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Presence of *aiiA* homologe genes encoding for N-acyl homoserine lactone lactonase in aflatoxin B1 degrading *Bacillus* Strains

Lilia R Cavaglieri, María L González Pereyra and **María P Martínez**
Universidad Nacional de Río Cuarto, Argentina

Microbial degradation of Aflatoxins (AFs) is an alternative to the use of mycotoxin binders. The lactone ring is a possible target for microbial enzymes, since its cleavage would result in less toxic derivatives. The aim of this study was to isolate and identify *Bacillus* strains able to degrade Aflatoxin B1 (AFB1) to less toxic metabolites, to identify *aiiA* genes encoding for N-acyl-homoserine lactone (AHL) lactonase and to possibly correlate detoxification with the production of this enzyme. Eleven *Bacillus* strains were isolated from soil, pond sediment and identified by MALDI-TOF MS. Ability of the strains and their cell free culture supernatants (CFCS) and cell lysates to degrade AFB1 was tested. Toxicity of degradation products was tested using the *Artemia salina* acute toxicity test. The presence of the *aiiA* gene was studied by PCR amplification using specific primers. The cleavage of the lactone ring was confirmed by Thin-Layer Chromatography (TLC). Strains were identified as *B. mojavensis, B. subtilis, B. cereus* and *B. mycoides*. Ten out of 11 cultures and eight CFCS were able to significantly degrade ($P<0.05$) AFB1. Degradation percentages ranged from 27.78% to 79.78%. Cell lysates were also able to reduce AFB1 ($P<0.05$). Exposure to high temperatures (70 and 80°C for 20 min) did not affect enzyme activity. All strains degraded AFB1 to less toxic metabolites. *B. subtilis* RC1B, B. cereus RC1C and *B. mojavensis* RC3B, amplified a fragment of 753 pb corresponding to the *aiiA* gene encoding for AHL lactonase. CFCS and cell lysates these strains were able to cleave the lactone ring. In conclusion, the degradation activity of these *Bacillus* strains is due to extracellular and intracellular enzymes. If demonstrated to be safe, they have potential to be used as biological control agents to detoxify AFB1 in contaminated food or feed.

lcavaglieri@exa.unrc.edu.ar