

***MALDI-TOF MS in Microbiology –
Introduction of an Innovative Physical Technology into Diagnostics***

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Routine identification of microorganisms for decades was based on investigation of their biochemical properties, in clinical diagnostics as well as in other fields like veterinary or pharmaceutical microbiology. These tests have been developed from home-brew and fully manual procedures to mostly automated assays, supplied and supported by diagnostic companies, with automated result transfer into laboratory information systems. Still, these assays kept to be limited in accuracy and slow, with results after several hours for fast growing bacteria up to several days for fastidious ones.

In 1996, several publications reported the successful and simple identification of microbes using MALDI-TOF mass spectrometry. Although this seemed to be a revolutionary development the novel approach stayed in the mass spectrometry community for a long time, and it took more than a decade until it reached clinical routine. In 2008/2009, the first clinical microbiology routine laboratories started to validate the technology and introduced it into their routine practice. The success in these laboratories caused a revolution which changed the work of microbiology laboratories and the expectations of their customers. Results are available in minutes now with an accuracy and systematic resolution which is in the range of molecular methods. New applications are being developed which might further add value in routine diagnostics. The number of laboratories using MALDI-TOF mass spectrometry for microorganism identification is increasing from hundreds to thousands today.

The talk will describe the technology and how it was introduced into routine laboratories, including the hurdles that had to be overcome. Its status of today as well as an outlook about further potential developments will be given. MALDI-TOF mass spectrometry in microbiology might act as a “blueprint” for other modern technologies, e.g. optical technologies to enter the diagnostic field.