

Review Article

Technology Usage Manual for Camel Milk Quality Controlling Parameter during Transportation to the Market

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- Wrapping
- Camel milk
- Quality control

Abstract

In Yabello Pastoral and Dryland Agriculture Research Center Dairy Research Team have several contributions in identifying major constraints and developing suitable production technologies related to dairy production in its mandated Borana pastoral and agro-pastoral areas. Accordingly, the team has conducted researches on livestock disease, dairy cattle nutrition, breeding, milk and milk product handling and processing and marketing of dairy and dairy products. Milk is a marketable commodity whereby consumers buy when they get satisfied by the quality of the product based on their perception. Having a due attention to total quality aspects of milk production and consumption; quality detection and safety precautions became of paramount importance.

In wrapping the container and soaking in water technology, milk containers were wrapped with sisal foil over the total body up to the neck level and soaked in water before adding the milk to the container. Then milk is added to the container and transported to the market. The wrapping of container with sisal foil and soaking in the water has a valuable effect in maintaining the quality of milk hygiene in transportation. The manual can be important reference for the dairy processing cooperative, pastoral community involved in milk transportation to market and individual milk seller during camel milk transportation to the market. In this manual, important justification about the sisal foil, input material, method of using sisal foil wrapped container and effective result is included. Furthermore, from this manual the effect of sisal foil wrapped milk containers on quality parameters of camel milk transportation is clearly sorted and will solve the problem of milk spoilage, deterioration of milk hygiene and improve quality parameter during transportation to the market. Lastly, the exact usage of this technology manual will help in milk quality monitoring of the milk involved in the market transported to long distance

HOW SISAL FOIL WRAPPED MILK CONTAINERS IMPROVE CAMEL MILK QUALITY

Background information

Milk is a marvel of nature and a very nutritious biological fluid. Lactating animals are producing milk to feed their offspring naturally. Throughout the world, milk and milk products are indispensable components of the food chain. In most part of the world cattle milk is consumed much than other milk sources; Goats, camel, buffalo and sheep. Milk and milk products are also used as a raw material for agro industries in the form of milk powder, concentrated milk and cream [1].

Milk is composed of much of water and other chemicals different in their composition due to genetic and environmental factors. One of the parameters in milk quality is the accepted level of composition of these chemicals in the milk. Like the fatty acid content, protein content, the lactose, the pH level of the milk,

its test and texture. The milk quality can be affected at different levels starting from the physiology of the cow, milking, collecting, transporting, processing and distribution.

Ethiopia has huge number of camel population which is outstanding performance in the arid and semi-arid areas of south-east lowlands of Ethiopia where browse and water are limited, pastoralists rely mainly on camels for their livelihood. In these areas, camels are mainly kept for milk production and produce milk for a longer period of time even during the dry season when milk from cattle is scarce [2]. The annual camel milk production in Ethiopia was estimated to be 75, 000 tones [3].

In most pastoralists, camel milk is always consumed either fresh or in varying degrees of sourness in the raw state without heat treatment thus, can pose a health hazard to the consumer [4,5]. Camel milk is transported from central Borana to Kenya border using plastic containers.

Milk is a marketable commodity where by consumers buy

when they get satisfied by the quality of the product based on their perception. As milk is also highly perishable product its quality and handling will affect the market. Therefore, having a due attention to total quality aspects of milk production and consumption; quality detection and safety precautions became of paramount important. Therefore, this manual emphasizes the already checked technology by Dairy technology research team of YPDARC on effectiveness of using sisal foil wrapped milk containers soaked in water in reducing microbial growth and increasing shelf life of the camel milk, transported long distance exposed to sunlight in Borana pastoral area. The procedures needed to apply the technique are listed here under.

Inputs required for use of the technique

- Camel milk
- Sisal foil
- Jerry cans (milk containers)
- Alcohol test
- Thermometer
- Refrigerator
- Icebox

Steps and procedures to use the technique

- Samples of the milk should be taken, transported and analyzed following standard procedure.
- Fresh morning camel milk samples need to be collected at farm level (Olla).
- All the milk samples collected from the pastoralists need to be tested for primary quality tests (Specific gravity, organoleptic test and Alcohol test).
- milk sample in collection area tested negative is considered as good quality milk and mixed to make homogenous milk before transferring to treatment containers.

Treatment of Sisal foil wrapped and soaked in water and even new plastic milk container needed to be sterilized using hot water.

Variations in terms of where the containers have to be placed on the vehicle needed to be controlled as much as possible

- how the milk containers were placed on the vehicle and deliberate efforts should be made to ensure the containers are placed systematically every time in a repeatable way so that some received more air movement and others less, as it is labeled below with regard to their placement pattern on the vehicle (Figure 1).

Treatment of Sisal foil wrapped and soaked in water should be replicated two times.

- Transfer Mixed and homogenized 1-liter milk sample was to each of the container.
- Take Thermometer reading of each container before transportation.



Figure 1 Wrapped container at Yabello Pastoral and Dry land Agriculture Research Center.

- Keep half of the containers on the upper layer of the entire container, in a way it was freely exposed to the sunlight and load the other containers, at the bottom of the layer of the container loaded on the car to prevent direct exposure to sun light and strong wind pressure (Figure 2).

Recommendation

- The technology found to be effective in maintaining the quality of milk during high environmental temperature and long distance transportation to the market.
- The technology is best performed in maintaining the quality of milk transported to long distance exposing to sun light,
- It is valuable if the study will be repeated for cow milk at the season of its excessive supply to market.
- Its applicable in all season especially in dry season in Borana zone

Important data recorded

Quality of milk at producer ('OLLA') and Terminal market: Quality tests under taken at collection site /producers/ and in the terminal point of the market where the milk is sold.

- Smell of the milk at collection site and after long distance travel to the market



Figure 2 Ways of transportation of milk.

Table 1: Comparing milk sample of Wrapped container (WLEC) and unwrapped container exposed to Sun light at terminal point (Moyale town) under 30°C environmental temperature after a long distance transportation.

Sample code	Alcohol Test	Clot on boiling	Organoleptic			Milk Temperature °C
			Smell	Color	Appearance	
WMEC	-ve	-ve	Smoked	Yellowish white	Physical derbies (PD)	25
WLEC	-ve	-ve	Smoked	Yellowish white	PD	22
LMEC	Turbid/ Sediment	-ve	Smoked	Yellowish white	PD & Minor curdling	33
LLEC	Sediment	-ve	Smoked	Yellowish white	PD	31
NMEC	Clear sedimentation	-ve	Smoked	Yellowish white	Viscous	34
NLEC	Sediment	-ve	Smoked	Yellowish white	Viscous	30

WMEC: Wrapped Container Exposed to Sun Light; WLEC: Wrapped Container Less Exposed to Sunlight; LMEC: Local Container Exposed to Sunlight; LLEC: Local Container Less Exposed to Sunlight; NMEC: New Container Exposed to Sunlight; NLEC: New Container Less Exposed to Sunlight

- Color of milk
- In wrapped container and unwrapped container at collection site and at terminal point (at market)
- Specific gravity ranges in all containers in all and after the travel in the market
- Alcohol test (68%) in different site
- Environment temperature at collection site and at market
- Temperature of the milk in Olla and in the market
- Clot on boiling point at terminal point
- Physical appearance of the milk
- Titratable acidity value of camel milk at farm level and terminal market
- Resazurin test of camel milk
- The average microbial count for the samples of camel milk under deferent container treatments (Table 1).
- Incubation of the milk in wrapped containers remained unchanged.
- The milk didn't show any significant variation in color change (remind unchanged) upto 3hrs
- Using this technology helps in reducing milk spoilage as it slow bacterial development of the milk that decreases its microbial load.
- It maintains the quality of milk involved in market transporting long distance.

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Expected output/benefits of using the technology

- Using the technology provide very low production of acid at farm level which helps in keeping freshness of the milk.
- The technology of wrapped and soaked containers keeps temperature of milk to optimum level (soaked containers relatively stayed cool) even at the terminal milk market.

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