

FTIR library for routine medical microbial diagnostics

Corné Klaassen¹, Alexander Piry², Matthias Boese², Jürgen Schmitt³ and Alphons Horrevorts¹

¹Canisius Wilhelmina Hospital, Nijmegen, The Netherlands. ²Bruker Optik GmbH, Ettlingen Germany. ³Synthon GmbH, Heidelberg, Germany.

An FTIR library of clinically relevant and most prevalent microbial species was constructed for use in routine diagnostics. In order to cover the natural variation occurring in included species, this library primarily contains true clinical isolates. It is of crucial importance that all isolates to be included in the library are identified by accurate and reliable identification methods. Unfortunately, for a relatively large number of clinically relevant microbial species, many standard identification procedures fail to produce reliable identification results. Therefore, a polyphasic determination approach was chosen as a reference method. Standard phenotypical identification results were combined with two molecular biological assays (16S sequencing and AFLP fingerprinting) to produce final identification results. Interestingly, even 16S sequencing (although by many considered to be the gold standard) failed to yield unambiguous identification results especially in the case of Enterobacteriaceae. In contrast, AFLP analysis proved far more informative for classification of strains. Obtained spectra were included in a library and used for identification of unknowns using the standard OPUS Ident module. In many occasions, the large intraspecies variability in spectra outranged the observed interspecies variability complicating the generation of unique identification results. However, this could prove very useful for strain typing in epidemiological analyses. Next, spectra from the library strains were included in an Artificial Neural Network which was subsequently used for identification of unknowns. Initial results from this ANN looked very promising and will be presented.