

Improving handling practices and microbiological safety of milk and milk products in Borana pastoral communities, Ethiopia

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Objectives

- Assess the knowledge, attitude and practices (KAP) of women with regard to milk consumption and handling, and the associated health risks focusing on microbial pathogens (before and after giving training on good milk production practices).
- Assess containers smoking on the microbial quality of traditional yoghurt
- Assess the effect of using stainless steel milk storage containers on the microbial quality of yoghurt.
- Generate evidence on the prevalence of foodborne bacterial pathogens circulating in milk and milking environments in pastoral and agro-pastoral areas of Ethiopia focusing on *E. coli* O157 and non-typhoid *Salmonella* spp.
- In laboratory conditions, assess the suitability of aluminium containers for preparation of traditional yoghurt in terms of the amount of aluminium metal leached into yoghurt and determine level of aluminium metal residue in the product for potential health risks.

Methods

- 120 women keeping dairy animals trained on good practices of milk handling and consumption
- KAP assessed two times (before and immediately after training, and 4-5 months after the training)
- Effect of smoking on the microbial load of yoghurt (Lab experiment, simulating traditional method)
- Three plants
 - *ejersa* (*Olea europaea subsp. africana*)
 - *daanse* (*Faurea speciosa*)
 - *birreessa* (*Terminalia brownii*)
- Microbiological analysis
 - In connection with the proposed interventions (i.e. improved storage and smoking effect)
 - Milk borne pathogens in milk and feces of dairy animals (*E. coli* O157 and *Salmonella*).
- Aluminum containers will be used for preparation of yoghurt and amount of potentially leached aluminum determined
- A participatory experiment to assess the suitability of using stainless-steel milk containers (supposedly easy to clean) for the preparation of yoghurt.
 - Comparison in microbial load of the yoghurt will be made
 - Technical, social and cultural acceptability of the stainless steel containers



Preliminary results

KAP results not available (data analysis not finalized)

Container smoking:

- Less total bacteria count (TBC) and coliform count
 - Traditional compared to stainless steel
 - Ejersa compared to daanse, birreessa
 - Mean of application (smoking by putting the burning wood inside the container compared with fumigation)

Occurrence of milk borne pathogens:

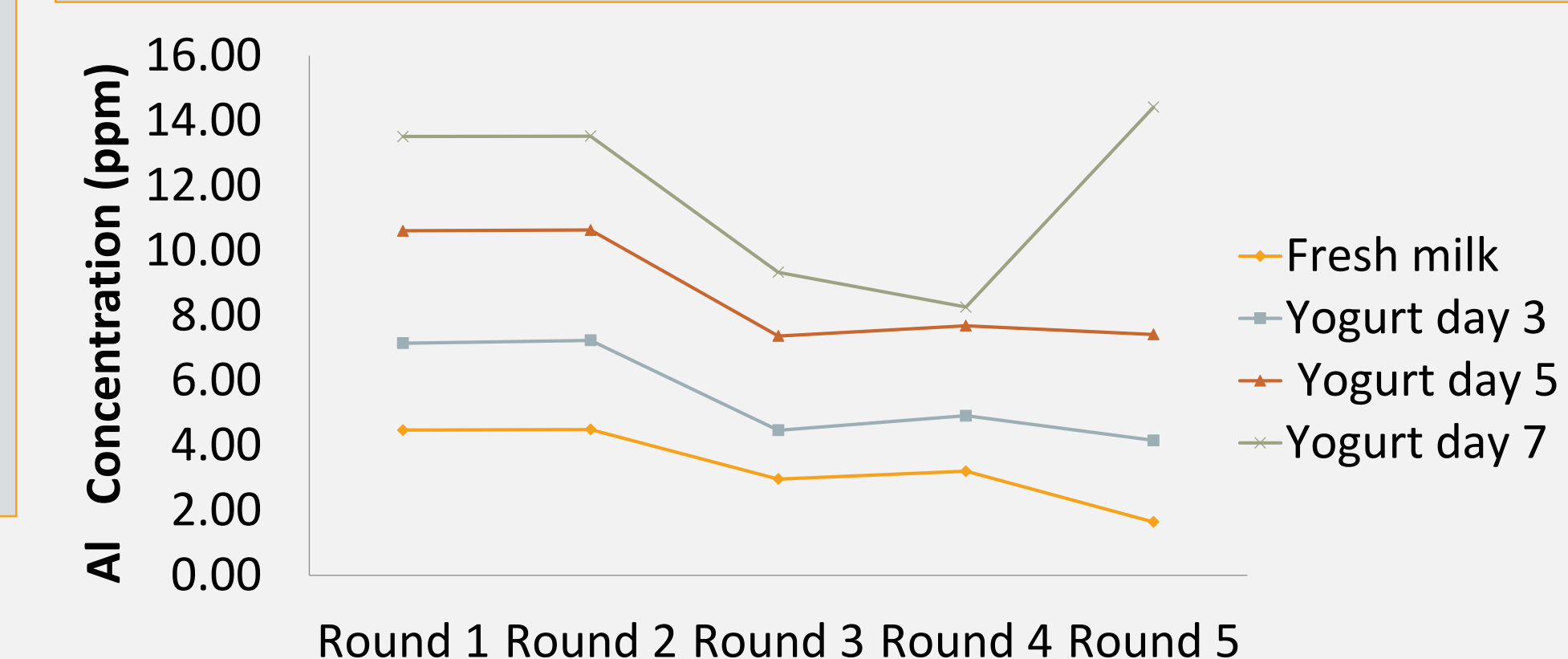
- 484 milk and fecal samples (150 samples each from cow milk and feces and 92 samples each from camel milk and feces)
- All isolates of both pathogens were found resistant for ampicillin
- Drug-resistant pathogens could be a significant public health risk

Livestock species	Samples	Number tested	<i>E. coli</i> O157:H7	Non-typhoid <i>Salmonella</i>
Cattle	Feces	150	4.7	4.0
	Milk	150	4.7	8.6
Camel	Feces	92	3.3	1.1
	Milk	92	0	2.1

Participatory experiment: preliminary results

- No difference in bacterial loads of yoghurt between traditional and stainless-steel containers
- Less preference for stainless containers (e.g. accelerates souring of milk)

Aluminum content in milk and yoghurt



Human capacity building

- Three MSc students: MSc in Veterinary Microbiology (June 2018), MSc in Analytical Chemistry (June 2018), MSc in Veterinary Public Health (June 2019, expected)

Options for scale-up?

- Use of stainless steel containers may not present an added value for Borana pastoral communities as it did not significantly reduce bacterial load of yoghurt and the container acceptability among end-users is low.

Future plan (no-cost extension)

- Second time post-training KAP assessment
- Molecular characterization of bacteria isolates

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