

***Identification of bacteria from a pharmaceutical environment
by FT-IR spectroscopy***

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In the pharmaceutical industry, production lines for sterile products are located in clean rooms to prevent contamination. Four different categories of clean rooms have been defined and a continuous monitoring of contamination levels is required. Due to legal requirements, such an environmental monitoring must include the determination of the number of cfu as well as the identification of the microbes detected.

In this study existing Fourier-transform infrared (FT-IR) spectra libraries for Gram-positive cocci [1] and bacilli were extended with isolates from pharmaceutical environments in order to adapt the libraries to this specific habitat. To determine the reliability of identifications using the upgraded libraries bacteria isolated from an environmental monitoring process were identified by FT-IR spectroscopy and by sequence analyses as a reference method for unequivocal identification (*rpoB* gene for staphylococci and 16S rDNA for all other bacteria). Since the main microbiological contaminants in these environments are spore-forming bacilli and Gram-positive cocci, the test was restricted to these two groups. 243 randomly picked isolates (172 Gram-positive cocci and 71 bacilli) from a current monitoring were identified. For Gram-positive cocci the rate of correct identified isolates was about 89% at species level and 100% at genus level. For spore-forming bacilli a rate of about 75% at species level and about 98% at genus level could be obtained. The results show the capability of FT-IR spectroscopy as a suitable identification method for isolates from pharmaceutical environments. Furthermore, including new strains, e. g. from this study, in the FT-IR databases will lead to a further improvement of identification results.

References:

- [1] H. Oberreuter, H. Seiler, S. Scherer, *Int. J. Syst. Evol. Microbiol.* 52, 91-100 (2002).