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**Review Article**

# Milk Handling, Hygienic Practise and Microbial Qualities of Milk in Ethiopia

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**Abstract:** This article had reviewed several research papers and collected information and tracked up. The review revealed that most of the dairy men have the perception that bad quality milk affects the health wellbeing of human (consumers). But the main problem concerned with the hygienic practice is that there is no standard (clear cut point) to be followed by the smallholder dairy producers. The producers do right what they perceive correct enough to keep the quality like washing their hand before milking without detergents and sanitizers. There were differences in hand washing, with some people not washing their hands. There was a difference between breast hygiene practices, drying and sterilization. Most respondents use traditionally made equipment for milking and storage in rural Ethiopia, while they use little plastic or stainless steel in areas around cities and towns. This review found also that the smallholder in most parts of the country do no sterilize the milk utensils even they do not wash. But in some cases they use their indigenous knowledge like fumigation and smoking. Generally, the hygiene standards and quality of milk in Ethiopia are low, resulting in high microbial levels in the milk. Given these facts, the sector needs to intervene in awareness and training, both in the short term and, if possible, in the long term.

**Keywords:** Handling, Hygiene, Milk, Microbial, Practice, Quality

## 1. Introduction

Milk as in this article perhaps defined as “the eadable fluid collected from the mammary cells of mammalian animals. It is very nutritious and complete diet which is preferred to peoples of all age [1]. Milk as it is the source energy, protein, fat, micro and macro minerals in addition to vitamins as a result of which it is considered as perfect food. People started the utilization of milk during ancient time [2]. The fermentation of cow milk begun with the aim of curbing the lactose intolerance by herd men [3]. Many Authors summarized that milk preservation utensils in country side are usually prepared from locally available materials like woven grass, calabash, hollowed wood plastic jars and stainless steel jars [4, 5]. To prepare quality fermented milk, farm sanitation, personal hygiene and routine activities have been taken into consideration. The physicochemical and microbial qualities of milk are improved by cleaning cows’ teat and udder, hygienic milking and milk handling from pollution free farm [6].

Milk is the most perishable of all farm output products. Contrary to other animal origin produce, milk is continuously harvested and consumed either fresh or after fermented which is perhaps produced from unhygienic farm. In tropics the environmental conditions are also conducive for milk spoilage. Microbes which can either harm the milk consumer or use in milk processing and natural fermentation get into milk from a various bases [7]. The decision that expresses whether milk quality is good or bad is made based on its chemical constituent and standard of hygiene at milk Parlour, storage and handling facilities including cleanliness of the udder of the individual animal [8]. Production of milk and various milk products under unsanitary conditions and poor production practices can exert both a public health and economic constraints.

Milk quality is paramount important for the consumer and also for milk processing plants. It is very serious as it has associated risk factors with the health of the consumer. There were ample studies done on the microbial and physicochemical properties of milk. At the same time as consumers are very

sensitive to dairy products it requires updated information. Hence this paper was aimed to plug out these gaps.

*Objectives*

The objective of this review was to inspect information on the physicochemical qualities and microbial properties of fresh milk.

# 2. Milking Hygienic Practices and Handling

Sanitation is of paramount important issue in the sector of producing milk because it directly concerned with the healthy well-being of the dairy product consumers. The absence of standard hygienic condition practiced by producers which probably vary based on production system, adapted practices, experience and availability of resources [9], during milk production is the primary unhygienic dairy end products. In almost all parts of the Ethiopia milking takes place by hand. The result of the finding of [10] which was conducted in Bahirdar city indicated that, about 85.8% of milk producers wash their hand before milking, 28.3% clean the milking area before milking and only 14.1 wash the udder before milking and most of them (74.6%) don't dry their hand. Nearly eighty nine percent of the interviewed farmers responded that they use low quality bedding which could affect qualities of milk and its products [11]. In order to maintain high milk quality, personal hygiene is must. There should be proper wearing and personal hygiene provided that they are free of person to person transmitting disease [12]. Unhealthy milk harvesting and no or poor postharvest technology affects milk quality at large and; children in the pastoral areas directly consume (suckle) from unclean teats as their babies do [13]. In addition to this they deny boiling milk as they believe it kills milk nutrient and for what they call 'dead milk'. This can be summarized with the following diagram.

## *2.1. Milker Hygienic Practices*

Milk is extremely perishable and easily gets spoilage; lose its quality and safety shortly unless preserved hygienically [14].

The first step that most dairy cow milking procedure follows is washing hand and drying with towels. Milk easily undergoes perish due to its conducive composition due to this attention should be given both during preservation and transportation [12].

***Table 1.*** *Hygienic practices regarding milkmen and equipment cleanliness.*

| **Hygienic practices sources in percent** | | | | | |
|---|---|---|---|---|---|
| **S/N** | **washing hand** | **wash udder before milking** | **dry udder with towel** | **wash utensils** | **Authors** |
| 1 | 85.8 | 36 | 9.6 | - | Yeserah et al. (2020) |
| 2 | 66.1 | 48.8 | 23.6 | - | Kibebew et al. (2020) |
| 3. | 77.2 | 82.5 | 48.1 | - | Amistu eat al. (2020) |
| 4 | 1.6 | 0.8 | | 98.4 | Mitiku et al. (2019) |
| 5. | 100 | 24 | 9.7 | - | Daginet (2020) |
| 6 | 89.1 | - | - | 100 | Alelign et al. (2020) |
| 7 | 92.2 | 37.3 | 21 | 92.2 | Edget et al. (2020) |
| 8 | 52.5 | | | 100 | Tadele et al. (2016) |
| 9 | 100 | 100 | 54 | 100 | Lencho (2018) |
| 10 | 150 | 0 | 0 | 73.33 | Bashir |
| 11 | 60 | 60 | | 60 | Chala and Mitiku, 2021 |
| 12 | 58 | 35.8 | 35 | | Oumer et al. (2017) |
| 13 | 97.5 | 95.8 | | 93.3 | Bashier et al.(2018) |
| 14 | 97.5 | 82.4 | | 95.8 | Sensay et al.(2020) |
| 15 | 100 | 62 | | | Shewangzaw (2016) |

From the above table which collects results of different Authors, there was variation with regards to washing their hand as some of them did not do. There were differences among udder hygienic practices, drying and sterilizing. Most of the respondents use plastic and stainless steel in rare case in areas around cities and towns while traditionally prepared equipment in rural parts of Ethiopia during milking and preservation.

## *2.2. Milk Handling Utensils and Hygiene*

Milk handling is the most important factor that determines the qualities of dairy products even after processing. The pre and postharvest hygienic standard of milk preservation determines the degree of contamination of fresh milk with pathogens. Absence of freezing preservation services at smallholder dairy farmers in the rural and pastoral area with conducive environmental conditions denotes that fresh milk simply get into spoilage ([15]. Milking and milk storage equipment have to be correctly washed and dried in an upturned position before use to minimize contamination due to equipment. Additionally, it is better to use utensils which do not easily rust and simple to inspect and clean.

***Table 2.*** *Reflection on Handling and transporting equipment.*

| **Handling and transporting equipment (%)** | | | | | |
|---|---|---|---|---|---|
| **S/N** | **Plastic** | **clay pot** | **stainless steel** | **other** | **Authors** |
| 1 | 100 | - | - | - | Lencho (2018) |
| 2 | 84 | 4.6 | - | 9.4 | Yeserah (2020) |

| Handling and transporting equipment (%) | | | | | |
|---|---|---|---|---|---|
| S/N | Plastic | clay pot | stainless steel | other | Authors |
| 3 | 83 | | 7 | 10 | Kibebew et al.(2020) |
| 4 | 81.96 | | 1.46 | 16 | Mitiku et al.(2019) |
| 5 | 84 | 16 | - | - | Oumer et al. (2017) |
| 6 | 95.2 | | 4.2 | 0.8 | Bashier et al.(2018) |
| 7. | 64.6 | | 6.67 | 28.9 | Shewangzaw (2016) |
| 8 | 33.3 | | | 55.6 | Gurmesa (2015) |

From the above table 2, it can be summarized that dairy producers mostly use plastic containers for handling and transportation because of its easiness to use and simplicity to move it from place to place as it is not that much fragile.

### *2.3. Status of Microbiological Quality of Raw Milk*

The status of microbial load of fresh milk in Ethiopia from different regions was given in table 3 below. Milk is a typical mammary secretion acquired from mammals that did not undergo processing or didn't receive any type of treatment. Fresh milk is well-defined as milk, which has not been heated further or undergone any treatment that have an equivalent effect stained from one or more milking without adding foreign materials removing its constituent like fat that is needed for marketing, home consumption or further processing [16]. Raw milk consists of microorganisms that experience proliferation when inappropriately preserved. Some of the microbes in raw milk of healthy animals are neither pathogen nor useful however it becomes possibly dangerous when certain condition that related with animal health or post-harvest milk contaminants [17]. According to [18], Health of the animal, sanitation of the barn, feed and water qualities, the equipment, personal hygiene are most significant factors that speed up microbial spoilage of fresh milk this idea is also supported by [19].

***Table 3.*** *Summary of Level of each microorganism in (log10 cfu/mL).*

| Level of each microorganism in (log10 cfu/mL) | | | | | |
|---|---|---|---|---|---|
| S/N | CC | TBC | YMC | Area of study | Authors |
| 1 | - | - | 9.82 | SNNPR Garage | Abebe *et al*. (2012) |
| 1 | 7.54 | 7.25 | | Holeta | Solomon et al, (2015) |
| 3 | 9.81 | 7.09 | | SNNPR Mizan | Teshome and Tesfaye, 2016 |
| 3 | 3.70 | 5.71 | 3.16 | Sibu sire (Oromia) | Chala (2021) |
| 4. | 4.82 | 6.21 | 3.90 | Meta (Oromia) | Mitiku Et al. (2019) |
| 5. | 5.85 | | 5.15 | Mersa (Wollo) | Oumer et al. (2017) |
| 6 | 4.49 | 7.58 | | Bahirdar (Amhara) | Haftom (2016) |
| 7 | 6.32 | 8.16 | | 5.29 | Gurmesa (2015) |

CC: coliform count, TBC: total bacterial count, YMC: Yeast and mold count

From the above table 3, it can be generalized that most of the Authors use total bacterial count, coliform count unit and yeast and mould count as parameters to measure the bacterial loads within milk.

### *2.4. Source of Milk Hazardous Microbes*

milk microbes usually gets into milk from sick animals, poor absence of sanitation of barn, poor personal hygiene, equipment, feed and polluted water source for drinking water or routine practices of farm [20]. Microbes are originated from milk and milk products represent two to six percent of food-borne epidemics. The consumption of contaminated milk results in sickness. the primary milk born pathogen is consuming milk of unhealthy wow, unclean farm worker, equipment, farm, milking parlour or processing [21].

### *2.5. Impact of Unsafe Milk*

Livestock and its derivatives (livestock by-products) are using as the sources of basic diets in human neutrino from ancient time. Pathogenic milk microbes are health intimidating [22]. The wellbeing of dairy goods w ith regards to foodborne diseases is a great anxiety globally, particularly in developing nations [23]. Unsafe milk is forced either to be withdrawn or need further treatment which is costly and affects the profitability of the dairy farm.

## 3. Conclusion

In order for the fermented milk to be obtained, it is must to keep and produce high quality milk at farm level. The quality of milk is paramount important for the consumer and also for milk processing plants. It is very serious as it has associated risk factors with consumers' healthy. There is no clear cut point (specific guideline) with regards to hygiene to be practiced by dairy producers in Ethiopia. Generally, the hygienic level and qualities of milk in Ethiopia is poor which resulted in higher load of milk microbes. Due to these facts the sector needs intervention in awareness creation and training Wether it is short and long term as possible.

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