Manufacture and extension of shelf-life of camel milk yoghurt to enhance food security in arid and semi-arid areas of Nothern Kenya.

Arimi. Joshua. M. jarimi@must.ac.ke. *Department of Food Science, Meru University of Science and Technology, Meru, Kenya*

Introduction

Camel milk is considered as the "white gold" of the arid and semi-arid areas and its rich in nutrients and medicinal properties. Camels produce milk all year round and produce milk when other livestock stop or die from dehydration. Although camel milk is available under harshest climatic conditions, making yoghurt and other fermented products with desired viscosity is challenging due to difference in structure of β-casein compared to cow's milk. Even if yoghurt can be successfully prepared, yoghurt requires cold storage for extended shelflife. In arid and semi-arid areas temperatures are high and limited households can afford refrigeration facilities. Due to sparse population, there is also poor distribution of power i.e. electricity. It is therefore important to evaluate methods of extending the shelf-life of camel milk yoghurt other than refrigeration.

Materials and Methods

- Camel milk was sourced from Isiolo County, Kenya.
- Milk was subjected to organoleptic tests, density test and Alcohol test
- Composition of camel milk was determined as follows:
  - Moisture content by oven drying
  - Protein by kjedahl method
  - Fat by Gerber method
  - Ash by Muffle furnace ashing method

Manufacture of camel milk yoghurt

Manufacture of control yoghurt with camel milk involved heating of milk to 40 ºC followed by addition of sugar (6%) and stabilizers (2%). The camel milk was further heated to 90°C for 10min., cooled to 42°C and inoculated with freeze dried fermentation cultures (2%), followed by incubation at 42°C until a pH of 4.5–4.6 was reached.

Cow's milk yoghurt purchased from the market was used as the reference.

Since coagulation of camel milk to form stable and good yoghurt coagulum has challenges, a starch stabilizer at concentration of 2% was added. Calcium chloride (0, 0.075 or 0.085%) was added.

Yoghurt was preserved either by pasteurisation or addition of potassium sorbate (0.01%) or Natamysin (0.8%). The yoghurt was packaged in 250 ml containers and stored under refrigeration or ambient temperature for 21 days.

Viscosity measurements were carried out in triplicates. The viscosity was measured using a physical rheometer (Reolab QC, Anton par, Germany). The measurements were carried out for 2 minutes at a shearing rate of 64S-1. The apparent viscosity was taken as the value of viscosity after 10 S of measurement.

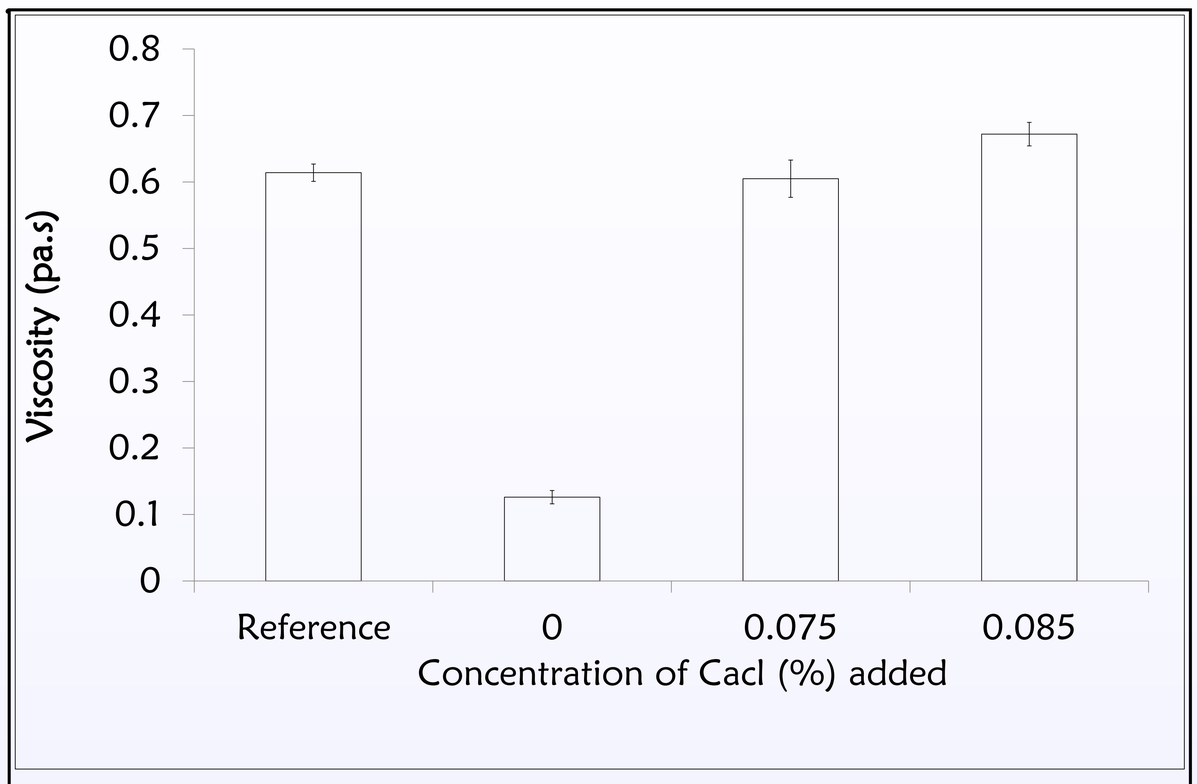

Figure 1. Effect of increasing concentration of calcium chloride on the viscosity of camel milk yoghurt.

Increasing the concentration of Calcium Chloride during the manufacture of the camel milk yogurt resulted in increased viscosity. At the level of 0.075% w/v, the viscosity was comparable to a reference yoghurt.

Shelf-life

Camel milk yoghurt with 0.075% and 0.8% Natamysin exhibited lowest total viable count, and lowest rate of pH decline following storage at refrigerated temperature and ambient temperature up to 21 days.

Conclusion

This study shows that it is possible to manufacture camel milk yoghurt with acceptable viscosity by addition of Calcium chloride at > 0.075%. Camel milk yoghurt shelf-life can be extended at ambient temperature by addition of Natamysin without pronounced changes in quality parameters ensuring availability of nutritious food over long periods leading food security.

References

Al haj, O. A., & Al Kanhal, H. A. (2010). Compositional, technological and nutritional aspects of dromedary camel milk. *International Dairy Journal*, *20*(12), 811–821.

Renan, M., Guyomarc'h, F., Arnoult-Delest, V., Pâquet, D., Brulé, G., & Famelart, M.-H. (2009). Rheological properties of stirred yoghurt as affected by gel pH on stirring, storage temperature and pH changes after stirring. *International Dairy Journal*, *19*(3), 142–148.

Acknowledgements

This work was funded by the Directorate of Research, Meru University of Science and Technology, Kenya

Contacts: Joshua Mbaabu Arimi.
Email: jarimi@must.ac.ke.
Tel. +254 717 47 37 36