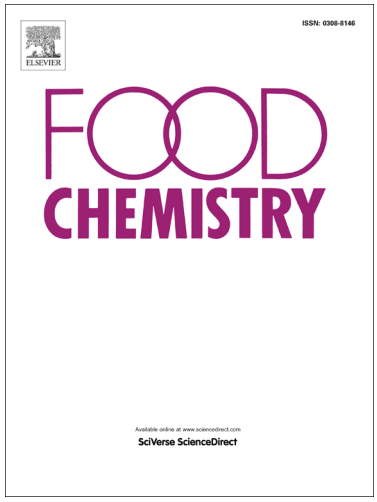

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Hydrolysers of modified mycotoxins in maize: α-amylase and cellulase induce an underestimation of the total aflatoxin content.

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Abstract

Aflatoxins are the most potent genotoxic and carcinogenic mycotoxins. To date, research has only focused on the presence of free aflatoxins in agricultural commodities. Therefore, the main objective of this study was to investigate the occurrence of possible modified aflatoxins in maize. Different hydrolysis methods were applied to convert modified mycotoxins into their free aflatoxins. Eighteen aflatoxin-contaminated maize samples were incubated with potassium hydroxide, trifluoromethanesulfonic acid and several enzymes to induce hydrolysis. Potassium hydroxide caused a total reduction of aflatoxins, while trifluoromethanesulfonic acid did not lead to an increase in free aflatoxins, neither did treatment with a protease. However, α-amylase and cellulase incubation caused significant increases in the total free aflatoxin content, 15±8% and 13±5%, respectively. These results show that a small proportion of aflatoxins could be associated to matrix substances in plants. Consequently, hydrolysis could occur during food processing and during mammalian digestion, leading to an underestimation of the total aflatoxin content.

Highlights

- Treatment under alkaline conditions caused a total reduction of aflatoxins.
- Trifluoromethanesulfonic acid conditions did not cause an increase of aflatoxins.
- Protease treatment did not change the aflatoxins content.
- Treatment with α-amylase and cellulase increased the aflatoxins content.
- Matrix-associated aflatoxins are embedded *in planta*.

Keywords

Aflatoxins, modified aflatoxins, cereals, matrix, modified mycotoxins