

Internship of 6 months for the beginning of 2023

Impact of a supercritical fluid extraction of hemp seed oil on extractability and quality of protein fractions

Description of the subject:

There is a rising interest for vegetable proteins to replace traditional food resources, as well as processes with a reduced environmental impact. The seeds, often exploited for their lipid fraction, can also represent an interesting source of proteins and secondary metabolites (such as phenolic compounds). Given the number of metabolites present and the concept of entire valorisation of resources, a multivalORIZATION process can be envisaged. Particularly, the supercritical fluid extraction is considered a better strategy from an environmental perspective than the traditional extraction processes using organic solvents. The objective of this internship is **to study the effect of the oil recovery strategy (solvent, supercritical CO₂) on the yield and quality of the protein fractions from hemp seeds**. Although hemp seeds are mainly known for their oil, this biomass contains significant amounts of proteins and phenolic compounds, whose exploration is still incipient. It will involve implementing and optimizing oil extraction processes and quantifying the impact on proteins, considering the protein extractability and functionalities. The oil fraction will be characterized by gas chromatography coupled with mass spectrometry. Protein fractions will be quantified by the Dumas method and different functional properties will be evaluated, such as their emulsifying, foaming, and gelling properties.

Laboratories implied:

This internship is offered by the URD ABI in collaboration with the Chair of Biotechnology (CentraleSupélec). These two research groups are located at the European Center for Bioeconomy and Biotechnology at the heart of the Pomacle-Bazancourt biorefinery (Marne). The ABI (Industrial Agro-Biotechnologies) Research and Development Unit of AgroParisTech is dedicated to the development of expertise in chemistry, microbiology and process engineering for the recovery of biomass through processes that meet chemical standards, green and white biotechnologies, including the expertise in separation processes through the implementation of academic or industrial projects applied to the recovery of biomass. The Chair of Biotechnology of CentraleSupélec has vast experience in developing processes for valorising biomaterials, applying engineering skills into biological systems. In the host laboratories, the student will have a favourable and international environment and will have access to the experimental devices and analytical tools necessary for developing the project. The student will benefit from the support of technical staff trained in the necessary tools.

Characteristics sought:

Training in process or bioprocess engineering

Knowledge of separation processes and proteins would be a plus.

The student should be rigorous, motivated and autonomous with a good adaptability

Location: European Center for Biotechnology and Bioeconomy (CEBB), 3 Rue des Rouges Terres, 51110 POMACLE

Grant: according to the current scale

Send your application to

Pr. Irina IOANNOU,
Team leader of Process Engineering Department
URD ABI, AgroParisTech
irina.ioannou@agroparistech.fr

Prof. Rafik BALTI,
Team leader of Biotransformation track,
LGPM, CentraleSupélec
rafik.balti@centralesupelec.fr

Prof. Pedro AUGUSTO,
Vice Director of the Chair of Biotechnology,
LGPM, CentraleSupélec
pedro.augusto@centralesupelec.fr