



Assessments of Raw Milk and Dairy Products Safety and Quality in Ethiopia; Review

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Abstract

Ethiopian dairy product is not sufficient, its quality, and safety and demand become not compatible with the supply. The objective of this review is to assess dairy and dairy product handling and safety, and factors affecting dairy and dairy product quality dairy cattle production in Ethiopia. There are different challenges centrally lack of quality and safe feed, lack of sufficient and clean water, lack of genetic improvement (AI), lack of clinical service, lack of Milk handling infrastructure. Further, lack of credit service, lack of agricultural extension, large household size, Lack of health extension, lack of quality and safety production awareness, lack of awareness of proper milk consumption and shortcoming of culture related to milk consumption, lack of deferent problem solver research related to milk production, will be weak regulatory of milk safety and quality standard for meeting worldwide country interest for export. And weak value chain. Ethiopian country-wide milk has been consumed in different forms. Different milk handling mechanisms are affecting milk quality and safety. Recommendations from the government especially the Minister of Agriculture and Agricultural Research Institute should focus on applied research that solves milk quality and safety problems and will raise awareness for all types of dairy farms and should establish dairy standards. Likewise, Minister of Agriculture is associated with other concerned organizations to facilitate credit service, improved feed, clean and sufficient water, AI service, Animal health service, and Milk handling infrastructure.

.Keywords: Challenges, Consumption, Cow, Factors, Handling, Quality, Raw milk and Safety

1. INTRODUCTION

Agriculture is the main economic activity in Ethiopia in general and livestock is also the major among other agricultural activities. The largest livestock population in Africa is owned by Ethiopia. Ethiopia is one of Sub-Saharan Africa's developing countries with a large potential in livestock, being 1 among African countries and 9 in the world. (Guadu & Abebaw, 2016 and Afras, 2019). The livestock sector being part of agricultural activities plays an important role in the social, cultural, and economic development of the agrarian community.

Livestock and dairy cattle contribute to agriculture, food, and rural development of the country. The majority of the livestock population in Ethiopia are cattle which are reared across all the agro ecologies. To be 66,260,987 heads of cattle, 38,013,272 sheep, 45,716,091 goats, 10,020,518 donkeys, 2,138,928 horses, 357,743 mules, 6,978,053 camels, 41,350,684 chicken and 5,982,336 beehives (Ethiopian Statistics Service Agricultural Sample Survey (ESSASS, 2021/2022). its development is more than (Central Statistical Agency (CSA, 2016/2017).98.95% of the total cattle are local breeds and the remaining are hybrid (0.94%) and exotic breeds (0.11%) (CSA, 2013). population. Cows are the main source of milk in Ethiopia. (Alganesh, 2017) Dairy cattle production systems already existing in Ethiopia are part of four major livestock production systems: specialized commercial dairy production systems, pastoral and agropastoral production, rural smallholder (mixed crop-livestock) production, and urban and peri-urban smallholder dairy production. (Afras, 2019) There are over six distinguishable, indigenous cattle types in Ethiopia mainly Arsi, Barca, Boran, Fogera, Horro, and Ogaden are evolved as a source of natural selection (Guadu & Abebaw, 2016) the farmers have used traditional and modern medicine to treat and control different diseases. (Tsegay et al., 2015) Dairy production systems are classified into three main systems :(1) rural, (2) peri-urban and urban, and (3) commercial dairy systems (Tamiru & Amza, 2017). In 2013 the annual milk production of cow milk was 4.06 billion liters and the average daily milk production/cow of 1.86 liters/day but 3,866,051,858.00 litter/cow/year and cow of 1.45 liter/day (ESSASS, 2021/2022). However, Milk yield per day per cow remains low for indigenous dairy cattle compared to crossbred in different parts of the country (Tamiru & Amza, 2017). Dairying is one of the livestock production systems of Ethiopia, involving a vast number of small, medium, or large-sized, subsistence, or market-oriented farms (Guadu & Abebaw, 2016). The large and diverse livestock genetic resources and, existence of diverse agro-ecologies suitable for dairy production (N. Gebreselassie, 2020).

There are three genetics of dairy cows exotic, indigenous, and cross breed. Natural pasture (66.7%) and crop- residues (22.2%) as major feed was mostly used in the lowland than midland and highland while enset was used by some farmers. Most of the respondents used rivers as water sources for their cattle (72.6%) followed by ponds (21.5%) and rainwater (5.9%). (Tsegay et al., 2015) The indigenous dairy products produced and consumed in Ethiopia are whole milk, buttermilk (arera), traditionally fermented milk (ergo), cottage-type cheese (ayib), traditional semi-hard cheese (metata ayib), whey, local butter and ghee (Duguma & G.P.J. Janssens, 2014).

2. LITERATURE REVIEW

2.1. Dairy cattle production in Ethiopia

Estimated to be 59.5 million heads of cattle, 30.7 million sheep, 30.2 million goats, 8.43 million donkeys, 2.158 million horses, 0.409 million mules, 1.2 million camels, 59.49 million chickens, and 5.90 million beehives (Central Statistical Agency (CSA, 2016/2017). However, to be 66,260,987 heads of cattle, 38,013,272 sheep, 45,716,091 goats, 10,020,518 donkeys, 2,138,928 horses, 357,743 mules, 6,978,053 camels, 41,350,684 chicken and 5,982,336 beehives (Ethiopian Statistics Service Agricultural Sample Survey (ESSASS, 2021/2022). The livestock population increasing year to year whereas, 98.95% of the total cattle are local breeds and the remaining are hybrid (0.94%) and exotic breeds (0.11%) (CSA, 2013) but 3,866,051,858.00 litter/cow/year, Average Lactation Period (Months) 6.00 and cow of 1.45 liter/day (ESSASS, 2021/2022) this shows us the productivity becomes delaying. Milk yield per day per cow remains low for indigenous dairy cattle compared to crossbred in different parts of the country. According to different studies, there was 1.0, 1, 2.07, 1.5 l, 1.5, 1.5, 2, 3.3, 2.2, 2, 1.9, 2.8, 2.2 in Gambela, Sidama, Mekele, Bahir Dar, Diredawa and Harar, Ambo, Bedele, Jimma, Metu, Nakemte, Dembi Dolo, respectively.

On the other hand, crossbred dairy cows provided a considerable amount of milk in different areas. According to the studies conducted by different researchers, there were 11.6, 10.8, 7.1, 15, 7.5, 7.8, 4, and 9.3 in Bishoftu, Akaki, Bahir Dar, Diredawa, Harar, Ambo, Bedele and Jimma, respectively (Tamiru & Amza, 2017) Natural pasture (66.7%) and crop- residues (22.2%) as major feed was mostly used in lowland than midland and highland while enset was used by some farmers. Most of the respondents used rivers as water sources for their cattle (72.6%) followed by ponds (21.5%) and rainwater (5.9%) (Tsegay et al., 2015). According to the information collected on the feed usage

experience of holders in the rural areas of the country, green fodder (grazing) is the major type of feed (57.77 percent) followed by crop residue which is 29.75 percent. (Ababa, 2023) the farmers used traditional and modern medicine to treat and control different diseases (Tsegay et al., 2015).

2.2. Challenges in dairy development

The type of production system had a distinct impact on the reproductive performance of crossbred dairy cattle in the central highlands of Ethiopia. Management decisions of farmers, as well as their knowledge and skill, have an important effect on the reproductive performance of cows. Cattle managed under an urban dairy production system showed the best reproductive performance, while the reproductive performance of cows under mixed crop-livestock was worst (Shiferaw et al., 2003) Results of the study revealed that productive and reproductive. The performance of crossbred cows was found to be low. Feed shortage (both in terms of quantity and quality), lack of access to land, disease prevalence, low level of management, and lack of proper poor breeding management such as lack of accurate heat detection and timely insemination might have contributed considerably to delayed age at first service, long days open (postpartum anestrous), late age at first calving, long calving interval, short lactation length, and low milk production. (Duguma et al., 2012) Estimated at 61416 tonnes, the annual compound feed production is far below the demand. Domestic production of supplements and feed additives is in its infancy and the country's requirement heavily depends on import, demanding technical and policy interventions. (Bediye et al., 2018) the most important problems perceived by the farmers in the study area were feed shortage, animal diseases, water shortage, and poor quality during the dry season, respectively. Farmers ranked feed shortage as a key constraint to livestock production. The reasons for feed shortage were land shortage, increased human and livestock population, increased crop production, long dry season, water logging,

and lack of information and inputs on forage development technologies. The reasons mentioned for livestock diseases were internal and external parasites, outbreaks of contagious diseases, feed shortage, water logging, lack of capital to buy medicine, and lack of veterinary care and service. The problems of water scarcity and poor quality were due to lack of rain, deforestation, increased human and livestock population, use of irrigation upstream, high prevalence of leech in the dry season, contamination due to washing and bathing, reduced flow and quantity of water, runoff into water sources. Thus, there is a need for technical and institutional intervention to alleviate the identified problems in livestock production through improved feed production and conservation, veterinary

health care and services, and increased availability of water and quality during the dry season. (D., 2013). The productivity of cattle did not match their number due to the prevalence of diseases, lack of breed improvement program, uncontrolled mating or breeding practices, shortage of feed, traditional production system, and poor reproductive performance (Afras, 2019). The main constraints that affect the milk production capacity of dairy cattle in Ethiopia include feed shortage in terms of quality and quantity, high feed cost, land shortage and space limitation for farming of improved forage, insufficient veterinary services, diseases, water shortage, lack of market information, absence of improved breed in most parts of the country, poor artificial insemination service, lack of milk processing facilities, poor milk production potentials of local dairy cows, poor management of animals, adulteration, waste disposal, lack of market-oriented production (L. Gebreselassie, 2019). Uncontrolled natural mating is the leading form of animal breeding system that is practiced under extensive husbandry in rural areas (D., 2013). Dairy farms are plagued with many challenges these include: Health problems, lack of infrastructure, environmental issues and lack of access to credit, reproductive challenges, and lack of trained manpower are some of the major reasons for the poor performance of dairy cattle production and cause a huge loss of production and productivity of dairy cattle in the country (Guadu & Abebaw, 2016).

The reproductive performance of crossbred dairy cows owned by smallholder dairy producers in Asella town was found to be promising considering the management situation and limited supplemental feed utilized in the area. (Hunduma Dinka, 2012) The dairy sector of Ethiopia is characterized by the poor genetic potential of indigenous cows. HF crossbred cows have relatively better productive performances (Kumar et al., 2014). Ethiopian dairy needs a labor force engaged in routine activities such as feeding, herding, cleaning milking, and processing (Bereda et al., 2014). Ethiopian milk production and reproductive performance of cattle in the study area was low. The principal constraints of dairy industries in Ethiopia were categorized as technical, institutional, and socio-economic (Tamiru & Amza, 2017). Dairy production is constrained by multifaceted factors, though the nature and magnitude of the problems vary between production systems and agro-ecologies, Opportunities of Dairy cattle production, Challenges of Dairy cattle production (Genetic limitation, Inadequate Animal feed and Water Resources, Limited access and high cost of dairy heifers/cows, Absence of an operational breeding strategy and policy, Inadequate Veterinary service

provision, Unavailability of land, Weak linkages between research, extension service providers and technology users, Inadequate

extension and training service, Milk market-related constraints, Limited availability of credit to the Dairy farmer) (N. Gebreselassie, 2020) The dairy value chain in Dire Dawa is not well organized. The roles and functions of all actors in the value chain are not clear and there is a weak linkage between milk producers, traders, and all stakeholders of the dairy industry in the area (Seifu & Reiner, 2014). Fulfilling the stringent requirements and the “Sanitary and Phytosanitary Agreement” (SPS Agreement) of the World Trade Organization (WTO) should be complied with and basic if we are exporting milk and dairy products (Bezie, 2019).

2.3. Dairy product consumption habit in Ethiopia

It is well known that milk is one of the most complete foods in nutritional terms; it is rich in nutrients essential for the growth and maintenance of a healthy life. (N. Gebreselassie, 2020) The importance of adding milk to the human diet is because of its richness in proteins, fats, carbohydrates (lactose), mineral salts, vitamins, conjugated linoleic acid, sphingomyelin, and butyric acid, among other substances, which provide immunologic protection and essential nutrients to its consumers (Oliveira et al., 2001). Milk is commonly known as a complete nutritional diet owing to its nutritional components such as 87.2 % water, 3.7% fats, 3.5% protein, 4.9% lactose, and 0.7% Ash. It is a valuable source of protein, fat, carbohydrates, vitamins, and minerals required by humans, especially young ones, for growth and development. Cows are the main source of milk in Ethiopia (Alganesh, 2017). However, the milk consumption rate in Ethiopia is low level which is 19 lt/capita compared to other countries such as Kenya=90 lt/capita and Uganda=50 lt/capita (L. Gebreselassie, 2019). The major dairy products traditionally produced in Ethiopia are raw whole milk, spontaneously fermented milk, buttermilk, cottage-type cheese, local butter, traditional ghee; dhadhaa, and whey (Alganesh, 2017). The indigenous dairy products produced and consumed in Ethiopia are whole milk, buttermilk (arera), traditionally fermented milk (ergo), cottage-type cheese (ayib), traditional semi-hard cheese (metata ayib), whey, local butter, and ghee. The major dairy products in the traditional milk processing system were naturally fermented sour whole milk (ergo), traditional butter (Kibe), buttermilk (Arera), cottage cheese (ayib), whey (aguat), and ghee (nitir kibe). The traditional milk processing materials in the study area were plastic containers (80%), gourd (*Lagenaria siceraria*, 12%), and clay pots (4.0%) (Duguma & G.P.J. Janssens, 2014). According to CSA [1] reported that 42.38% was used for domestic

consumption, 6.12% traded, 0.33% used for wages, and the remaining 51.17% used for butter and cheese production from the total annual milk production. The product is consumed in all parts of the Ethiopian country where fermented milk is produced. It is served as a beverage either plain or spiced. It is preferred as a side dish or as a drink. Surpluses are given to calves, lactating cows, and dogs. It also serves as additional income for women by its use as raw material for cottage cheese ('ayib') manufacture, which is sold in the local market. Due to its relatively short shelf life and some traditional taboos, 'arera' is not sold in the market for direct consumption (Alganesh, 2017).

Traditional butter is processed and sold by women in every community. 'Kibe' has an attractive appearance with a white to light yellowish color. 'Kibe' is semi-solid at room temperature. It has a pleasant taste and odor when fresh, but with increased storage changes occur in odor and taste, unless refrigerated or further processed into 'nitir kibe' by boiling with spices. 'Kibe' is the most shelf-stable of all traditionally processed fermented milk products next to 'nitir kibe'. 'Kibe' has an important role in the diet, both in rural and urban areas, and is utilized by children of weaning age and the elderly. In addition to direct consumption as a side dish, it is used as oil for food preparation. It is also used for hairdressing and as a skin cosmetic by both sexes. It is used for roasting coffee beans that are used for special traditional ceremonies (Alganesh, 2017). 'Ayib' is a soft curd-type cheese typical of many regions in Ethiopia. 'Ayib' is made from the defatted sour milk resulting from the churning of sour whole milk and heating the defatted sour milk to coagulate the curd.

The product is white and acidic and it is mainly consumed locally. 'Ayib' contributes to the overall nutrition of the people and forms part of the staple diet (Alganesh, 2017). This is especially true in Ethiopia where cottage cheese typically manufactured in small dairy farms under poor hygienic conditions is commonly consumed (Alganesh, 2017). Milk is primarily for family consumption, except sour milk which is sold by a few households.

2.3.1. Urban

Of the total urban milk production, 73 percent is sold, 10 percent is used for household consumption, 9.4 percent goes for feeding calves and 7.6 percent is processed into butter and Ayib (a cottage type of soft cheese crumbly in texture common in many parts of Ethiopia. (2019DairyDevelopmentSenarios, n.d.) The result shows that cottage butter, pasteurized milk, cottage cheese, and raw milk were the most common dairy products purchased and consumed by the majority

of Addis Ababa consumers (Mamo et al., 2022). This study has revealed that households in the Addis Ababa milk shed hold more cross-bred and pure-bred milk cows. As a result, the mean daily milk production (liters) is much higher than that of the Hawassa-Dilla milk shed. The results of the study indicated that dairy products are the most commonly consumed animal-sourced foods (ASFs) by farm households in both milk sheds, which is an integral part of food groups (Duressa et al., 2022).

Addis Ababa milk shed is more accessible to raw milk markets; hence the proportion of milk sold out as raw milk is higher (Duressa et al., 2022). the majority of the households consumed milk products regularly, (K. Melesse & Beyene, 2009) Urban households in Addis Ababa, finds that a large proportion of the sample eats insufficient amounts of vegetables, animal-source foods, and fruits (M. B. Melesse et al., 2019).

2.3.2. Semi-Urban

Milk that is traditionally processed into other dairy products is much less than that from farmers in the Hawassa-Dilla milk shed (Duressa et al., 2022). Major towns/pre-urban of Ethiopia about their milk consumption behaviors, although consumption of heat-treated milk was the most common, around 20% of the study population still drank raw milk at least monthly (Deneke et al., 2022)

2.3.3. Rural area

The frequency of milking, Sidama Zone Aroresa Woreda milked their cattle, two times per day in the morning and evening and they had milk by their hand. On average, 1.5 liter of milk per day was obtained from each dairy cow however, each household could obtain 1.7 liter milk per day (Tsegay et al., 2015). Over 85% of the milk produced by rural households is consumed within the producer households with the proportion marketed being less than 7% (Bereda et al., 2014). In Ethiopia, milk is produced and marketed to consumers without being pasteurized or subjected to and quality standard. About 98% of the annual milk is produced by subsistence farmers who live in rural areas where dairy processing in the country is limited to the smallholder level and the hygienic quality of products is generally poor (Takele Taye, Workneh Ayalew, 2012).

Milk and milk products play an important role in the diet of pastoralists in Ethiopia (Amenu et al., 2019). In agro-pastoral and pastoral communities where livestock production is the main Pastoralists have strong preferences for raw milk and fermented raw milk products. Through fermentation and further processing, cow milk is converted into different products such as ititu (fermented whole milk

with whey removed), butter, ghee, and buttermilk. Milk from goats and camels is often consumed in fresh raw form without further processing (Amenu et al., 2019). There are varieties of traditional fermented dairy products in Ethiopia. Ergo is popular and is consumed in all parts of Ethiopia by all age categories of people. Kibe (Traditional butter) is always made from ergo and not from cream. Kibe plays an important role in the diet both in rural and urban areas, and is utilized also by children of weaning age and the elderly. In addition to direct consumption as a side dish, it is used as oil for food preparation and after processing into neter kibe, it is also used for hairdressing and as skin cosmetic by both sexes and it is used for roasting coffee beans in special traditional ceremonies. Arera (Defatted sour milk) is obtained after the removal of kibe after churning and is consumed in all parts of the Ethiopian Country. It is served as a beverage either plain or spiced. It is preferred by women for consumption as a side dish or as a drink. Indirectly serve use as raw materials for cottage cheese (Ayib). Ayib (Ethiopian cottage cheese) is white and acidic and it is mainly consumed locally (Abebe et al., 2014).

Some households had zero consumption. These zero consumptions in most cases were related to insufficient household income (K. Melesse & Beyene, 2009). Low levels of milk and milk product consumption among the majority of the households and the high incidence of income and availability constraints indicate that even small changes in these areas would result in significant improvement in the consumption of milk and milk products (K. Melesse & Beyene, 2009). Rural Availability of milk from own cows is the major enabler of dairy consumption (Hove et al., n.d.) Rural Cow ownership is the best way to increase consumption in the short term (Hove et al., n.d.) Another issue related to cow ownership is that dairy is not available daily due to practices of making cheese or butter that require all milk on the day of production. Rest products such as whey were consumed in some but not all clusters (considered animal feed, not nutritious or unsuitable for

humans) (Hove et al., n.d.). Households that do not own cows consume dairy less frequently than households that have any type of cows (roughly 1 day a week less) (Hove et al., n.d.) Households that have crossbreeds consume dairy more frequently than households that only have local cows (roughly 1 day a week more).

There is some mention of children being prioritized as dairy consumers if the supply is low. (Fresh) milk is deemed the dairy product of choice for children. (Hove et al., n.d.) Key informants do report

that during fasting times there are differences in dairy consumption for pregnant and lactating women based on religious beliefs and practices. Although most religious leaders report that children under a certain age can consume dairy products (Hove et al., n.d.) Religious fasting among Orthodox Christians has a clear influence on dairy product consumption. Dairy consumption is reduced during the Orthodox Christian fasting season and increased during the feast season. The study shows no difference between the average dairy consumption frequency of Orthodox Christians and Protestants. Muslims seem to consume dairy more frequently. Seasonality has a big impact on dairy consumption, with animal feed availability being the main driver of milk availability. During the dry season, the amount of animal feed declines, leading to lower milk production and availability. (Hove et al., n.d.) a bigger number of family members is correlated to an increase in consumption of dairy products per week. (Hove et al., n.d.). The majority of livestock keepers rely on the rural dairy system which is part of the subsistence farming system that contributes up to 98% of the total milk production in Ethiopia and includes pastoralists, agro-pastoralists, and mixed crop-livestock producers. The system is not commercial-based and most of the milk produced in this system is left for home consumption (Tamiru & Amza, 2017).

2.4. Dairy and dairy product handling and safety

Food safety and quality are a growing concern all over the world, particularly from the human health point of view (Alganesh, 2017). Safety of food is a basic requirement of food quality that implies the absence of acceptable and safe levels of contaminants, adulterants, naturally occurring toxins, or any other substance that may make food injurious to health on an acute or chronic basis. Consumers generally demand products of consistent quality, standards, hygiene, proper presentation, and ease of use. Different organizations have been working in different countries to establish quality and safety standards to ensure the health of consumers. Health hazards to the consumer are often grouped into microbiological, physical, and chemical hazards (Alganesh, 2017). Food is unsafe due to poor handling and storage conditions, naturally occurring toxins in the food itself, contaminated water, pesticides, and drug residues, and lack of adequate temperature control (Alganesh, 2017). In the country, indigenous dairy products are produced using traditional materials and methods (Alganesh, 2017). In the country, indigenous dairy products are produced using traditional materials and methods. The materials used for milk handling and processing are local materials made of bottle gourds and clay pots. Recently plastic containers have also been used (Alganesh, 2017). Indicated that hygienic practices during the production, processing, and handling of milk and milk products in different parts

of Ethiopia were substandard and the quality and safety of milk products were questionable (Alganesh, 2017). The Ethiopian standard authority has set standards for indigenous and imported dairy products, but the standards were not enforced to control and ensure the safety and quality of dairy products.

Hence, there are no strict regulations and quality assurance techniques on the production, processing, packaging, transportation, and marketing of dairy products in the country (Alganesh, 2017). There are varieties of traditionally fermented dairy products in Ethiopia, in which the exact type of lactic acid bacteria responsible for fermentation is unknown, due to uncontrolled and spontaneous fermentation. Most of these products are produced by smallholder, producers where access to the required dairy infrastructure is limited (Abebe et al., 2014). In most cases under smallholder conditions, the common hygienic measures taken during milk production, especially during milking are limited to letting the calf suckle for a few minutes and/or washing and the quality of the water used for cleaning purposes not secured (Abebe et al., 2014).

Raw milk samples from different parts of the country have TBC counts greater than 5 log cfu/ml which is higher than the given international standard set minimum acceptable level of bacterial count in milk (IFCN, 2006). The hygienic conditions under smallholder conditions are limited to letting the calf suckle for a few minutes and washing the udder before milking. Moreover, unhygienic cleaning and handling of milk containers and inadequate dairy infrastructure (Abebe et al., 2014).

About 52 % of smallholder producers and 58% of large-scale producers use common towels to clean the udder of cows before milking. While the smallholder producers do not clean cow udder at all. The smallholders neither use clean water to clean the udder nor other milk utensils. In general, the majority of smallholders do not treat milk before consumption. Organoleptic properties (such as color and odor) of dairy products are commonly used in quality tests (Alganesh, 2017). In the traditional milk production and processing system in Ethiopia, the sources of milk contamination are the udder and body of the milking animal, and the milking environment (the barn, dust and dirt from feed sources, and the air) (Alganesh, 2017). Dairy processing in the country is generally based on ‘ergo’ (spontaneously fermented milk), with a natural starter culture. In rural areas, raw milk is kept at ambient temperature or kept in a warm place to ferment before processing (Alganesh, 2017). In Ethiopia, no attempt was made to control the fermentation process of milk and milk products

manufactured under traditional systems. The presence of different species of yeast in milk and its products may result in the spoilage of the product or conversely could contribute to the enhancement of the flavor of fermented milk, (Alganesh, 2017).

The use of the herb of *Ocimum hardiense* for cleaning milk vessels and leaves and stems of *Ocimum urticifolium* and *Ocimum hardiense* to rub milk containers for flavor impartation is common in different parts of Ethiopia (Alganesh, 2017). These practices were reported to be beneficial to keep the better quality of 'ergo' through their inhibitory effects on spoilage and pathogenic organisms. (Alganesh, 2017). Arrera is a byproduct of 'ergo' obtained after churning and removal of 'kibe'. (Alganesh, 2017). This study confirmed the presence of *S. aureus* and *E. coli* O157:H7 in dairy products in pastoralist areas in Ethiopia, constituting a potential health risk for pastoralist areas. (Amenu et al., 2019) Intensification without careful management, lack of infrastructure and capacity for risk analysis and quality surveillance and control, poor support services, and absence of appropriate regulations can lead to an increase in food safety issues and public health risks within the dairy industry (Lemma et al., 2018).

2.5. Factors affecting dairy and dairy product quality

When feeding their cattle most used free grazing (61.5%) on natural pastures throughout the year in the same place however, this is highly affected by natural pasture quality. (Tsegay et al., 2015) The quantity and quality of milk are highly dependent upon the amount of mammary tissue available to produce milk (Nickerson, 1995). In emerging dairy chains, inconsistent product quality and safety are recurring issues (Ledo et al., 2020). The information on the safety and quality of dairy products in Ethiopia is not comprehensive. (Alganesh, 2017). Price was the most important factor than safety and quality attributes to determine household consumption level and choice of product, (Agza et al., 2013) Low demand primarily during fasting periods was the major factor affecting milk marketing in the study area. (Duguma & G.P.J. Janssens, 2014). The major dairy products in Ethiopia include traditional and industrially produced products. The traditional products are sour milk, 'ergo' (fermented milk), cooking butter, and 'ayib' (cottage cheese) (Bezie, 2019). The microbial properties of milk and Ethiopian traditional fermented milk products made by different dairy producers were of substandard quality (Abebe et al., 2014).

3. CONCLUSION

In conclusion, the Ethiopian dairy cow population has increased but dairy products and demand have become not compatible due to a decline in milk product amount, quality, and safety. Locally bred products amount is the fewest than cross-bred and exotic cows. But as cow population is reverse. There are different challenges centrally lack of quality and safe feed, lack of sufficient and clean water lack of genetic improvement (AI), lack of clinical service, lack of Milk handling infrastructure for instance small scale and medium-scale farmers, lack of credit service, lack of agricultural extension, large household size, Lack of health extension, lack of quality and safety production awareness, lack of awareness of proper milk consumption and shortcoming of culture related to milk consumption, lack of deferent problem solver research related to milk production, will be weak regulatory of milk safety and quality standard for meeting worldwide country interest for export and weak value chain. Recommendations from the government especially the Minster of Agriculture and Agricultural Research Institute should focus on applied research that solves milk quality and safety problems and will raise awareness for all types of dairy farms and should establish dairy standards. Likewise, Minster of Agriculture is associated with other concerned organizations to facilitate credit service, improved feed, clean and sufficient water, AI service, Animal health service, and Milk handling infrastructure.

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