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Public Health and Hygienic Aspects of Milk and Dairy Products: A Review

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Abstract: Milk is a vital ingredient of the dairy industry and is primarily manufactured for human consumption. Due to its substantial nutritional content, milk has a very high nutritional value. Anywhere in the world, including Bangladesh, people consume a variety of dairy products, including butter, cheese, milk powder, dahi, cream, ghee, ice cream, sweets, etc. Different types of microbial development are greatly aided by milk's high nutritional value. Consuming milk and dairy products can result in foodborne infections, according to a recent experiment. Serious foodborne infections are carried on by the numerous microorganisms found in dairy products. Milk and dairy products can be contaminated in a variety of ways. In order to affirm the standards of milk and dairy products, good cleanliness and manufacturing methods in the dairy business are crucial. Strict hygienic measures and precautions must be taken to eliminate the risk of microbial foodborne diseases and to obtain high-quality dairy products. In both rural and urban dairy sectors, hygienic collection, processing, shipping, and marketing are essential. It is important to employ good hygiene practices (GHP), good manufacturing practices (GMP), and hazards analysis and critical control points (HACCP) in the dairy sectors to lower the degree of microbial contamination because food safety is a growing global public health concern. This review will assist researchers, milk and milk producers, businesses, industrialists, and students in learning how to produce safe, hygienic, and high-quality dairy products.

Keywords: Milk, Dairy Products, Dairy Industry, Hygienic Production, Human Health, Food Safety

1. Introduction

Milk plays an important role in the daily diet of humans. Milk production is an important secondary source of income for several farm households involved in agriculture [1]. Milk and dairy products contain a wide variety of nutrients, such as proteins, vitamins, and minerals, that are beneficial for human physical and mental health. The dairy product is made from milk that has high nutritional values and is easily accepted by consumers [1]. Bangladesh's milk production in fiscal year 2020-2021 is 119.85 lakh metric tons [2]. About 60% of whole milk is used to make various traditional dairy products such as cream, butter, cottage cheese, ghee, yogurt, cheese, ice cream, etc., and a variety of sweets are offered in Bangladesh. Dairy products have a major impact on the daily diet of the Bangladeshi population [3]. The total population of cattle and buffalo was 245.45 lakh and 15.00 lakh, respectively, in the period 2020–2021. Milk availability per

capita is approximately 193.38 mL per day per head [2]. Dairy products spoil quickly because they provide an ideal environment for microbial growth. As a result, the Bangladeshi population is at greater risk of acquiring various foodborne diseases [2]. The dairy market demands and frequently provides safe, high-quality products. It is critical to reduce potential exposures to foodborne pathogens and chemical residues by preventing milk contamination through good hygiene practices. The mammary gland is involved in the excretion of various xenobiotic substances from milk residues from veterinary medicinal products and from milk contaminants, as well as other chemical residues from environmental contaminants in pastures, feed, and thus crops [4]. Contamination of milk and milk products can be caused by various microorganisms such as Achromobacter, Acinetobacter, Alcaligenes, Bacillus, Clostridium, Enterobacter, Flavobacterium, Micrococcus, Pseudomonas, Serratia, Alternaria, Aspergillus, Candida, Claicdosporium, Geomyotrichium, Geomyotrichium, Rhpodorcesium) or pathogens (Staphylococcus aureus, Escherichia coli 0157: H7, Salmonella, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogeneses [5]. Food safety ensures that consumers are protected from harm if food is used as intended, prepared, and/or consumed, and it rejects the spread or survival of microorganisms and pathogens during manufacture and processing, handling, manufacturing, packaging, storage, and distribution [8]. This is due to the alarming situation caused by these diseases [6, 7]. From a hygienic standpoint, Good Manufacturing Practices (GMP), Hazard Analysis and Critical Control Point (HACCP), and Good Hygiene Practices (GHP) are crucial in the dairy business to guarantee the quality of milk and dairy products. In order to guarantee wholesomeness, quality, food safety with a long shelf life, and fulfilment of consumer demands, this review attempts to provide a succinct explanation of the relevance of safe and sanitary production of diverse dairy products.

2. Hygiene Management of Dairy Products

Milk is the main source of income for dairy farms and also a source of nutrition for consumers. It is therefore very important to ensure the hygienic production of milk and dairy products. The hygienic handling of milk is understood to mean all conditions and measures that are required in the manufacture, processing, storage, distribution, and preparation of dairy products that do not pose a major health risk if ingested. This covers all the steps involved in making dairy products. It includes every step in manufacturing dairy products. Control of contamination sources, product design and process control Good hygienic practice during production. Processing, handling, and distribution, storage, sale, preparation, and use. Extraneous matters, like dirt, hair, dust, dung, plastics, broken glass pieces, nails, wire, pant leaves, flies, etc., are removed by using a clean strainer. Proper maintenance of the pasteurization temperature is required. Control of the air temperature in the coolers should be maintained. It is recommended that hot water must be used for proper flushing of vending machines [1]. The production of high grade dairy products is made possible by managing the milk quality through sanitary milk handling. For the dairy sector, maintaining proper hygiene is crucial. It ensures the highest food safety standards and offers the highest quality and safest dairy products for end users by helping to prevent contamination from the ingress of pathogens and bacteria through unhealthy milking practices, equipment, milk contact surfaces, handling, storage, or packaging conditions. After milking, the bacteria multiply quickly within 2-3 hours and contaminate the milk. Therefore, the milk should reach the milk collection point quickly, ideally within 2 to 3 hours after milking. The milk is preferably cooled to 4°C and kept at this temperature until processing. The milk consumption of rural and urban populations is shown in Figure 1.

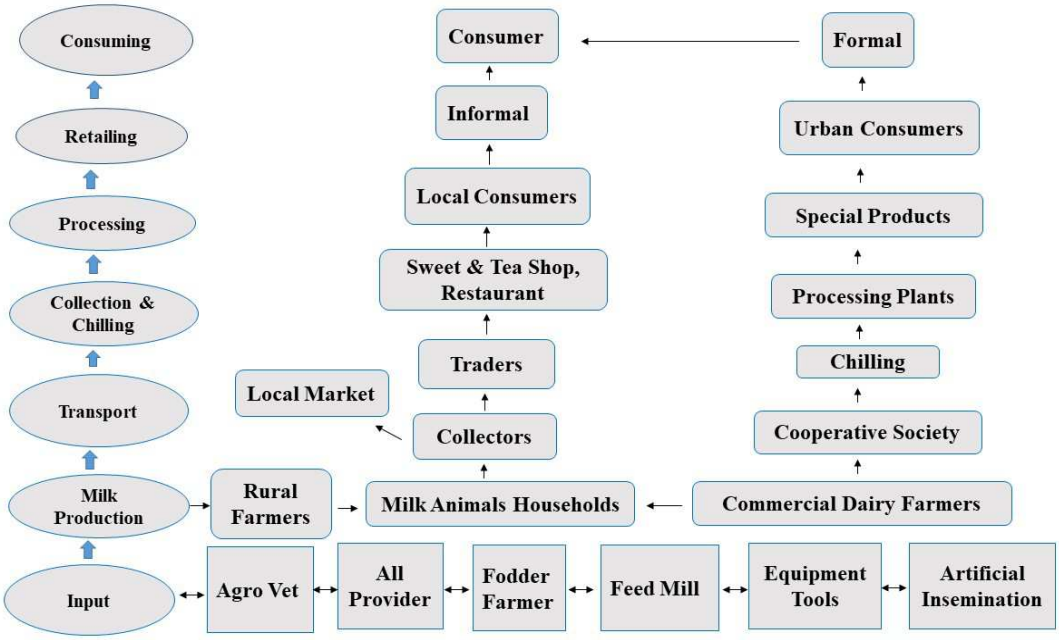

Figure 1. *Flowchart of milk from collection to processing.*

2.1. Milk

The mammary glands of mammals secrete milk, a complex biological fluid with 3.5 percent fat and 8.5 percent SNF [9]. (Non-Fatty Solids). Leukocytes might enter the milk as a result of poor udder hygiene and insufficient sanitary measures, increasing the SCC (Somatic cell count) and signaling mastitis [10]. Milk is a great medium for the growth of many microorganisms that cause product deterioration or consumer food poisoning/poisoning [11]. It is imperative to cool the milk immediately upon receipt. Milk can only be stored at room temperature for 3 hours after milking. The shelf life of milk can be extended by refrigerating it at 5°C for 24 hours. Pasteurization extends the shelf life of milk from 4 to 7 days and up to 3 months with ultra-high temperature treatment [8]. Several research studies have shown that milk is more easily contaminated with microbes than dehydrated dairy products. Organisms such as Pseudomonas spp., Staphylococcus spp., Streptococcus spp., Micrococci, and lactic acid bacteria (LAB) are more common in aseptically expressed milk from the udders of dairy cows [9]. After removing unnecessary particles with the help of a sieve, proper maintenance of the pasteurization temperature is essential. Before and after milk processing in the dairy industry, clean-in-place must be carried out. Air temperature control in refrigerators must be maintained. It is recommended to use hot water to properly clean the machine. Many pathogens survive long in the environment and can get into milk from various sources [8].

2.2. Cream

Cream is a dairy product or milk-based mixture that includes no more than 25% milk fat [12]. The cream has a high milk fat content and also has fat-soluble vitamins (10). The shelf life of the cream can be extended by a more intense heating process [9]. For creams with a fat level of 18% or less, the International Dairy Federation (IDF) suggests a process of 75°C for 15 seconds, and for creams with a fat content of 35% or more, it suggests an 80°C process for 15 seconds [13]. It is essential to take the required precautions to avoid contamination during and after pasteurization once the cream has been prepared with hygienic practices. Additionally advised for optimum cream quality is sterilization. Sweet cottage cheese, sour cream, bitterness, and sterilized cream dilution can all be brought on by bacteria such Bacillus cereus, Bacillus coagulans, Bacillus licheniformis, Bacillus subtilis, Bacillus pumilus, and Bacillus sporothermophilus. It is recommended to chill it below 5°C before packing and to keep it there until use or processing [9].

2.3. Ice Cream

Ice cream is a dairy product that is created from milk or cream that has been frozen, together with fruit, cane sugar, fruit juices, eggs, almonds, dried fruit, chocolate, and other ingredients that can be eaten. A maximum of 0.5 percent by weight of permitted stabilizers and emulsifiers are also present. Before freezing, the mixture needs to be properly heated. It is advised to consume milk with 10% milk fat, 3.5% protein, and 36% total solids [12]. In Bangladesh as well as the rest of the civilized world, ice cream is the most popular frozen treat. Ice cream is consumed by people of all ages as a frozen dairy product that has been enriched with nutrients [14]. It is an excellent source of protein, fat, and several vitamins and minerals. Milk is the base for making high-quality ice cream, which is then combined with a variety of additives, including sugars, flavors, fruits, nuts, and stabilizers [15]. The eight essential phases in the creation of ice cream, such as pasteurization, freezing, and hardening, are crucial for getting rid of microbial risks. In ice cream, a number of pathogens have been discovered [16]. Microorganism development can be accelerated by inadequate pasteurization, contamination after pasteurization, or incorrect chilling of the combination [17]. The hygienic standards followed throughout manufacture are an indication of the ice cream's quality [18].

2.4. Butter

Butter is a product made from milk, cream, or curd with or without the addition of table salt and annatto, or carotene, as coloring. It should have a fat content of 80% milk, 1.5% curd, and 3% table salt [12]. Butter is an ancient dairy product that first appeared around 300 BC and was used by the Egyptians [19]. It is very popular for its shelf life and nutritional value. It contains all the nutritional components of the milk from which it is made, and especially fat-soluble vitamins such as A, D, E, and K. The main components of normal salted butter are fat, protein, water, calcium, phosphorus, and salt. The use of salt increases the aroma, taste, and shelf life of butter [20]. Butter has a variety of purposes. Butter is a key ingredient in the production of several baked goods in the bakery [13]. The contamination of the cream is crucial for creating butter from cream. Cream contains a variety of microorganisms, including Clostridium spp. and Bacillus spp., just like raw milk [21]. After separation, cream is utilized for pasteurization in the production of industrial butter. Pasteurization kills the majority of microorganisms, including lactic acid bacteria (LAB), but some thermoduric organisms, like streptococci and microbacteria, may still be present in small quantities [22]. Strong growth of Flavobacterium spp., Pseudomonas putrefaciens, Shewanella putrefaciens, Pseudomonas fragi, Pseudomonas fluorescens, Pseudomonas mephitica, and Pseudomonus can lead to defects in the industrial butter such as surface discoloration, fruity smells, proteolytic activity, and black discoloration. Sometimes unhygienic butter consumption leads to food-borne outbreaks [23].

2.5. Cheese

Cheese is a dairy item made from cottage cheese, obtained from milk by curdling casein. There are numerous ways to

make cheese, which largely differ in the fundamental production step that influences the cheese's color, texture, flavor, and water content. There are more than a thousand different names for cheese that are used globally [9]. Several nutrients are added to cheese to fortify it. The Mediterranean diet usually includes proteins, different minerals, and vitamins, all of which are growing in popularity [24]. The main step in making cheese is to coagulate the milk curd using non-animal rennet or other suitable coagulants. It might be juvenile or mature, soft, semi-hard, hard, or extra-hard. For maturation, additional starting cultures are added. All around the world, several types of cheese, including blocks, slices, chopped, shredded, and grated cheese, are widely used [25]. Pasteurization of milk eliminates numerous spoilage organisms, vegetative spores of microorganisms, and some of the enzymes found naturally in milk. Pasteurization may have an impact on how cheese ripens and develops flavors, according to some scientists. According to a recent study, pasteurization when utilizing high-quality milk results in textural variations but little affects taste and aroma [26]. It should be noted that cheese can be contaminated by food-borne pathogens, Listeria monocytogenes, in the post-processing phase [27]. Other defects, such as cracks in cheese, can occur due to excess gas generated by certain strains of Lactobacillus helveticus and Streptococcus thermophiles [28]. Improper handling, incorrect processing, and improper hygienic measures can lead to the development of undesirable flavors, affect the texture, and also bacterial and fungal attacks can occur. Mycotoxins are occasionally produced. Daily cleaning and disinfection of pipes, equipment, and utensils is very important for the production of quality cheese. Before the pasteurization of raw milk, bactofugation is very helpful to reduce the bacterial count [29].

2.6. Milk Powder

To make a solid that contains 5% or less moisture, the water in milk must be removed using heat or another acceptable method to create milk powder [13]. Cow, buffalo, goat, or a combination of such milks are used to make milk powder. By adding or eliminating milk constituents, the amount of fat and the whey protein to casein ratio can be changed [25]. Due to its long shelf life, small storage footprint, and inexpensive shipping, milk powder has many advantages over liquid milk. It is utilized as a raw material to create dairy products with a longer shelf life, such as cheese, ice cream, dahi, and whey powder. Milk powder is more affordable to ship and needs less storage space [30]. In the past, milk powder was made by drying milk in the sun. Large-scale production of milk powder is possible today. The maximum shelf life of whole milk powder is 6 months and of skimmed milk powder is 3 years [31]. Several microbes are found in powdered milk. Salmonella, Bacillus, Clostridium botulinum, Clostridium perfringens, Cronobacter species, intestinal virus pathogens, and mycotoxin-forming molds are the most common [32]. Raw milk of high microbial quality is used for the production of milk powder. Evaporators are also responsible for microbial contamination. Proper cleaning and disinfection can reduce the risk of contamination. Using a clothes dryer is very effective at killing microbes. Hygienic conditions must be observed in the drying room in order to produce contamination-free milk powder. The supply of filtered air for dryers, conveyors, cooling processes, and air purification is very important. Therefore, the filter mats must be cleaned regularly to remove accumulated dust. All vacuum trays, pipes, concentration tanks, packing rooms, and storage containers must be completely disinfected [33].

2.7. Dahi

In Bangladesh, dahi is the most well-known and widely consumed fermented milk product. Due to its exceptional palatability, it is consumed all throughout the country. Additionally, it is a good source of protein, riboflavin, vitamin A, magnesium, potassium, calcium, phosphorus, and riboflavin [7]. It also functions as a probiotic, which is good for the health of our digestive system. Although goat and buffalo milk are also used in Bangladesh, cow milk is the most frequently utilized to make dahi. In Bangladesh, starter cultures are used to produce dahi using a variety of beneficial fermented bacteria, including Streptococcus thermophillus, Lactobacillus bulgaricus, Lactobacillus acidophilus, Lactococcus lactis, etc. Through the production of desirable traits including lactic acid, scent, flavor, texture, and flavor, this culture contributes to the production of high-quality dahi. Dahi serves as an excellent growth medium for various types of microorganisms. Without basic hygiene measures, dahi contaminated with potential microbes during handling, processing, packaging, storage, and distribution can spoil and become harmful immediately [34]. Microbial contamination can create public health risks and also affect product quality, which can lead to economic losses [35]. It is very important to use good quality milk to make high quality dahi. It is recommended not to use raw milk with a high bacterial load, which can affect the quality of the dahi. Sometimes, sugar is the main source of yeast, mold, and bacterial spores. The best quality can be achieved by using sugars with a mesophilic number of less than 20 and yeasts of less than 1 per gram. Fruit, both fresh and frozen, must be yeast-free. There are many germs since equipment and utensils used to make dahi are cleaned and washed properly. Throughout the manufacturing process, as well as on the milk floor and other surfaces, strict hygiene procedures must be followed. In order to prolong the life of the dahi, hygiene precautions should be taken during packaging, storage, and transportation. Because of this, it is advised to practice stringent hygiene standards to lower microbial contamination [7].

3. Microbiology and Milk

A significant nutritional value is added to milk through fortification, including sugar, lactose, proteins, lipids, vital amino acids, minerals, and vitamins. Milk contains Ruminococcus, Bifidobacterium gene, and Peptostreptococcaceae [36]. The teat canal, udder skin,

milking equipment, tanks, and storage containers are also potential sources of microorganisms [37]. It is crucial to evaluate the makeup and development of the milk microbiota, as well as how these factors affect the composition of milk and its derivatives from the time of milking through transportation, storage, and conversion into dairy products [38]. Dairy products often provide an ideal environment for a wide variety of foodborne microbes and zoonotic agents to grow. Milking healthy cows produces high quality, low-germ count milk. Milk can be contaminated by spoilage microorganisms and foodborne pathogens from a variety of sources. The risk of pathogens and accompanying diseases multiplying with raw milk and dairy products is 150 times higher than with pasteurized dairy products [39]. A follow-up study of raw milk and cheese data from 2009 to 2014 estimates that the consumption of these raw products carries an 840-fold higher risk of disease compared to pasteurized products [40]. Herd health has been linked to specific zoonoses caused by animals such as Salmonella spp., Mycobacterium bovis, Mycobacterium subsp., paratuberculosis, brucellosis, and Escherichia coli 0157: H7 focuses on sanitary conditions and health risks [41]. The outcome of the microbiological examination of milk can be influenced by microorganisms in the teat canal and on the surface of the teat skin [42]. The use of milk and dairy products can spread a number of microorganisms to people [43]. Coliforms, such as coliforms, fecal coliforms, E. coli, the total number of Enterococcus species, and aerobic count, are frequently employed to ensure the safety of food [44]. The majority of coliforms do not cause disease and may be caused by faecal contamination, which is accompanied by the presence of intestinal pathogens [45]. Most pathogens that are dangerous to the public's health can be killed by pasteurization. However, tainted components and poor handling might still cause the pathogen to remain in the milk product after pasteurization [46]. The report shows that the causative agents of the various milk-borne diseases have changed dramatically over time. Most of them (at least 90%) milk-borne disease pathogens were of bacterial origin, and at least 21 milk-borne diseases are currently reported [47]. The microbes involved in foodborne outbreaks include *Salmonella*, *Staphylococcus aureus*, and *E. coli*. These pathogenic bacteria can cause serious health risks [48].

4. Public Health and Dairy Products Zoonosis

Humans and other vertebrates can both contract zoonotic diseases through the consumption of milk [49]. The transmission of several zoonotic illnesses can occur in a variety of ways, including through the ingestion of tainted milk, close contact with infected animals, animal products, and polluted agricultural surroundings [50]. Numerous zoonotic pathogens, including Campylobacter jejuni, enterohemorrhagic Escherichia coli, Salmonella typhimurium, Listeria monocytogenes, Staphylococcus aureus, Yersinia enterocolitica, etc., are present in various dairy products. These microorganisms being present in milk seems to be detrimental to public health [51]. The presence of different pathogenic bacteria in milk is the cause of over 90% of milk-related zoonotic infections [52]. Improper handling and pasteurization of milk and dairy products can result in foodborne disease outbreaks [53]. Today, E. coli 0157: H7 has become a serious threat to the dairy industry, causing everything from diarrhea to fatal hemolytic uremic syndrome (HUS) [54]. Streptococci are bacteria with approximately 40 subspecies and multiple groups that cause subclinical mastitis in dairy cattle and economic loss in the dairy industry [55].

Streptococcal species cause clinical and subclinical mastitis in animals, and scarlet fever, sore throats, tonsillitis, bacterial endocarditis, rheumatic fever, and pneumonia in humans [56].

5. Milk and Milk Products

People of all ages are satisfied to consume milk and dairy products since they are entire foods [57]. It is crucial to recognize the physical, chemical, and biological risks that can occur throughout each stage of processing various dairy products. Chemical contamination during food preparation can result through the inclusion of numerous chemicals [11]. Numerous bacteria that are significant sources of foodborne pathogens can be found in milk. Through direct contact with polluted sources near dairy farms, foodborne pathogens can be found in milk [58]. Consuming tainted food is bad for the general population's health [59]. To lower the risk of infection, pasteurized milk is sold commercially [60]. Pasteurization helps to minimize germs by 99.999 percent because it reduces pathogens (5 records). Consuming dairy products that have not been pasteurized is known to have negative effects on public health [57]. Because viruses and spores can be rendered inactive by the heating process, ultra-high temperature milk (UHT) has a lengthy shelf life at room temperature [60]. Milk is continuously subjected to UHT treatment in order to create a product that is "commercially sterile." It also significantly affects the product's flavor, color, and nutritional value [61]. It also affects the product's physical and chemical stability. The yogurt's quality is determined by the raw materials, the production method, and the flawless operation of the production facility and line. When yogurt is fermented by Lactobacillus bulgaricus and Streptococcus thermophiles, its physical and molecular characteristics change [60].

Cheese is a dairy product that has been condensed to contain predominantly milk proteins and lipids. Salt, starter cultures, rennet, and milk are the essential components of cheese. The moisture content, flavor, and texture of cottage cheese are all influenced by the formation of acid by bacterial cultures [62]. Foams made of air cells enclosed in a partially frozen emulsion are what make ice cream and other frozen drinks. Water, fat and non-fat milk solids are the basic ingredients in ice cream, along with sugar, emulsifying stabilizers, colors, flavors, and fruits or nuts. Ice cream is a

product made from carefully inspected raw ingredients that has been pasteurized, homogenized, matured, cooled, and frozen. Ice cream consists mainly of water, fat and non-fat milk solids combined with sugar, emulsifying stabilizers, colors, flavors, and fruits or nuts. Ice cream is a product obtained from controlled raw materials, processed through pasteurization, homogenization, maturation, cooling, freezing, keeping air in the composition, with or without glaze, and is sold in various pots or wafers [63].

Butter is made from milk, cream or yogurt and should not contain any fats or oils other than milk fat. It must be made from cream or yoghurt and its fat content must be at least 82% according to the relevant standard [64]. It is best to avoid vacuum deodorization combined with direct steam injection for heating the cream. The presence of indicator bacteria and other bacteria in lower levels is what determines the quality and safety of milk and milk products [65]. One of the veterinarian's main duties is to provide consumers with safe and nutritious food. The germ count for raw milk production must be less than 105 CFU/ml in accordance with EU rules. Microbiological analyses therefore serve a significant role in the dairy business in preserving public health and preventing financial losses by allowing for the early identification of faulty handling, packaging, or refrigeration. Therefore, the immediate detection of microorganisms in the cow is necessary, which makes a significant contribution to the food chain through the milk.

6. Mastitis

Mastitis is the most serious problem in the dairy industry, causing enormous economic losses [65]. Milk production, milk quality, and treatment, labor, and maintenance costs all rise. The slaughter of a severely affected cow also results in significant economic losses [66]. Mastitis is caused by several different types of bacteria. Mastitis is more common in high-yielding dairy cows than in local breeds [67]. Mastitis can be caused by a number of factors. Changes and abnormalities in the physical and chemical properties of milk occur in the mammary gland [68]. Mastitis is caused primarily by Staphylococci spp., Streptococci spp., and some gram-negative bacteria [69]. Other pathogens are staphylococci (Staph. aureus and Staph. epidermidis), streptococci (St. Agalactiae, St. dysgalactiae, St. uberis, and St. bovis), and coliforms (mainly E. coli and Klebsiella pneumonia) are also responsible. Mastitis causes massive economic losses by reducing output and raising maintenance costs. It costs the state money because it generates less income due to lower milk sales. Furthermore, the affected cow must be removed and replaced with a healthy one. As a result, the price must be raised. The medication, the purpose of the diagnosis, and the labor involved in caring for the affected cows would all incur additional costs. When fertility is compromised, annual calf production must be reduced. Due to the low fat and protein content, greater somatic cell count, and overall germ count of the cows with mastitis, the milk quality must be degraded, which decreases the market price for raw milk [69]. Milk production is impacted by mastitis, whether it is subclinical or symptomatic. Low milk production is caused by physical changes in the mammary gland tissue [70]. According to one study, 96.9% of the samples represented numerous inflammatory alterations that take place when the mammary gland is inflamed [71]. Inflammation might therefore result in a decrease in appetite and food intake, which lowers milk production. The udder serves as the primary reservoir for bacteria that cause infectious mastitis in cows. The bacteria that cause it are found on the udder and nipple skin. According to reports, 7 to 40% of all cows have common infectious diseases [72]. While milking, infectious mastitis can spread from cow to cow, with new infections most frequently occurring during lactation [64]. Depending on the pathogen and the final product, mastitis can have a variety of implications on product quality. Mastitis can compromise the crucial sensory qualities of milk, such as its flavor, aroma, or appearance. The imbalance of the milk's constituents can be used to detect the salty flavor. While lipid-degrading enzymes release fatty acids, proteolytic enzymes can make milk taste harsh. Spore-forming bacteria that are found in raw milk can be activated during cheese ripening, forming gases and breaking down certain products. When cheese ripens, spore-forming bacteria that are present in raw milk are active, generating fumes and degrading some ingredients. The CCS of bulk milk increases from 100 to 400,000 cells/ml, which causes a more than 3% decline in sales at the processing plants. In order to improve the wellbeing of the cows and to provide a high-quality product, producers work to reduce the occurrence of subclinical and clinical mastitis in their herds.

7. Conclusion

Milk contains all of the essential nutrients that people of all ages require. The taste, texture, and quality of dairy products significantly improve this nutrient. It also acts as a carrier for viruses that degrade milk quality and cause a variety of disorders. As a result, sanitary collection, processing, transportation, and dissemination are critical in both rural and urban dairy sectors. Manufacturing must take place in exceptionally hygienic conditions to maintain product quality. It is recommended to boil milk before converting it into a dairy product. Consumer demands are met by maintaining proper food safety measures. It will provide the food industry a legal basis and compass. Maintaining food safety continues to be a major public health challenge in our country. Effective action must be taken to prevent dairy contamination.

8. Recommendation

Preserve the quality and safety of food and supplies. The following points are suggested to overcome the current scenario for milk and dairy products and their supply chain.

(1) Build improved milk collection systems in rural and remote areas.

(2) Improve access to inputs, markets, and services.
(3) Design of an improved milk transport network.
(4) Organize better access to quality services at the factory level.
(5) Initiate the establishment of the National Food Safety Policy and the Security Council.
(6) Increase the capacity of the public health laboratory, staff, and existing foodborne disease surveillance system.
(7) Dissemination of information on food hygiene through the media.
(8) Upkeep of HACCP and cold chain systems.
(9) Finally, set up a national food safety authority as an independent regulator.

Conflict of Interest

All the authors do not have any possible conflict of interest.

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