

Applications of FT-IR spectroscopy in medical mycology

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Incidence of candidiasis has increased since the three last decades. Advances in medical treatments and technologies, e.g. antibiotherapy, chemotherapy, corticosteroids and immunosuppressive drugs, use of catheters, have contributed to the dissemination of fungal infections. In high risk patients (haematology, ICU...), the prognosis is relatively poor for invasive infections.

Face to this situation, it is important to develop rapid and accurate identification methods for efficient and prompt therapy. Most clinical laboratories rely on conventional identification methods that are based on physiological and nutritional characteristics. As many methods, these have their own limitations, i.e., they are time-consuming and may lack accuracy.

Candida infections are generally of endogenous origin but several outbreaks of candidiasis have been described. Molecular typing methods (RAPD, PFGE, Ca3 fingerprinting, microsatellite markers ...) are generally used to determine the genetic relationship between the infectious strains. However, these methods require time, expensive consumables, and a highly trained staff to be performed adequately. In addition, there is no consensus about the most efficient method. Association of several methods is generally recommended in order to enhance the discriminative power.

In the present contribution we will show and discuss a span of FTIR spectroscopic applications to different situations encountered in routine mycological diagnosis. Examples will concern *Candida* species differentiation using both young and older cultures and the implementation of a data base for routine species identification. We will also demonstrate the potentials of the technique as a tool for typing *C. albicans*, *C. glabrata* and *C. parapsilosis* in situations where an inter-human transmission is suspected. Finally, we will discuss the modalities of FT-IR spectroscopy as an investigative method in more fundamental studies, such as gaining more insight into biological processes like morphogenesis or understanding more complex structures like *Candida* biofilms and their interactions with an anti-fungal agent.