Mycotoxins production by Aspergillus section Flavi isolated from harvested maize

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Mycotoxins are toxic compounds produced by some species of filamentous fungi known to cause serious health problems in humans and animals. In cereals, the key mycotoxigenic fungi in partially dried grains are *Aspergillus flavus* (aflatoxins), *A. ochraceus* (ochratoxin A) and some *Fusarium* species (fumonisins, trichothecenes), being maize is one of the more susceptible commodities. Aflatoxins (AF) produced by *Aspergillus* section *Flavi* species and fumonisins produced by *Fusarium verticillioides* are prominent mycotoxins associated with maize economic losses. Cyclopiazonic acid (CPA) is produced predominantly by *A. flavus* strains and occurs naturally in a wide variety of crop products as a co-contaminant with AF. In Portugal, maize is one of the most important field crops. In 1999, maize occupied 163 497 ha, with a production of 933 800 tons.

The aim of this work was to detect whether the isolated species of *Aspergillus* section *Flavi* were AF and CPA producers and whether these mycotoxins were present in post-harvested maize samples.

In order to do so, ninety five maize samples were collected from different agroclimatic regions of Portugal. From these samples, 25 grains chosen randomly were plated in 5 Petri dishes with solidified agar, incubated and the *Aspergillus* section *Flavi* strains were isolated under stereomicroscope observation. All these strains were screened for AF and CPA production, as described elsewhere (Soares et al, 2010). Also, the maize samples were screened for AF and CPA. The extraction methodology was based on protocols provided by Vicam for aflatoxins (AF), with immunoaffinity clean-up and a chloroform extraction was used for cyclopiazonic acid (CPA). Both methods were validated by analysis of replicate spiked samples with 40 µg/Kg of AF and 4000 µg/Kg of CPA. A matrix blank was also analyzed to determine any residual mycotoxin levels.

In conclusion, four hundred and seventeen strains of *Aspergillus* section *Flavi* isolated from maize grains from three Portuguese regions were evaluated for AF and CPA production on agar plates. These were found in seventy four samples (78%). CPA and AF were produced by 74% and 40% of the isolates, respectively. Mycotoxin detection of the 95 samples obtained was also performed revealing that 8% of the samples were positive for aflatoxins. CPA was not detected in any sample.

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