

Characterization of aflatoxigenic *Aspergillus flavus* associated with aflatoxin B1 (AFB1) production in maize kernel in India

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Abstract

Mycotoxin-producing fungi directly impact on the yield and quality of agricultural produce. *Aspergillus flavus* is predominant fungi to produce aflatoxin B1 (AFB1) mycotoxin in maize. Early detection and quantification of aflatoxin B1 producing *A. flavus* is indispensable to mitigate maize loss. With this aim, three different detection methods (PCR, qPCR and HPLC) deployed to screen highly toxigenic and atoxigenic isolates of *A. flavus*. PCR analysis of four *A. flavus* isolates revealed possession of six toxigenic genes (*aflO*, *aflP*, *aflQ*, *aflM*, *aflS* and *aflD*), among *aflO*, *aflP* and *aflQ* genes are most common. In qPCR, seven isolates tested representing 5 different maize growing agroclimatic zones of India, expressed *nor-1* gene. In two of the isolates, higher mean expression levels were noticed. In HPLC, aflatoxin B1 (AFB1) production capacity was tested in all isolates. About 65% of the *A. flavus* isolates produced aflatoxin B1 (between 43.87 and 0.88 µg/g). This study exhibited that the highly toxic isolate observed from the sample collected from Hyderabad, where maize crop is growing year round, followed by nagaon's sample from Assam, therefore these locations will need extra care during post harvest condition to minimize the risk of aflatoxin in storage.