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Review on handling, hygienic practices and microbial qualities of raw 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. 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.

Keywords: Handling, hygiene, milk, microbial, practice, quality

1. Introduction

1. 1 Background and justification

Milk as in this article maybe characterized as "the eadable liquid collected from the mammary cells of mammalian creatures. It is exceptionally nutritious and total count calories which is favored to people groups of all age O"Mahony (1988) [26] depicted drain because it is the source vitality, protein, fat, miniaturized scale and large scale minerals in expansion to vitamins as a result of which it is considered as idealize nourishment. Individuals began the utilization of drain amid antiquated time. The aging of bovine drain started with the point of controlling the lactose narrow mindedness by group men (Curry, 2013) [8].

Numerous Creators for case (Alganesh, 2002 and Lemma, 2004) [3, 21] summarized that drain conservation utensils in nation side are as a rule arranged from locally accessible materials. To get ready quality aged drain, cultivate sanitation, individual hygiene and schedule exercises need to take into thought. The physicochemical and microbial qualities of drain are moved forward by cleaning cows' nipple and udder, clean draining and milk dealing with from contamination free cultivate.

Drain is the foremost perishable of all cultivate yield items. Opposite to other creature root create, drain is persistently collected and expended either new or after aged which is maybe delivered from unhygienic cultivate. In tropics the natural conditions are moreover conducive for drain deterioration. Concurring to Quigley (2013) [29] organisms which can either hurt the drain shopper or utilize in drain handling and normal aging get into drain from a different bases. Swai, 2011 [32] detailed that the choice that communicates whether drain quality is nice or terrible is made based on its chemical constituent and standard of cleanliness at drain parlour, capacity and taking care of offices counting cleanliness of the udder of the person creature. Generation of drain and different drain items beneath unsanitary conditions and destitute generation hones can apply both an open wellbeing and financial imperatives.

Drain quality is paramount important for the shopper conjointly for milk preparing plants. It is exceptionally genuine because it has related chance components with the wellbeing of the buyer. There were sufficient ponders done on the microbial and physicochemical properties of drain. At the same time as customers are very sensitive to dairy items it requires overhauled data. Thus this paper was pointed to plug out these crevices.

1.2 Objectives

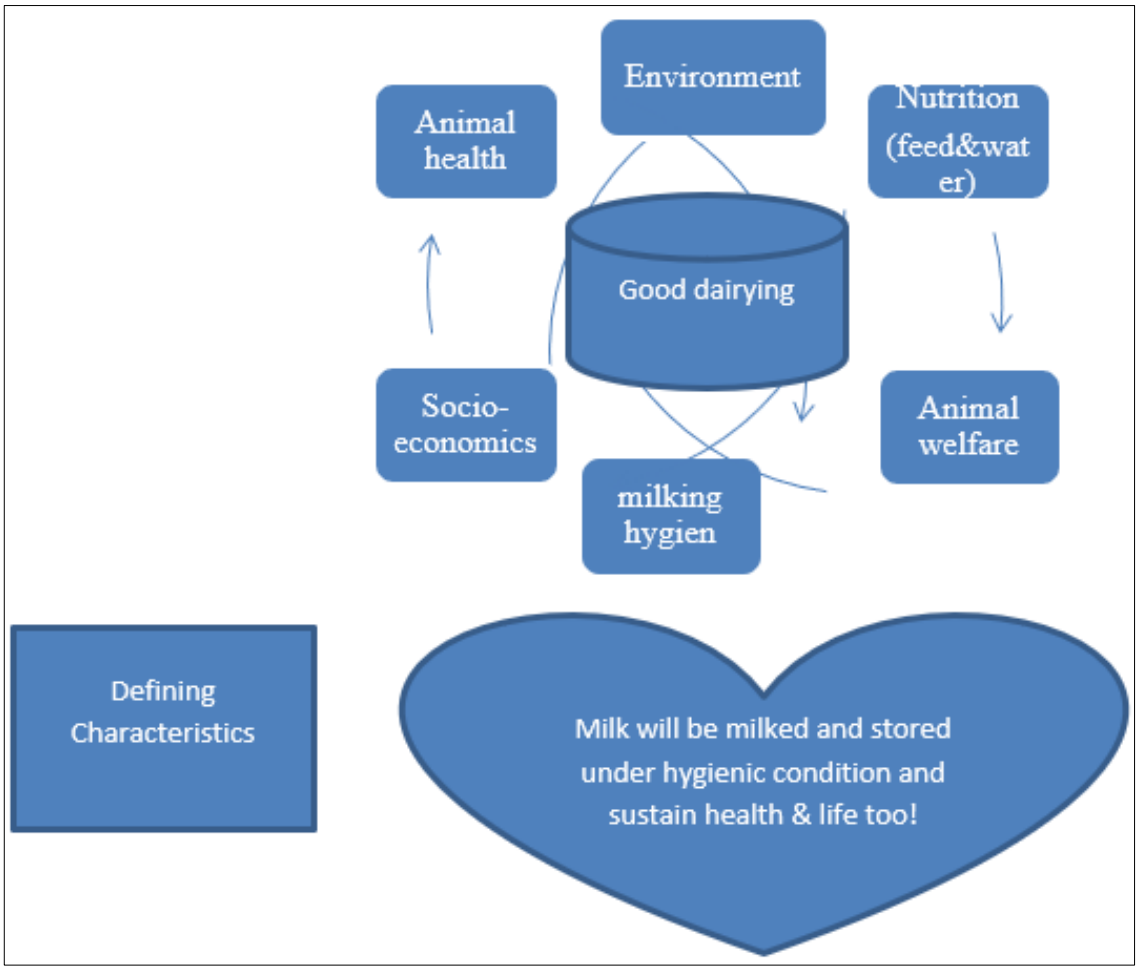
1.2 Objectives

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 foremost critical issue within the segment of creating drain since it straightforwardly concerned with the sound well-being of the dairy item customers. The nonappearance of standard clean condition practiced by makers which likely shift based on generation framework, adjusted hones, encounter and accessibility of assets (Zelalem, 2003) [35] amid drain generation is the essential unhygienic dairy conclusion items. In nearly all parts of the Ethiopia draining takes put by hand. Agreeing to Lencho and Seblewongel (2017) [36] all of the dairy makers within the Bishoftu town, draining is done by hand lion's share of the makers wash their hand with water, draining takes put within the animal dwelling place with the nonattendance of cleaning the barn. The result of the finding of Yeserah (2020) [34] which was conducted in Bahirdar city demonstrated that, almost 85.8% of drain makers wash their hand some time recently draining, 28.3% clean the draining range some time recently draining and as it were 14.1 wash the udder some time recently draining and most of them (74.6%) do not dry their hand.

Kibebew *et al.*; (2020) [19] concluded that about eighty nine percent of the met agriculturists reacted that they utilize moo quality bedding which might influence qualities of drain and its items. Barret & Larkin (1979) [37] had drawn conclusion that, in the event that you wash bovines udder earlier milking you can evacuate grimy materials not microbes existing with cows' outside body. Agriculturists see that nipple can be cleaned by letting suckling. In arrange to preserve tall drain quality, individual cleanliness is must. There ought to be appropriate wearing and individual cleanliness given that they are free of individual to individual transmitting infection (Kurwijila, 2006) [20]. Kebede (2019) [18] found that undesirable drain gathering and no or destitute postharvest innovation influences drain quality at huge and; children in the peaceful zones straightforwardly devour (suckle) from unclean teats as their babies do. In expansion to this they deny bubbling drain as they believe it slaughters drain supplement and for what they call 'dead milk'. This may be summarized with the taking after below diagram.



2.1. Milker hygienic practices

According to (Fernandes, 2009) [12] milk is extremely perishable and easily gets spoilage; lose its quality and safety shortly unless preserved hygienically.

1. Hand washing and drying during milking.
2. Washing and sterilizing utensils.
3. Washing and drying udder.

2.1.1 Hand Washing and Drying

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 (Kurwijila, 2006) [20].

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) [34]
2.	66.1	48.8	23.6	-	Kibebew *et al.* (2020) [19]
3.	77.2	82.5	48.1	-	Amistu *et al.* (2020)
4.	1.6	0.8		98.4	Mitiku *et al.* (2019) [23]
5.	100	24	9.7	-	Daginet (2020)
6.	89.1	-	-	100	Alelign *et al.* (2020) [2]
7.	92.2	37.3	21	92.2	Edget *et al.* (2020) [11]
8.	52.5			100	Tadele *et al.* (2016) [33]
9.	100	100	54	100	Lencho (2018) [35]
10.	150	0	0	73.33	Bashir
11.	60	60		60	Chala and Mitiku, 2021 [23]
12.	58	35.8	35		Oumer *et al.* (2017) [28]
13.	97.5	95.8		93.3	Bashier *et al.* (2018) [38]
14.	97.5	82.4		95.8	Sensay *et al.* (2020) [39]
15.	100	62			Shewangzaw (2016) [31]

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.

2.1.2 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 (Godefay and Molla, 2000) [13]. 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) [34]
3.	83		7	10	Kibebew *et al.*(2020) [19]
4.	81.96		1.46	16	Mitiku *et al.*(2019) [23]
5.	84	16	-	-	Oumer *et al.* (2017) [28]
6.	95.2		4.2	0.8	Bashier *et al.*(2018)
7.	64.6		6.67	28.9	Shewangzaw (2016) [31]
8.	33.3			55.6	Gurmesa (2015)

%: Percentage

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.

2.1.3 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. According to codex, 1999, 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. 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 (Othman *et al.*, 2008) [26]. According to Chatterjee *et al.* (2006) [7] 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 Ali and Abdelgadir (2011) [4].

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) [40]
2.	7.54	7.25		Holeta	Solomon *et al.*, (2015) [41]
3.	9.81	7.09		SNNPR Mizan	Teshome and Tesfaye (2016) [42]
3.	3.70	5.71	3.16	Sibu sire (Oromia)	Chala (2021) [43]
4.	4.82	6.21	3.90	Meta (Oromia)	Mitiku *et al.* (2019) [23]
5.	5.85		5.15	Mersa (Wollo)	Oumer *et al.* (2017) [28]
6.	4.49	7.58		Bahirdar (Amhara)	Haftom (2016) [13]
7.	6.32	8.16		5.29	Gurmesa (2015) [44]

CC: Coliform Count, TBC: Total Bacterial Count, YMC: Yeast and Mould 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.

2.1.4. 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 (Lubote *et al.*, 2014) [22]. As De Buyser *et al.* (2001) [45] stated, microbes are originated from milk and milk products represent two to six percent of food-borne epidemics. Mitiku *et al.* (2019) [23] stated that 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.

2.1.5. 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 (FAO, 2006) [46]. Negash *et al.* (2012) [25] stated that the wellbeing of dairy goods with regards to foodborne diseases is a great anxiety globally, particularly in developing nations. 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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