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Can *Iactiplantibacillus plantarum* spp from Indigenous African Foods be Used in Folate Bio-fortification of Cereal-dairy-based Beverage*s*

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Abstract

Folates are essential micro-nutrients responsible for preventing Neural Tube Defects (NTDs) in foetuses and promoting growth and development during pregnancy. Folate deficiency is more prevalent in developing countries than developed countries because of the high consumption of cereals such as maize. As a result, folic acid, a synthetic folate, is used as a dietary supplement during pregnancy and lactation. Long-term use of folic acid is associated with the masking of vitamin B_{12} deficiency, necessitating an alternative natural dietary source of folate. Lactic Acid Bacteria (LAB) fermentation of cereals is a potential alternative dietary source to help improve the folate content in fermented maize. The folate production by LAB is strain-dependent and is moderated by the presence of folate precursors, fermentation medium, and time.

The study aims to enhance the folate content in cereal-based fermented beverages using LAB and evaluate the effect of adding milk as a folate precursor on folate biosynthesis to address the nutrient deficiency of folate. Four *L. plantarum* strains FS2, B411, S49, and S7, capable of producing extracellular folate, were used to ferment a cereal gruel prepared by cooking maize flour with sterile water in a 1:9 ratio. Milk was added at 0%, 25%, 35%, 50%, and 75% of the total maize gruel volume. Fermentation was carried out at 37̊ C to reach pH 3.5.

The total folate content was quantified using a microbiological assay. There was an increased folate content in the fermented cereal gruel using LAB. However, adding milk led to a notable increase in folate levels, with strain FS2 having the highest concentration in both gruels, whether with or without milk. When a combination of LAB was used as a starter culture, the folate content produced contributed at least 27% of the recommended daily intake per 200 mL.

The use of LAB in bio-processing, utilizing indigenous African diets, has the potential to raise the folate content in fermented foods, thereby providing an alternative source of natural dietary folate.