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S2-2 Nuances on the application of MALDI-TOF Mass Spectrometry for the microbial identification

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Matrix Assisted Laser Desorption/Ionisation Time-Of-Flight (MALDI-TOF) is a soft ionisation based Mass Spectrometry (MS) technology suitable for application on large biomolecules. It has emerged in the late of 80s as techniques for the ionisation of large proteins (Tanaka et al. 1988). The 2002 Nobel Prize for chemistry was awarded to Koichi Tanaka for the use of MALDI-TOF with biological macromolecules. This technique has been experimentally used for discriminating microorganisms based upon chemical compositional information alone, or by the use of multiple characters (the polyphasic approach). MALDI-TOF for the identification and classification of microorganisms needs statistical tools to enable comparisons of the unknown biomarkers with reference molecular masses. Ribosomal proteins are used normally as reference molecular masses as they are conserved and abundant biomarkers in the cells. Recent studies using MALDI-TOF for rapid and reliable microbial identification, show considerable promise (Santos et al. 2010; Rodrigues et al. 2011; Passarini et al. 2013; Nicolau et al. 2014; Pereira et al. 2014). Furthermore, the technique is rapid, reliable and inexpensive in terms of labour and consumables when compared with other biological techniques. The full impact of this approach has been now appreciated once more diverse species have been studied in detail. Currently, based on the acquired knowledge of MALDI-TOF application on the microbial identification, it is a sound technique that adds an additional step for polyphasic microbial identification. MALDI-TOF is essential when there is a paucity of characters for defining many species. Nevertheless, even with the best polyphasic system, identification of some microbial taxa remains time-consuming and determining what represents a species remains subjective. This communication will focus on the nuances of the application of MALDI-TOF MS for the microbial identification. Potentialities and applications of the technique from the chemical to the life sciences fields with particular attention to the microbial identification and microbial proteomics will be discussed.

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