



# FOOD SAFETY IN DAIRY PRODUCTION AND PROCESSING



## Introduction

Food safety, also known as food hygiene, involves a scientific approach regulating how food is handled, prepared, and stored to prevent foodborne illnesses. It requires adherence to various procedures aimed at reducing health risks. Issues related to human health in the context of milk production and processing include errors in pasteurization, consumption of unpasteurized dairy products, contamination by newly resilient pathogens, the increase in antimicrobial resistance among disease-causing pathogens, adulteration of milk with chemicals, transmission of disease-causing pathogens through animal contact, and foodborne diseases linked to culling dairy cows. Some of the key guidelines in ensuring safety within the dairy products processing, marketing and consumption are discussed.

## Quality of raw milk

Milk, being extremely perishable, is especially prone to contamination and the growth of microbes where proper hygiene measures are not maintained during production and processing. Various sources, such as hygienic production and storage methods, handlers, equipment, the environment and packaging materials, can contribute to the contamination of dairy products. To address the risks associated with insufficient food safety standards in the dairy industry, it is essential for dairy farms and processing facilities to follow guidelines such as Good Manufacturing Practices (GMP), Good Hygiene Practices (GHP), and Hazard Analysis and Critical Control Points (HACCP).

## Key Hygiene Practices for the Dairy Industry

Outlined here are important guidelines to maintain high levels of hygiene across all steps of dairy production and processing.

### 1. Milk Production Hygiene

Cutting-edge automated milk production techniques are fast replacing manual milking processes in top-notch dairy farms. However, proper hygiene training should be imparted to everyone involved in the milking process because the two primary contamination sources here are equipment

used and handlers.

### a) Equipment

- Use the recommended milking equipment



**Milking bucket-**  
Milk storage while  
milking especially  
when hand milking



**Milking salve-**  
Lubrication and  
protection of teat  
against pathogens



**Cleaning towels-**  
Cleaning the teats



**Milking machine**



**Milk churn**

- Milk handling equipment should be thoroughly cleaned and sterilised with hot water and sanitisers such as acid sanitizers, quaternary ammonium, chlorine, iodine, and peroxyacetic acid (PPA). Do not use aldehydes, alcohols, phenolics and chlorine dioxide for sterilization of milk equipment. Acid sanitizers are very effective sanitizers and are economical to use e.g. peracetic acid, hydrogen peroxide and nitric acid. Sun drying of milk handling equipment is also recommended.



### **b) Milkers/ Milk handlers**

- They should always wear personal protective equipments (PPEs) while milking that include:
  - ❖ Clean overall/ dust coat
  - ❖ Clean safety boots (Gumboots)
  - ❖ Nose mask
  - ❖ Hair net
  - ❖ Gloves when necessary

Milk handlers should be trained on the safety regulatory requirements when handling milk.

## **2. Dairy processing hygiene**

Effective cleaning and sanitization play an integral role in preserving mandatory hygiene measures in dairy processing plants. Plant hygiene typically comprises of three segments – Processing hygiene, equipment hygiene and personnel hygiene.

### **a) Processing hygiene and equipment hygiene**

- Lack of knowledge pertaining to equipment handling or functioning of machineries is one of the key reasons causing bacterial contamination in milk and other dairy products. To prevent this, it is crucial to impart proper training and ensure routine monitoring of the equipment's working performance. Lubricant contamination should also be prevented.
- Not adhering to equipment cleaning and sanitization standards can also result into contamination through harmful substances such as milk residues, allergens, microorganisms or chemical residues. Therefore, comprehensive cleaning and sterilization of equipment should be undertaken after milk processing.
- Only non-corrosive, industry-approved detergents and disinfectants should be used.

- Maintain optimal drainage system in the processing area and ensure abundant water supply for effective cleaning.
- Using automatic can washer can help prevent milk surface contamination.
- The plant floor and wall should be built from easy to clean materials such as tiles. Ensure regular scrubbing and cleaning of the floor and wall for optimum hygiene.
- Processing room should be free from pests, vermin and pets which could be carriers of the contaminants.
- A footbath and hand washing facility is to be provided at the entrances of the processing rooms to prevent entry of contaminants via feet and hands
- Lack of proper measures to manage dairy waste water is a primary cause of unhygienic work conditions and spreading of contaminants through various sources. At the same time, most dairy farms and processing plants do not have sufficient supply of clean and impurity-free water for rigorous cleaning and sanitization purposes. To maintain proper hygiene and stay compliant to regulatory standards, it is important for dairy plants to implement effective measures for treating dairy waste water. Some of these methods are aerobic treatment, biological filtration and activated sludge.

## **b) Personnel Hygiene**

Human beings are the biggest source of dirt, dust and contamination in a dairy plant, affecting quality and safety of the final product. Keeping this in mind, modern dairy farms and production plants should implement stringent personnel hygiene guidelines as stated below:

- People working in the plant unit should enclose themselves in clean & sterilized work wear, including dustcoats/overalls, face masks, hair caps and gloves. Reinforced safety boots or shoes should also be used.

- Refrain wearing jewelry or cosmetics inside the processing facility.
- Thoroughly wash hands using a high-quality disinfectant or hand-care product before and after leaving the milk processing or production unit. Every time the hands become soiled, they should be cleaned properly before getting back to the work area. Finger nails should be cut short and cleaned. Do not use perfumed hand soaps or lotions. Hands must be properly sanitized for critical production areas.
- Any wounds must be reported to the medical centre and covered by a band-aid type coloured dressing. Processing hand gloves must always be worn on the dressed wound while at work.
- Implement use of hygienic and sterilized clothing in dairy plant to prevent product contamination. The work wear should not be worn outside the production facility. This includes into the toilet, smoking room or canteen. Proper design of hygiene clothing is essential to prevent the skin from coming into contact with the products.
- Wearing hand gloves is mandatory when handling or packaging the dairy products. Feet should be properly covered with high-quality, disposable shoe caps/gumboots.
- Dairy plants should also give utmost importance to effective work wear laundry in compliance with highest standards of hygiene which is vital for safe, sanitized and reusable clothing.
- Workers should also be free from all communicable disease and have a medical examination after every six months.





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