

## KEYWORDS

- » Plant Cells
- » Single Cell Analysis
- » Flow Cytometry
- » FT-IR Spectroscopy
- » Chl a *In Vivo* Fluorescence



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## SINGLE CELL ANALYSING SYSTEM SICAS

Single cell techniques allow to identify and to select plant cells with features of special interest. The research group of Prof. Dr. Christian Wilhelm has developed a single cell analysing system (SICAS) based on a multi-laser excitation equipped flow cytometer coupled to single cell absorption, chlorophyll a *in vivo* fluorescence and FT-IR devices.

Based on this equipment they are able to analyse physiological features of plant cells like chlorophyll content, lipid content, ploidity degree or intactness of the cytoplasmic membranes "on the fly".

Applying the sorting function subpopulations can be analysed further by means of biochemical analysis or for gene expression patterns. For biotechnological purposes the group studies phytoplankton cells, chloroplasts or cell cultures after genetic manipulation. SICAS allows to determine not only cell activities (photosynthesis, pigments, growth potential) but also to screen for secondary metabolites via microscopy-coupled FT-IR spectroscopy. The system is applicable to forecast the water quality development in a given water reservoir.

Based on SICAS data sets individual strategies can be developed to design sustainable water quality managements. Recently it was shown that this approach can be used to define the process parameters in bioreactors to optimize the content in valuable products and can be a basic tool in system biology.

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