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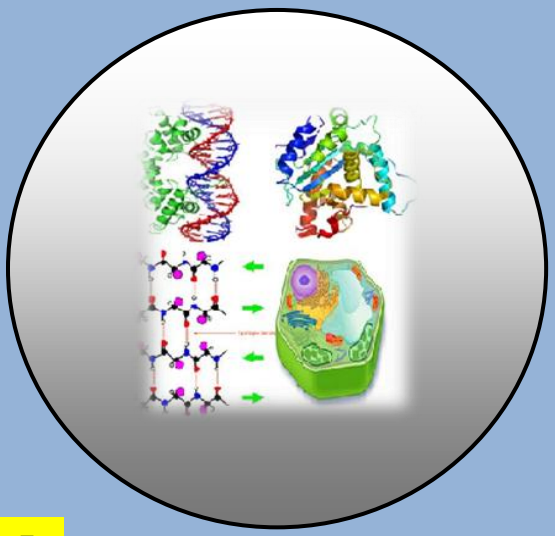

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RESEARCH PAPER

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A Survey Study on *Dhanaan*; Indigenous Traditionally Fermented Camel Milk of Eastern Ethiopia

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ABSTRACT

This survey was conducted to identify the production areas, fermentation art, and purpose of production of Dhanaan by the farmers and pastoralists in eastern Ethiopia. A total of sixty key informants were interviewed using a structured questionnaire. In addition to the primary data generated through survey, secondary data were collected from various reports published about Dhanaan and through consultation of concerned individuals in the study area. The result of this study indicated that farmers and pastoralists in Shinile, Babile and Jigjiga districts of eastern part of Ethiopia produce naturally fermented sour milk called Dhanaan. The production of Dhanaan from camel milk is a household art, and is made by spontaneous fermentation in a closed container. This suggests that the microorganisms responsible for souring or fermentation of camel milk are probably thermophilic anaerobic types. The farmers and pastoralists use Dhanaan as food source, for treatment of gastritis and various abdominal discomforts. In conclusion, the present study showed that the production areas, medicinal value and traditional manufacturing art of Dhanaan were studied in detailed.

Key words: Indigenous, Fermentation, Thermophilic, and Dhanaan.

INTRODUCTION

According to FAO (2009), there are about 22 million camels in the World. Of this, 19.58 million are believed to be one-humped dromedary camels (Camelus dromedarius) while the remaining 2.42 million are two-humped bacterian camels (Camelus bactrianus). More than 60% of the dromedary camel population is concentrated in the four North

East African countries viz. Somalia, Sudan, Ethiopia and Kenya (FAO, 2004). Ethiopia is estimated to have the third largest camel herd in the world after Somalia and Sudan (FAO, 2008). According to CSA (2010), Ethiopia which possesses about 2.4 million camels ranks second in camel milk production in the world next to Somalia. Pastoralists consume camel milk either in its raw state without heat treatment or after it turns sour (Seifu, 2007). Fermentation appears to be the only means of preserving camel milk under warm conditions (Farah, 1993; Mohamed *et al.,* 1990).

Camel milk and its fermented product have critical importance for treatment of various communicable and non-communicable diseases and it is superior nutritionally and medicinally than other milk species (Rao M.B *et al.,* 1970). In India, camel milk is used therapeutically against dropsy, jaundice, problems of the spleen, tuberculosis, asthma, anemia, piles and diabetes (Rao M.B *et al.,* 1970).

The production of Ethiopian indigenous traditional fermented camel milk food products is still a household art and in most households no study was conducted on assessment of the Ethiopian indigenous traditional fermented camel milk (production areas, fermentation process, purpose and medicinal value of *Dhanaan*). Therefore, the objective of this survey was to identify the production areas, fermentation protocols, and purpose of production of *Dhanaan* in eastern Ethiopia.

MATERIALS AND METHODS

Description of the Study Area

Babile is located in the eastern Hararghe Zone of the Oromia Region, 30 Km east of Harar and 560 Km distanced from Addis Ababa. The town has latitude and longitude of 09°13’N 42°20’E coordinates: 09°13’N 42°20’E with an elevation of 1648 meters above sea level. Babile is known for its hot springs, mineral water, camel milk production, and the Babile Elephant Sanctuary.

Shinile is a town in eastern Ethiopia. Located in the Shinile Zone of the Somali Region, this town has a latitude and longitude of 09°41’N 41°51’E coordinates: 09°41’N 41°51’E with an elevation of 1079 meters above sea level. The first station of the Addis Ababa - Djibouti Railway east of Dire Dawa is at Shinile.

Jijiga is a city in eastern Ethiopia and the capital of the Somali Region of the country. Located in the Jijiga Zone approximately 80 km east of Harar and 60 km west of the border with Somalia, this city has an elevation of 1,609 meters above sea level.

Data Collection

Data on production areas, fermentation art, and purpose of production of *Dhanaan* by the farmers and pastoralists in eastern part of Ethiopia were collected using a structured questionnaire. Other related information with the problems on market accessibility for sealing *Dhanaan* was also collected. A total of sixty key informants were interviewed using a structured questionnaire. In addition to the primary data generated through survey, secondary data were collected from various reports published about *Dhanaan* and through consultation of concerned individuals in the study area.

A survey study on *Dhanaan*: Indigenous Traditionally Fermented Camel Milk of Eastern Ethiopia (Data Collection Form).

1. District Name _____ Kebele _____
2. Do you produce traditional fermented milk in your Kebele?
   A. Yes □ B .No □
3. If "Yes" which animal take advantage of milk source in your area?

A. Cow □ B. Camel □ C. Goat □ D. Sheep □ E. Others _____.

4. If your answer for question number 3 is B, which fermented camel milk is produced in your area?

A. *Dhanaan* □ B. *Ititu* □ C. Both □ D. Others _____.

5. If your answer for question number 4 is A, how do you produce this *Dhanaan*?

A. Using starter culture□ B. using spontaneous fermentation □

C. Using other system _____.

6. Which input and equipment you use for fermentation process of *Dhanaan* for one phase?

A. Water □ B. Container □ C. Milk □ D. all □ E. others _____.

7. Which season is conducive for production of *Dhanaan?*

A. Summer □ B. Winter □ C. Throughout the year □

8. How long it takes to complete the fermentation process of *Dhanaan*?

A. Days □ B. Weeks □ C. Months□

9. For how long it stays without deterioration?

A. Days□ B. Months□ C. Years □

10. For what purpose you use this *Dhanaan*?

A. As a source of food □ B. For abdominal discomfort □

C. For gastritis □ E. others _____.

11. If your answer for question number 9 is B or C, after how long get relief?

A. Hours □ B. Days □ C. Weeks □

12. If your answer for question number 9 is B or C, what is the indigenous thought to use *Dhanaan* as medicine?

A. Nutritional quality of *Dhanaan* □ B. Microbial composition of *Dhanaan* □ C. Others□

13. Do you sell fermented camel milk to customers?

A. Every day □ B. Sometimes□ C. Never□

RESULT AND DISCUSSION

This survey study provides complete data concerned on the production areas, traditional medicinal values and manufacturing art of *Dhanaan* in depth.

Production areas of *Dhanaan*

There are various traditional fermented camel milk products that are produced in different parts of the world by camel herders (Abdelgadir *et al.,* 1998; Abdel Rahman *et al.,* 2009; Hassan *et al.,* 2008; Lore *et al.,* 2005; Yagil, 1982). Suusac and garris are fermented camel milk products in Kenya, Somalia and Sudan (Abdelgadir *et al.,* 1998; Lore *et al.,* 2005). Pastoralists in the areas of Shinile, Babile and Jigjiga districts of eastern part of Ethiopia produce naturally fermented sour milk called *Dhanaan*. *Dhanaan* has different vernacular name in the study area. Pastoralists around Babile, Shinile give a name *Kerur* only for fermented product from camel milk but *Dhanaan* is for all fermented product from ruminant milk. *Dhanaan* has good nutritional quality and shelf life up to five months.

Traditional fermentation art of *Dhanaan*

The traditional fermentation process, consumption pattern and bacteriological characteristics of *Dhanaan* are not well described. The production of *Dhanaan* is still a household art and no study was conducted on assessment of the fermentation process, purpose and medicinal value of *Dhanaan*. *Dhanaan* is made by placing fresh camel milk in a clean/smoked container, wrapping the container with a piece of cloth and keeping it in a warm (ambient temperature) place for about 12-24h to allow spontaneous fermentation. *Dhanaan* is made by spontaneous fermentation without using a starter culture. However, some of the producers mentioned that when a small amount of previously fermented milk is added as a starter into fresh camel milk it takes only 6 hrs to obtain *Dhanaan*. The resulting fermented milk doesn't have uniform taste and shelf life because of the uncontrolled fermentation system. Kenyan researchers showed that the quality of susac, fermented camel milk, improved using selected mesophilic lactic starter cultures rather than spontaneous fermentation; the resulting fermented milk had a uniform taste and a longer shelf life (Farah *et al.,* 1990; Lore *et al.,* 2005). Isolation and identification of microorganisms that are responsible for the fermentation and production of the indigenous fermented camel milk product, *Dhanaan*, would help to develop a commercial starter culture and to standardize the manufacturing method for this product in the future. The producers also mentioned that during making *Dhanaan*, the milk in the container should be kept closed; otherwise the fermentation process doesn't take place. This suggests that the microorganisms responsible for souring or fermentation of camel milk are probably thermophilic anaerobic types.

Nutritional quality and Micro flora of *Dhanaan*

No information has been reported about the bacterial characteristics, manufacturing protocols and potentials of the fermented camel milk product *Dhanaan* produced in eastern Ethiopian. Farmers and pastoralists make *Dhanaan* from camel milk because they believe that it has high nutritional value and long shelf life, it enables collection of milk over a few days and thus facilitates delivery of milk to the market, it eliminates seasonal surpluses of milk, its taste is liked by the consumers, it has high demand in the market especially by urban dwellers, and it quenches thirst. Although, the farmers and pastoralists in eastern Ethiopia are widely using *Dhanaan* for nutritional (as food source) and medicinal benefits, including for treatment of gastritis and various abdominal discomforts. There was no study conducted regarding the scientific microbiological evaluation of *Dhanaan* as far as Ethiopia is concerned.

Therefore, this project will provide complete scientific information about the micro flora of *Dhanaan* and its antagonistic activities against healthy important microorganisms.

Table 1 importance of *Dhanaan* responded by pastoralists of Shinile, Babile and jijiga districts.

Use of *Dhanaan*	**Number of respondent**
As food source	20
For treatment of gastritis	30
For treatment of various abdominal discomfort	10
Total	60

Table 2 Indigenous thoughts of *Dhanaan* as medicine responded by pastoralists of Shinile, Babile and jijiga districts

Alternatives	**Number of respondent**
Nutritional quality of *Dhanaan*	33
Micro flora of *Dhanaan*	17
plants feeding by camel	10
Total	60

CONCLUSION

The production of Ethiopian indigenous traditional fermented camel milk food products is still a household art, and is made by spontaneous fermentation in a closed container. This suggests that the microorganisms responsible for souring or fermentation of camel milk are probably thermophilic anaerobic types. Farmers and Pastoralists in the areas of Shinile, Babile and Jigjiga districts of eastern part of Ethiopia produce naturally fermented sour milk called *Dhanaan*. *Dhanaan* has different vernacular name in the study area. Pastoralists around Babile, Shinile give a name Kerur only for fermented product from camel milk but *Dhanaan* is for all fermented product from ruminant milk. The farmers and pastoralists use *Dhanaan* as food source, for treatment of gastritis and various abdominal discomforts in the study area. In conclusion, the present study showed that the production areas, medicinal values, and traditional manufacturing art of *Dhanaan* were assessed in detailed.

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