

Antifreeze proteins: characteristics and potential applications

ABSTRACT

Aspergillus flavus is a toxigenic fungus well known for the synthesis of aflatoxins that contaminate crops and food products. Antifungal peptides generated by lactic acid bacteria have a high potential for applications as bio-control agent to prolong the shelf life of crops. In this study, antifungal activity of peptides generated by *Lactobacillus plantarum* TE10 was tested against the spoilage fungi *Aspergillus flavus* MD3. *L. plantarum* TE10 was inoculated in MRS broth and incubated at 37 °C for 48 h and the antifungal activity was determined using dual agar overlay method. The cell free supernatant was fractionated using size exclusion chromatography, and the peptides were identified using LC-MS/MS. Scanning electron microscope was performed to determine the effects of the active fraction on the morphology of target fungi. The antifungal activity of the active fraction was further confirmed against selected fungi in fresh maize seeds. A total of 37 peptides were identified in fraction 7 that showed the highest antifungal activity. The peptides mixture in fraction 7 caused damage at the tip of the mycelia as observed by scanning electron microscope. Growth of *A. flavus* was observed after 7 days on the samples treated with distilled water and MRS broth, while slight growth was observed on the sample treated with fraction 7. Fraction 7 reduced the spore formation of *A. flavus* by 4 folds compared to the control. The results demonstrated promising application of the peptides mixture as bio-control agent to prevent the growth of *A. flavus* in maize.

Keyword: Bioactive peptides; Bio-preservatives; Bio-transformation; Spoilage; Maize