Potential of lactic acid bacteria for the reduction of fumonisin exposure in African fermented maize based foods

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Abstract

Maize, which contributes to a large portion of the African diet and serves as the base substrate for many fermented cereal products, has been reported to be contaminated with fumonisins. This study aimed to evaluate the *in vitro* ability of predominant lactic acid bacteria (LAB) in African traditional fermented maize based foods (*ogi* and *mahewu*) to bind fumonisin B_1 (FB_1) and B_2 (FB_2), as well as the stability of the complex at different pH and temperatures, in particular observed during *ogi* fermentation and under its storage conditions (time, temperature). The percentage of bound fumonisins was calculated after analysing the level of fumonisins not bound to LAB after a certain incubation time, by HPLC. The results revealed the ability of all tested LAB strains to bind both fumonisins, with binding efficiencies varying between strains and higher for FB_2. Binding of fumonisins increased with a decrease in pH from 6 to 4 (observed during the *ogi* fermentation process) and from 4 to 2 (acidic pH in the stomach), and an increase in temperature (from 30 to 37 °C). The percentage of FB_1 and FB_2 bound to LAB at pH 4 decreased after 6 days of storage at 30 °C for all LAB strains, except for *Lactobacillus plantarum* (R1096) for which it increased. *Lactobacillus* species (*L. plantarum* and *Lactobacillus delbrueckii*) were the most efficient in binding FB_1 and FB_2, whereas *Pediococcus* sp. was less efficient. Therefore, the *Lactobacillus* strains tested in this study can be recommended as potential starter cultures for African traditional fermented maize based foods having detoxifying and probiotic properties.