

Frida Albinusi Nyamete
Potential of Lactic Acid Fermentation in Reducing Aflatoxin B₁ and Fumonisin B₁ in Tanzanian Maize-Based Complementary Gruel

Abstract

Aflatoxin B₁ (AFB₁) and fumonisin B₁ (FB₁) are the most carcinogenic and heat-stable mycotoxins and they are harmful to both humans and animals. This study investigated the effect of fermentation on AFB₁ and FB₁ reduction in maize-based gruel fermented at 30°C for up to 24 h using four monocultures (*Lactobacillus plantarum*, *Pediococcus pentosaceus*, *Lactobacillus casei* and *Lactobacillus fermentum*) and two co-cultures (one composed of *Enterococcus faecium*, *Lactobacillus plantarum* and *Lactobacillus buchneri* (AS), and the other consisting of *Enterococcus faecium*, *Lactobacillus plantarum* and *Lactobacillus lactis* (SR3.54) (MC)) of lactic acid bacteria (LAB), natural fermentation and back-slopping. Generally, the bacteria increased by two log units and the acidity (expressed as lactic acid) ranged from 3.30 to 3.95 × 100µg/mL after 24 h of fermentation. Back-slopping and natural fermentation removed 68 and 56% of AFB₁ and 30 and 20% of FB₁, respectively after 24 h. *Lactobacillus* strains removed between 45 – 55% of AFB₁ and 14 – 27%, of FB₁. Co-culture of (AS) was superior at removing both AFB₁ (68%) and FB₁ (27%) than co-culture of (MC) which only removed 54% of AFB₁ and 17% of FB₁ respectively. Comparatively, back-slopping was the most convenient, economical and effective method for detoxification of mycotoxins in fermented gruel.