MILK FERMENTATION AS A PREVENTATIVE INTERVENTION IN THE SPREAD OF TUBERCULOSIS IN SUB-SAHARAN AFRICA

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Introduction:
We will present data on the potential of milk fermentation in controlling the growth and multiplication of Mycobacterium bovis, the causal agent of zoonotic tuberculosis (TB), in Africa where large varieties of indigenous fermented milk products are traditionally manufactured from raw milk. The main aims of the study were to evaluate different culturing and molecular methods for the isolation and accurate quantification of M. bovis in dairy products, to determine the effect of the fermentation process on the survival of M. bovis in milk, and to evaluate the use of the food additive, Ethyl pyruvate (EP), as a means of increasing the antimicrobial effect of lactic acid fermentation on M. bovis. Three sample treatments namely 0.75% (m/v) hexadecylpyridinium chloride (HPC), N-acetyl-L-cysteine-sodium hydroxide (NALC-1% NaOH), and direct plating onto 7H10 - 2% (m/v) PANTA agar were evaluated for recovery of M. bovis from contaminated milks. The 7H10 agar enriched with PANTA was found to be an effective method for suppressing natural microorganisms present in both raw milk and fermented milk, while allowing the enumeration of M. bovis. The established culture method was used to monitor the survival of M. bovis during fermentation using kefir grains or single strains of lactic acid bacteria (LAB) isolated from African indigenous fermented milks. Ethyl pyruvate (EP) at concentrations of 10 mM, 20 mM and 80 mM was added at the beginning of the fermentation of the contaminated milks using kefir grains as starter. A PCR-based method that accurately detects bacterial species belonging to the Mycobacterium tuberculosis complex (MTBC) in raw and fermented milk was also established.

The study has demonstrated milk fermentation decreases M. bovis cell concentration and a fermentation period of 60 h is required for elimination of M. bovis. The organic acids produced during fermentation are the most important antimicrobial factor. Addition of EP resulted in higher mortality of M. bovis and was found to be a potential candidate to be used as an antimicrobial against M. bovis during milk fermentation. Therefore, the fermentation process has potential in ensuring the safety of traditional fermented milk produced by some African communities.

Keywords: Milk fermentation, Mycobacterium bovis, Zoonotic tuberculosis, Raw milk, Probiotics

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