

**TITLE:** EVALUATION OF MATRIX-ASSISTED LASER DESORPTION / IONIZATION TIME OF FLIGHT MASS SPECTROMETRY SYSTEM FOR IDENTIFICATION OF CLINICALLY RELEVANT FILAMENTOUS FUNGI OBTAINED FROM 2018 TO 2019

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## **ABSTRACT**

The use of antibiotics and the number of immunocompromised patients has contributed to increase fungal infections worldwide. Mycological diagnosis has limitations but is crucial for a favorable outcome for patients. Traditional fungal identification methodology is time-consuming and has a long turnaround time. However, new techniques such as mass spectrometry can be a fast and efficient identification method of yeast and filamentous fungi of medical interest. The objective of our study was to evaluate Matrix-Assisted Laser Desorption-Time of Flight Mass Spectrometry (MALDI-ToF MS) BioMérieux® for identification of clinically relevant filamentous fungi. A total of 187 isolates of filamentous fungi were evaluated: 108 *Trichophyton* spp. (43 *T. rubrum*, 58 *T. interdigitale*, 07 *T. tonsurans*), 29 *Microsporum* spp. (15 *M. canis*, 14 *M. gypseum*), 20 *Sporothrix schenckii* complex, 14 *Aspergillus* spp. (01 *A. niger* complex, 01 *A. terreus* complex, 09 *A. flavus/oryzae*, 03 *A. fumigatus*), 11 *Fusarium* spp. (06 *F. oxysporum* complex, 04 *F. solani* complex, 01 *F. proliferatum*), 2 *Epidermophyton floccosum*, 02 *Purpureocillium lilacinum*, 1 *Curvularia spicifera*, obtained from several clinical samples from outpatient and inpatient from 2018 to 2019. Two standard strains of the American Type Culture Collection (ATCC): *T. interdigitale* ATCC 9533 and *A. brasiliensis* ATCC 16404 were used for control. These isolates were identified by traditional methods that consist of evaluation of macro and micromorphology by cotton blue and microculture. Identification by MALDI-TOF MS version 3.0 was performed according to BioMérieux® protocol and were analyzed by Myla version 4.4 database. The data were submitted to Kappa coefficient of agreement to evaluate the degree of reliability and accuracy between the two identification methods. Concordant results were observed in 184 (98.3%) filamentous fungi samples by both methods. Two discordant identifications were observed in the genus *Trichophyton* spp. (Two *T. rubrum* were identified by MALDI ToF as *T. violaceum* and another as *Paecilomyces* spp.) The Kappa coefficient evaluation showed a concordance of 0.9.

The MALDI-ToF MS was able to accurately identify filamentous fungi. This methodology is presented as a fast, reliable and accurate alternative for identification of filamentous fungi by the clinical laboratories and can improve medical decisions of treatment and patient outcome.

**Keywords:** Mass spectrometry, MALDI-ToF MS, Filamentous Fungi identification