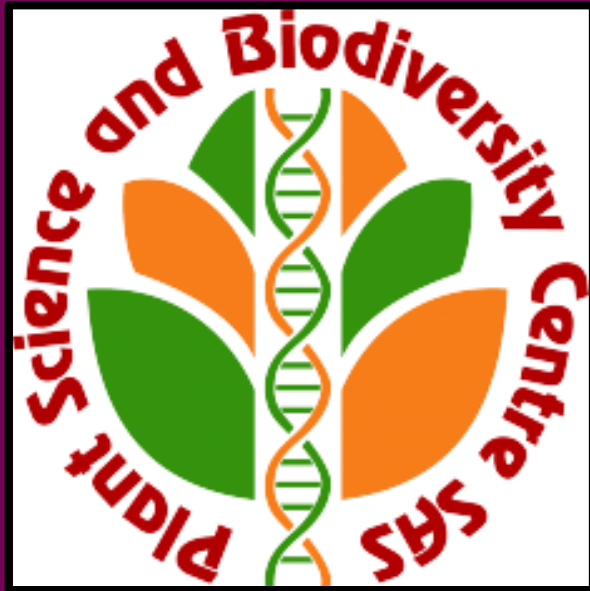


Leaf development in carnivorous sundews: Proteomics for the discovery of novel hydrolytic enzymes



Institute of Plant Genetics and Biotechnology at Nitra
Plant Science and Biodiversity Center

Potential Supervisor:

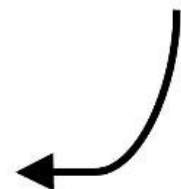
Maksym Danchenko, PhD; maksym.danchenko@savba.sk

Plant Physiology

Workflow of Doctoral project



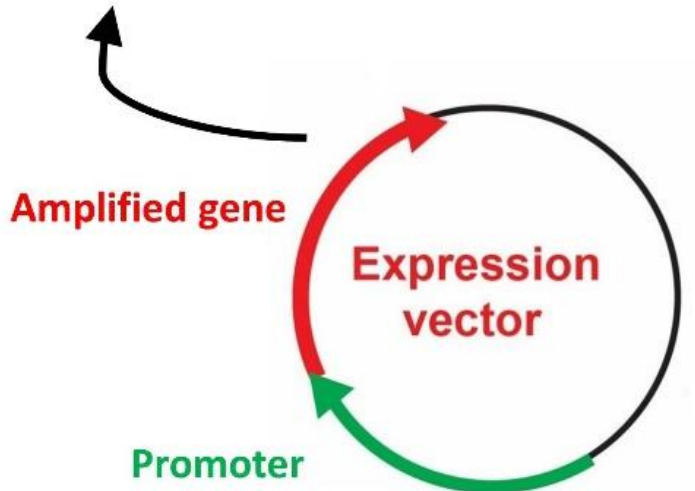
Quantitative proteomics by ultrahigh-performance liquid chromatography coupled mass spectrometry



Discovery of hydrolytic enzymes produced in the digestive fluid



Purification of recombinant enzymes



Background

Carnivorous plants have the competency to trap and digest several types of prey utilizing hydrolytic enzymes. Subsequently, they absorb desired nutrients from the digested prey that promote their growth in nutrient-deficient ecotopes. One of the most important groups of carnivorous plant species is sundews, which have modified leaves—adhesive traps—with glandular tentacles containing sticky secretions. The digestive fluid of the carnivorous plants acts as a repository for various hydrolytic enzymes, which vary based on the developmental stage of the plant.

Methodology

Within the study, Student will identify and monitor the abundance of the proteins (focusing on hydrolytic enzymes) in the leaves with tentacles (containing digestive fluid) in sundews during the ontogenesis. The proteins will be quantified by liquid chromatography coupled mass spectrometry. The structural and functional characteristics of the studied enzymes will be explored employing the appropriate bioinformatics tools. Further, a few promising enzymes will be selected that could be implemented in biotechnology applications, while corresponding genes will be inserted in a suitable expression vector to augment the productivity of these enzymes.

Impact

This project will consolidate the knowledge on dynamic protein profiles in developing sundew leaves, which was never comprehensively explored.