

Microbial Diagnostic Applications of Mass Spectrometry



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ABSTRACT BOOK

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THE IMPORTANCE OF A QUICK IDENTIFICATION OF *Aspergillus niger* FOR A PROPER MYCOTOXIN RELATED DIAGNOSIS

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Food safety has become an important food quality attribute within the last decade. Moreover, consumers have a better perception about the food contamination with mycotoxins. These secondary metabolites produced by filamentous fungi can cause acute toxic, mutagenic, teratogenic and carcinogenic effects on animals and humans. Mycotoxins can appear in the food chain and are greatly resistant to decomposition or being broken down in digestion. They remain intact in the food chain in livestock and dairy products and even after temperature treatments, such as cooking and freezing.

Aspergillus niger aggregate species are commonly found on soil and are pathogenic to several crops. This group of filamentous fungi is formed by a series of morphologically indistinguishable species. *Aspergillus niger* is one of the species in the aggregate and, apart from its economic value (it is used for industrial purposes), it is also an important mycotoxin producer, such as ochratoxin A (OTA) and, more recently, was described as fumonisin B2 (FB2) producer. Both mycotoxins were evaluated by the International Agency for Research on Cancer (IARC) as "Group 2B carcinogens", i.e., probably carcinogenic to humans. The continued exposure to these mycotoxins can cause chronic toxicity which is characterised by low-dose exposure over a long time period, resulting in cancers and other generally irreversible effects. Hence, a proper diagnosis is important, which will allow correct treatment. Fast identification of fungi is, therefore, a must needed necessity. Matrix-assisted laser desorption ionisation time-of-flight mass spectrometry (MALDI-TOF MS) allows rapid and reliable identification of microorganisms, being sensitive and accurate for the discrimination between species and strains of *Aspergillus*.

This work consisted in the identification of fungal isolates belonging to the *Aspergillus niger* aggregate. Fungal identification was based on a polyphasic approach consisting of macro- and micro-morphology, mycotoxigenic profiles (OTA and FB2) and MALDI-TOF MS. About 250 isolates belonging to *Aspergillus niger* aggregate were analysed and results obtained were compared with type strains. Final results showed that all isolates were identified as *Aspergillus niger*, *A. lacticoffeatus* and *A. vadensis*.

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