



FACULTY OF SCIENCE  
Charles University

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## LABORATORY OF PLANT BIOCHEMISTRY

### OFFER

We offer our expertise, as well as consultancy or collaboration within a diverse range of plant biochemistry and biotechnology.

- Enzyme assays
- Enzyme kinetics
- Inhibition studies
- Determination of antioxidant capacity
- Electrophoretic separations of enzymes
- Immunochemical assays, ELISA, Western blot

„Our main goal is elucidating rearrangements of metabolic pathways during abiotic and biotic stress in plants.“

### KNOW-HOW & TECHNOLOGIES

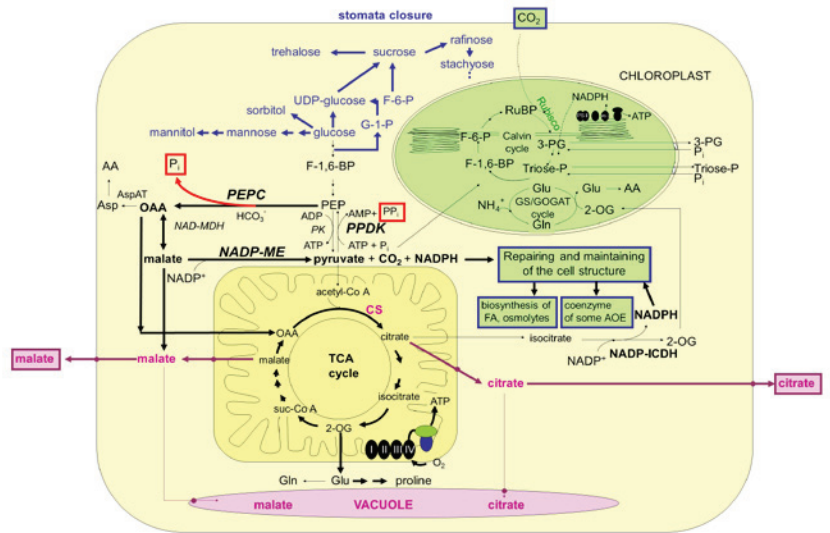
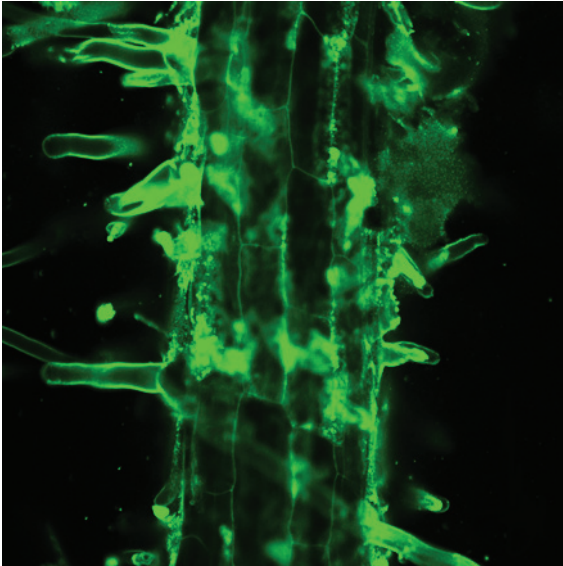
#### APPLICATIONS OF STRESS FACTORS AND THEIR QUANTIFICATIONS

- Biotic stress caused by *Potato virus Y*, tobacco mosaic virus (virus quantification – ELISA, Western blot, qPCR)
- Salt stress (atomic absorption spectrometry)
- Drought stress (relative water content)
- Phytoremediation of pharmaceuticals
- Nutrition, organic source of N (analysis of medium composition and enzyme activities)
- Heat stress (Heat shock protein quantification)

#### TIME COURSE OF STRESS TREATMENT

- Physiological and photosynthetic parameters
- Enzyme activities: NADP-dependent enzymes, Hatch-Slack cycle enzymes, enzymes of N, C metabolism (NR, GS, GOGAT, GDH, glycosidases,  $\beta$ -fructosidase, amylase, cellulase, chitinase,  $\beta$ -1,3 glucanase), Antioxidant enzymes (SOD, peroxidases, catalase, glutathione reductase)

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## ENZYME ISOLATION AND CHARACTERIZATION, INHIBITION STUDIES

- NADP-malic enzyme
- Phosphoenolpyruvate carboxylase
- $\beta$ -hexosaminidase
- Shikimate dehydrogenase
- Alcohol dehydrogenase
- Lactate dehydrogenase

## CONTENT OF RESEARCH

- Abiotic plant stress (drought, salinity, xenobiotics, high temperature)
- Biotic plant stress (viral infection)
- Plant nutrition, organic sources of nitrogen
- Biological control agents for sustainable agriculture
- Screening of antioxidant activities in plants

## MAIN CAPABILITIES

- Plant Biochemistry
- Enzymology
- Stress markers
- Plant nutrition and *in vitro* cultivation

## KEY RESEARCH EQUIPMENT

- Spectrophotometer UV-VIS Helios alpha Thermo Spectronic, USA
- Spectrophotometer UV-VIS Ultrospec 2100 ProBiochrom, UK
- Trans-Blot Turbo Transfer System Bio Rad, USA
- Electrophoretic Separation System, Biometra, Germany
- Microplate Reader Multiskan Go, Thermo Scientific, USA
- Microplate Reader Infinite M200 pro, Tecan, USA
- CFX Connect Real Time Detection System, Bio Rad, USA

## PARTNERSHIPS & COLLABORATIONS

### ACADEMIC PARTNERS

Institute of Experimental Botany Academy of Sciences of the Czech Republic | Institute of Biophysics Academy of Sciences of the Czech Republic | CEITEC – Central European Institute of Technology | Mendel University in Brno | BIOCEV – Biotechnology and Biomedicine Centre of the Academy of Sciences and Charles University | Institute of Organic Chemistry and Biochemistry of the Czech Academy of Science | Hasselt University, Diepenbeek, Belgium

### MAIN PROJECTS

- Technology Agency of the Czech Republic (2018 –2019)
- Ministry of Industry and Trade of the Czech Republic (2017 –2021)
- Innovative Technologies for the Identification and Optimization of the New Generation of Anti-Cancer Drugs (Charles University, UNCE 204025/2012, 2012–2016)
- Innovation voucher (with BARD, s.r.o. 2015)

### ACHIEVEMENTS

Publications in respected international journals: Plant Science, Biochimie, Journal of Plant Physiology, Food Bioscience, FEBS Journal, Photosynthetica.

### SEE OUR WEBPAGES

<https://sites.google.com/natur.cuni.cz/plantbiochemistry>