

## Species Identification and Detection of Fungi in Biological Materials by FTIR Microscopy

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FTIR spectroscopy provides the opportunity to simultaneously detect many molecular bonds or functional groups of different polysaccharides, proteins, lipids, aromatic and other compounds. The measurement principle is based on the absorption of infrared light by dipolar molecular bonds. In combination with microscopy, local resolution of the chemical composition is possible. Each absorption point or peak in the spectrum can be integrated to create an image of the distribution of the corresponding compound. We use FTIR-microscopy in order to detect fungi in plant tissues such as in infected wood and in mycorrhizal roots. For the development of a fast and inexpensive method for localisation and identification of fungi, differences between FTIR measurements of fungi and plant cells are characterized. In addition, FTIR spectra of different fungi are compared. Beech wood blocks were infected with *Trametes versicolor* and with *Schizophyllum commune* and FTIR spectra in sections of the infected wood determined. Cluster analysis revealed major differences between FTIR spectra recorded from wood fibres and empty vessel lumina and spectra from fungal mycelium, irrespectively of whether grown on the surface of wood or inside vessel lumina. Species specific clustering of spectra of fungal mycelium grown on the wood surface and inside vessel lumina demonstrated the potential of FTIR microscopy to identify fungal mycelium in wood. Currently, we are sampling FTIR spectra from various basidiomycetes in order to define species according to their specific FTIR spectra.

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