

Bio-Detoxification of Aflatoxin B1 in Artificially Contaminated Maize Grains Using Lactic Acid Bacteria

Flora Oluwafemi¹, Manjula Kumar², Ranajit Bandyopadhyay², Tope Ogunbanwo³, Kayode B. Ayanwande¹

¹University of Agriculture, Abeokuta, Nigeria

²International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria

³University of Ibadan, Ibadan, Nigeria

Address for Correspondence Dr. Flora Oluwafemi, Department of Microbiology, University of Agriculture, UNAAB box 64, Abeokuta, Nigeria. E-mail: : foluwafemi2000@yahoo.co.uk

Abstract

Aflatoxins are a group of carcinogenic mycotoxins produced by *Aspergillus flavus*, *A. parasiticus*, and *A. nomius*. Due to the ubiquitous occurrence of aflatoxins, preventive and remediative measures are necessary including detoxification techniques. Physical and chemical decontamination strategies are inconvenient. In this study a biological detoxification strategy was tested using bacteria of the *Lactobacillus* species collected from the biotechnology laboratory at University of Ibadan, Nigeria. Maize grains with moisture content of 17% were artificially inoculated with toxigenic *A. flavus* (LA 32G_28) and atoxigenic *A. flavus* (LA32_79) at ambient temperature and four samples of bulk maize grains were prepared at aflatoxin B1 concentrations of 50, 100, 200, and 500 ng/g. To evaluate the detoxifying potential of lactic acid bacteria five different cultures consisting of *Lactobacillus acidophilus*, *L. brevis*, *L. casei*, *L. delbruekii*, and *L. plantarum* were used to inoculate the aflatoxin B1-contaminated maize samples at 37°C. After 5 days, the residual aflatoxin B1 on maize was determined. All treatments showed significant reductions ($P < 0.05$) in aflatoxin B1. Lactic acid bacteria decreased the pH of the medium from 5.0 to 4.0. Pronounced aflatoxin B1 reduction was observed in maize contaminated at 50 ng/g (44.5%), while maize contaminated at 500 ng/g was the least reduced (29.9%). *L. plantarum* was the most efficient organism in degrading aflatoxin B1. Use of lactic acid bacteria, which already has Generally Regarded As Safe (GRAS) status, should be encouraged for use as a bio-detoxification agent for aflatoxins.

Keywords: [Aflatoxins](#), [aspergillus flavus](#), [maize grains](#), [lactic acid bacteria](#), [detoxification](#)
