CHARACTERIZATION OF GERMINATING SEED EXUDATES FOR THE IDENTIFICATION OF BIOACTIVE MOLECULES STIMULATING AND PROTECTING SEEDS AND SEEDLINGS.

#SEEDS #GERMINATION #PROTEINS PEPTIDES #SMALL RNAS #SPECIALIZED METABOLITES

Background

The **SUCSEED** project is one of the 10 projects funded by the Priority Research Program "Cultiver et Protéger Autrement" (PPR-CPA). SUCSEED aims to make the seed a central player in plant health management by focusing on two major plant health problems: (i) seed-borne pathogens and (ii) damping-off. To reinforce the multi-disciplinary nature of this project we propose to recruit a cohort of five PhD students.

Summary

Seeds play a fundamental role in the reproduction and dispersal of higher plants. Seed quality is a key element for agricultural performance. The seed vigour is defined by rapid and homogeneous germination, right seedling establishment, and the capability to adapt to biotic and abiotic constraints imposed by the environment. The seed coats and endosperm are favourable structures for the protection of the embryo throughout its development, its conservation till germination and seedling emergence. During germination sensu stricto, from water uptake to radicle protrusion, the seed releases exudates on its tegument surface consisting of complex mixtures of organic and inorganic molecules. While many studies previously described exudates from plant tissues (e.g. root, stem, leaves), the scientific literature is quite limited concerning exudates from germinating seeds. Plant exudates have been described to have functional properties such as antimicrobial or antioxidant activities. Our preliminary works indicated that the germinating seed released many metabolites, peptides, proteins and small RNAs within the early hours after imbibition. The objective of the thesis will address the characterization of the germinating seeds exudates and the identification of molecules displaying bioactivities on the biotic environment and / or on the seed embryo to improve its vigour. The results of this work will be included in prospective studies on research of new products derived from plants for seed treatment applications (e.g. coating, pelleting or priming).

Informations

Lab: Institut Jean-Pierre Bourgin (IJPB), PHYGERM Team, Versailles (78)
Supervisors: Loïc Rajjou (loic.rajjou@agroparistech.fr)
Graduate school: ABIES
Starting date : October 2021 (Deadline : April 18-May 27)