## The Use of Beneficial Microorganisms from Diverse Environments for the Management of Aflatoxin in Maize

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Abstract : The management of aflatoxins (naturally occurring toxins produced by certain fungi, most importantly Aspergillus flavus and A. parasiticus) relies mostly on the use of best cultural practices and, in some cases, the use of the biological control consisting of atoxigenic strains inhibiting the toxigenic strains through competition resulting in considerable toxin reduction. At AgBiome, we have built a core collection of over 100,000 fully sequenced microbes from diverse environments and employ both the microbes and their sequences in the discovery of new biological products for disease and pest control. The most common approach to finding beneficial microbes consists of isolating microorganisms from samples collected from diverse environments, selecting antagonistic strains through empirical screening, studying modes of action, and stabilization through the formulation of selected microbial isolates. A total of 608 diverse bacterial strains were screened using a high-throughput assay (48-well assay) to identify strains that inhibit toxigenic A. flavus growth on maize kernels. Active strains in 48-well assay had their pathogen inhibiting activity confirmed using the Flask Assay and were concurrently tested for their ability to reduce the aflatoxin content in maize grains. Strains with best growth inhibition and reduction of aflatoxin were tested in the greenhouse and field trials. From the field trials, three bacterial strains, AFS000009 (Pseudomonas chlororaphis), AFS032321 (Bacillus subtilis), AFS024683 (Bacillus velezensis), had aflatoxin concentrations (ppb) values that were significantly lower than those of inoculated control. The identification of biological products with high efficacy in inhibiting pathogen growth and eventually reducing the aflatoxin content will provide a valuable alternative to control strategies used in aflatoxin contamination management.

Keywords : aflatoxin, microorganism bacteria, biocontrol, beneficial microbes

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