Is it possible to increase the folate content in cereal based fermented foods using lactic acid bacteria?

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Folate deficiency is a well known cause of many disorders such as megaloblastic anemia, congenital malformations and neural tube defects. Even if the most important natural source of folate is leafy vegetable, cereals can greatly contribute to folate intakes. The in situ fortification thanks to lactic acid bacteria (LAB) has proved its efficiency in dairy products. However, very few studies have been carried out on cereal-based fermented foods (CBFF), although they are widely consumed all around the world and can contain high amount of folate (up to 28µg/100g dry matter). Furthermore, in a collection of 150 LAB isolated from a traditional pearl millet fermented slurry (ben-saalga), the genes folK and folP, essential for folate biosynthesis, have been detected in 96% of the strains. The objective of this study was to find a way to increase folate content in CBFF using LAB. We first measured by microbiological assay the folate content of 50 samples of ben-saalga (chosen as CBFF model) collected in 10 production units in Ouagadougou (Burkina Faso). It was comprised between 0 to 3µg/100g fresh matter, which is very low. In order to increase this content, we looked for the best folate producing strains among the 150 LAB (Lactobacillus acidophilus, L. fermentum, L. plantarum, Pediococcus acidilactici and P. pentosaceus) previously used for the genetic screening. In culture medium (MRS), 62% of the strains are able to produce folate (up to 120µg/l), 28% consume it and 10% do not modify folate content. Finally, we used the most producing strains to prepare ben-saalga to verify if it can increase folate content of the CBFF. These strains permitted only to maintain the initial folate content of the food. Other parameters (addition of precursors, fermentation duration...) should be studied to find a way to increase folate content on CBFF.

Reference of this abstract:

Saubade F., Almousa-Almaksour Z., Hemery Y., Humblot C., Picq C., and Guyot J-P. (2014). Is it possible to increase the folate content in cereal based fermented foods using lactic acid bacteria ? Food Micro 2014, 24th International ICFMH conference (September 1-4 2014, Nantes, France).