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Abstract

Effect of Photosensitization on Inactivation of *Aspergillus flavus* in Maize †

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Abstract: Mycotoxins are naturally occurring toxins produced by certain types of fungi that contaminate food and feed, posing serious health risks to human and livestock. Photosensitization is a light-based technique, which has emerged as a novel and promising green technology to control microbial growth in food and feed. This study aimed to evaluate the effect of solvent medium including ethanol (EtOH), 50% (v/v) propylene glycol (PG), 20 % (v/v) tween 20 (TW-20), and 20 % (v/v) tween 80 (TW-80), on curcumin-mediated photosensitization to inactivate *Aspergillus flavus* spores in vitro and on the surface of yellow and white maize kernel and flour. Results showed a reduction in the phototoxic activity of curcumin in TW-20 and TW-80. However, curcumin-based photosensitization using EtOH and PG as solvents led to a significant decrease in the colony forming ability of *A. flavus* spores in vitro, up to 2.04 and 3.33 log colony-forming unit (CFU), respectively. Interestingly, fungal growth was delayed in photosensitized maize kernel and flour for 14 and 7 days, respectively, which were stored at 25 °C. Consequently, no Aflatoxin B1 (AFB1) was detected in maize kernels after 20 days of storage at 25 °C, whereas accumulation of the toxin was reduced by 91% in photosensitized flour. Thus, photosensitization showed to be a potential alternative to reduce *A. flavus* contamination on maize kernel and flour, giving rise to low concentrations of AFB1. This technique has the potential for use in feed applications resulting in the reduction of post-harvest losses in maize.

Keywords: curcumin; maize; mycotoxins; photosensitization

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