

To consume or not consume bacteria from Traditional Fermented Milk, Mursik of Kenya?

Presented by:

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Outline of Presentation

- Introduction
- Materials and methods
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- Conclusion
- Acknowledgement

Introduction

- Fermented milk role in human diet - man even during the ancient days of civilization (Behboud *et al.*, 2011)
- The medicinal and nutritional properties of various fermented foods have been experienced by several generations.
- However, the scientific community gave impetus to these beliefs in 1910, with Eli Metchnikoff postulates.

- In Kenya - pastoral communities such as the Maasai, Borana, Kalenjins and Somali by spontaneous fermentation.
- *Mursik* - mainly produced by the Kalenjin community in Kenya, gourd (Muigei *et al.*, 2013; Bezkorvainy, 2001).
- It forms a major part of the Kalenjin diet due to its delicious taste and belief that it improves health.

- The Kalenjin community also value it - special occasions (successful marriage negotiations and weddings, victory in athletics among other events) (Muigei *et al.*, 2013).
- IDF- Fermented milk as the milk product prepared from skimmed milk or not with specific cultures. The microflora is kept alive until sale or consumption by the consumers and may not contain any pathogenic germs.
- Lactic acid bacteria (LAB) widely dispersed in the nature and occurring native microflora in fermented milk that play an important role in improving their increased shelf life.

- Within the LAB group, the genus *Lactobacillus* is the most widely encountered for probiotics because they display numerous antimicrobial activities (Ogunbanwo *et al*, 2003).
- Some of which could provide valuable alternatives to traditional therapeutic antibiotics for the treatment of infectious diseases (De vuyst and Leroy, 2007).
- Hence, the purpose of this work was to isolate and characterize potential probiotic *Lactobacillus* strains from mursik of Kenya.

Materials and Methods

Isolation and identification of *Lactobacillus species*:

- A total of 41 mursik samples were randomly collected in sterilized glass bottles from Bomet, county.
- Mursik was serially diluted and plated on to sterile MRS agar. The MRS plates were maintained in microaerophilic condition and incubated at 37°C for 48h.
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- After incubation isolated typical colonies were subjected to standard morphological, cultural and biochemical reactions tests(Howells, 1992 ; Schillinger and Lucke, 1987).

- **Determination of Antimicrobial Activity:** The antagonistic properties of isolated LAB species were determined by modifying the disc diffusion method against test pathogens, *Salmonella enteritica*, ATCC 13076, *Escherichia coli*, ATCC 25922 and *Staphylococcus aureus* (Kirby-Bauer, 1966).
- **Acid and bile salt tolerance:** Isolated *Lactobacillus* sp. were inoculated into MRS medium of varying pH and concentrations of bile salt (0.5, 1.0, 1.5 and 2.0%).

Results and Discussions

- 16 isolates LABs were obtained. All of the isolates were gram positive and catalase negative rods.
- The *Lactobacillus* species were identified as *Lactobacillus brevis*, *Lactobacillus plantarum*, *Lactobacillus casei* and *Lactobacillus fermentum* after subjection to identification tests.
- Some similar *Lactobacillus* sp. were isolated from traditional dairy products of Ardabil region in Iran by Jafari *et al*, (2011). According to Bergey's manual many probiotics cannot utilize rhamnose. Seventeen (with glucose) different carbohydrates were used for identification.
- They give different fermentation patterns when they are compared. The patterns are showed in Table 1 below. When these biochemical test results (Table1), were compared with the literature information (Roos *et al*, 2005; Hammes & Vogel, 1995).

- It seems that isolates Ba, Ba1, Bd1 and Cd were like *Lactobacillus plantarum*. Bb, Bb1, Be, Cc and Cf, *Lactobacillus fermentum*. Bc and Bc1, *Lactobacillus brevis* and, Ca, Cb and Cf1 were like *Lactobacillus casei*.

Biochemical Test Results of Isolates

Lactobacillus Isolates																					
	15°C	45°C	Arabinose	Fructose	Galactose	Glucose	Lactose	Maltose	Mannitol	Mannose	Raffinose	Ribose	Salicin	Sorbitol	Sucrose	Trehalose	Rhamnose	Xylose	Esculin	NO ₃ ⁻	Arginine
Ba, Ba1, Bd1 and Cd	+	-	-	-	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	-	+
Bb, Bb1, Be, Cc and Cf	-	+	+	+	+	+	+	+	-	-	+	+	-	-	+	+	-	-	-	-	+
Bc and Bc1	+	+	+	+	+	-	-	+	+	+	-	+	-	-	+	-	-	+	-	-	-
Bd, Ca, Cb and Cf1	+	-	+	+	+	+	+	+	-	+	-	+	+	-		+	-		+	-	-

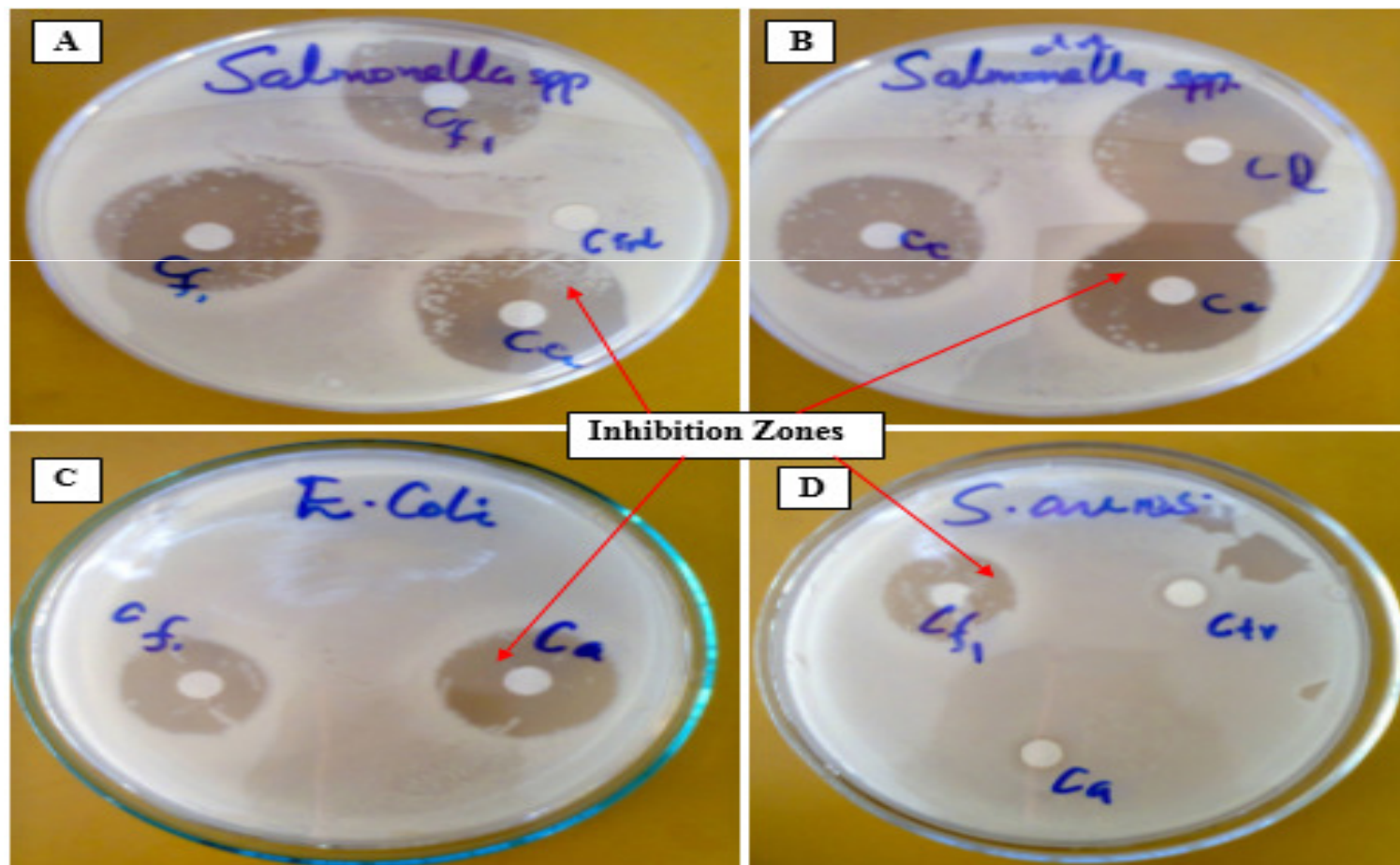
Symbols: + resembles positive reaction while - negative reaction.

Antagonistic activity:

- The antagonistic activity of isolates was determined against selected enteric bacterial pathogens. Out of the 16 isolates all showed inhibition in the disc diffusion test.
- This may be due to the production of acetic and lactic acids that lowered the pH of the medium or competition for nutrients, or due to production of bacteriocin or antibacterial compound (Bezkorvainy, 2001).
- Obadina *et al*, (2006) also reported that fermentation process which involved *L. plantarum* had a broad antimicrobial inhibitory spectrum, against *Salmonella typhi*, *E. coli* and *S. aureus*.

Our study showed that *Lactobacillus* isolates had strongest antibacterial potential against *Salmonella typhi* followed by *Escherichia coli* and *Staphylococcus aureus* (figure1).

Noordiana, (2013) noted that the presence of *Lactobacillus* species in Threadfin Salmon and Grass Shrimp decreased the number of the enterobacteria and fecal coliforms in the final product.



Acid and bile salt tolerance:

- For evaluating the potential of LAB as effective probiotics it is generally considered necessary to evaluate their ability to resist the effects of bile acids (Lee and Salminen, 1995).
- In this study all the 16 isolates showed acid tolerance at pH 2, pH 3 and bile salt tolerance at 2%.
- Before reaching the intestinal tract, probiotic bacteria must first survive transit through the stomach where the pH can be as low as 1.5 to 2 (Dunne *et al*, 2001).

- Tolerance to bile salts is considered to be a prerequisite for colonization and metabolic activity of bacteria in the small intestine of the host (Havenaar *et al*, 1992).
- This will help *Lactobacilli* to reach the small intestine and colon and thus contribute in balancing the intestinal microflora.

Conclusion

- The study indicated that the isolated *Lactobacillus* species meet several of the criteria for use as a probiotic.
- These characteristics may be advantageous for a probiotic culture to be successful in colonizing and compete with pathogens in gastrointestinal environment.
- The ability to survive acidic conditions, bile resistance, and the production of antimicrobial compounds that are active against enteric pathogens.
- Probiotic approach is to reconstitute natural condition by means of repairing a deficiency either by producing organic acids, antimicrobial substance and vitamins etc. and remove foreign chemicals from the body, which may have toxic consequences or, as in the case of antibiotics induce resistance and compromise subsequent therapy.

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The end

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Thank You