

Title Characterisation of Aflatoxin-producing and Non-producing Strains of *Aspergillus* Section Flavi in Nigeria

Author Matthias Donner, Joseph Atehnkeng, Ranajit Bandyopadhyay, Sebastian Kiewnick, Richard A. Sikora, Peter Cotty

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Abstract

Aflatoxins are toxic metabolites produced by fungi of the genus *Aspergillus*. *Aspergillus flavus* is the most common toxin producing species, but different strains produce different amounts of aflatoxin and some produce none. In West Africa these fungi cause aflatoxin contamination in maize both during crop development and in storage. In a joint project with the International Institute for Tropical Agriculture, the potential of atoxigenic *Aspergillus flavus* strains as biological control agents was assessed for the reduction of aflatoxin contamination of maize in Nigeria. Over 1000 fungal isolates belonging to *Aspergillus* Section Flavi were collected by dilution plating on modified Rose Bengal agar. The isolates originated from 56 soil samples that were collected from Nigerian maize fields located in five agroecological zones. These isolates were screened for their aflatoxin producing ability in liquid fermentation. Of over 600 isolates screened, 48% produced detectable quantities of aflatoxin. The aflatoxin B1 production of *A. flavus* isolates varied from 33 ppb up to 19,000 ppb. From each soil sample the producing habit of sclerotia and spores was investigated for high aflatoxin producers and atoxigenic isolates. Isolates that produced high levels of toxin in liquid fermentation produced proportionally less spores and had a higher sclerotia mass on Czapeks agar (31C, 25days), while isolates with high spore mass and less sclerotia mass produced less aflatoxin. The current research involves molecular genetic characterisation of the isolates. Portions of the aflatoxin biosynthetic pathway genes, aflR, as well as genes from the *Aspergillus flavus* genome (taka amylase and pecA) were amplified by PCR and sequenced. Phylogenetic trees were constructed from the sequence data to assess relationships among the toxigenic and atoxigenic isolates. The study demonstrates the differences between aflatoxin producing and atoxigenic *Aspergillus* Section Flavi isolates.