

Microbial Diagnostic Applications of Mass Spectrometry



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ABSTRACT BOOK

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MALDI-TOF MS: IMPROVED METHODS FOR THE IDENTIFICATION/CHARACTERISATION AND AUTHENTICATION OF FUNGAL STRAINS

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The identification of species is an important goal in taxonomic mycology. Information about each fungus (e.g. morphological description, physiological and biochemical properties, ecological roles, and societal risks or benefits) is key element in this process. Identifications can be a long and seemingly never-ending process with frequent revisions of the taxonomic schemes. These changes make identifications even more complicated for the non-specialised researchers as each taxonomic group has specialised literature, terminology and characters. This occurs to the extent that identifications can only be undertaken by a narrow group of scientists especially skilled in the “art”, which can make the procedures appear to be subjective.

Aspergillus is a large fungal genus, with a complex and ever evolving taxonomy. Section *Flavi* is one of the most significant sections in this genus. Taxonomy and species identification is subject of great interest for scientists aiming to clarify the species concept and limits within the section. Furthermore, this section comprises both toxigenic and non-toxigenic species/strains, with great interest to biotechnology and food industry.

In the present study, from 352 isolates of *Aspergillus* section *Flavi* obtained from Portuguese almonds and identified based on morphological, biochemical and MALDI-TOF MS profiles, 24 isolates were further characterised through molecular analyses by use of ITS region and calmodulin gene.

Molecular results confirm that ITS gene was not able to resolve differences at the species-level on this particular taxonomic group. In contrast, calmodulin gene was a robust and reliable genomic marker for this taxon. In conclusion, the results obtained from MALDI-TOF MS confirm that this technique is as good as calmodulin gene analysis for fungal identification. Another important output of this work was the clear evidence that two putative new species were present among these isolates. Finally, MALDI-TOF MS technique is rapid, reliable and inexpensive in terms of labour and consumables when compared with molecular techniques. At present, it adds an additional step for polyphasic identification which is essential when there is a paucity of characters for defining many fungal species.

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