

Quantitative FT-IR spectroscopy in plant cells – The state of the art

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The macromolecular composition of plant cells is of high interest for many purposes in plant research. It has been shown that FT-IR is a powerful tool to monitor changes in the content of secondary metabolites as well as of the major cell components like proteins, carbohydrates or lipids. Since the biochemical composition of plant cells change very dynamically in response to the light or to other environmental conditions a fast and reliable method to quantify components of interest is highly desirable. FT-IR spectroscopy fulfils in general these requirements. FT-IR spectra can be easily obtained from plant cell material even on the level of a few cells, the problem is not sufficiently solved how to extract true quantitative biochemical information from these FT-IR spectra. We show based on measurements of algal cell cultures which approaches had been tested to extract quantitative information. The validity of these chemometric models is presented and the limits with respect to accuracy and sensitivity are discussed.

References

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