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BIOLOGICAL CONTROL OF AFLATOXINS AND FUMONISINS USING GREEK ENDEMIC NON-AFLATOXIGENIC STRAINS OF *ASPERGILLUS FLAVUS* IN MAIZE

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Mycotoxins are one of the major threats to food and feed safety and quality worldwide. Aflatoxin AFB1 and its metabolite AFM1, produced by fungi belonging to *Aspergillus flavus* and *A. parasiticus*, have been classified by the International Agency for Research on Cancer as the most carcinogenic compounds for humans. In maize, aflatoxins are often co-occurring with fumonisins, produced by several *Fusarium* species, such as *Fusarium verticillioides,* which can cause several diseases, including cancer. Due to the inability of chemical methods to control mycotoxin levels in maize, the use of non-aflatoxigenic strains of *Aspergillus flavus* has been characterized by numerous studies as the most effective control strategy against aflatoxins. The purpose of the present study was initially to evaluate 14 and 35 endemic non-aflatoxigenic strains isolated from pistachios and maize respectively, in terms of their ability to reduce aflatoxin production *in situ*, on artificially inoculated maize seeds by endemic highly aflatoxigenic *A. flavus* strains. Previous experiments indicated the high efficacy of the 14 non-aflatoxigenic strains isolated from pistachios, in inhibiting the biosynthesis of aflatoxins on pistachios, with aflatoxin levels reduction rates ranged between 80-90%, both in laboratory and field experiments. Additionally, *in situ* experiments on maize seeds indicated high inhibition rates that exceeded 90%. Subsequently, the non-aflatoxigenic strains were subjected to Vegetative Compatibility Groups (VCGs) aiming to find genetically stable isolates, suitable to serve as biological control agents against aflatoxin contamination in Greece. The total of 49 isolates were further applied on maize plants, to evaluate their effectiveness in reducing aflatoxins levels under field conditions. 14 out of 49 isolates were able to minimize aflatoxin levels by 95-100% and were included in large VCG groups, indicating that they are also well adapted at the local environment. Finally, 4 of the most effective non-aflatoxigenic isolates, from distinct VCGs, were tested for their ability to decrease fumonisin levels on artificially inoculated maize seeds, with a highly toxigenic Greek isolate belonging to *F. verticillioides*. The results of the present study could potentially provide useful biocontrol agents, for the control of mycotoxins in maize, in Greece.