules, 2011. The Punjab Pure Food rules cover 104 items falling under nine broad categories including Dairy & Dairy Products.

Section 20: Special provision for milk and dairy produce

No person shall offer or keep in possession for sale or deliver for sale or supply to any person:

- a) Impure or unwholesome milk or milk drawn from animals affected with any disease of livestock whether contagious, infectious or otherwise capable of causing the milk to become unwholesome;
- b) Milk drawn from animals within thirty days before or ten days after parturition or for butter, curd or cheese-making; and
- c) Milk drawn from animals shall be free from veterinary drug residues like estrogen residue, and others.

³ Recommended International Code of Practice – General Principles of Food Hygiene, CAC/RCP 1 – 1969 available at www.codexalimentarius.net.

⁴ Code of Hygienic Practice for Milk and Milk Products, CAC/RCP 57 – 2004 available at www.codexalimentarius.net.

4.14 Reference

- Dairy Hub Training Booklets on Mastitis. Tetra Pak Group. www.tetrapak.com
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Note: For more information, you may download pre-feasibility studies and sector information through SMEDA website by visiting and registering yourself free of cost at www.smeda.org.pk.