



## Ecole Doctorale - 104

Sciences de la Matière, du Rayonnement  
et de l'Environnement

**ESTABLISHMENT** : University of Lille, ICAM

**Laboratory(ies) of affiliation** : UMR-t BioEcoAgro 1158 INRAe

**Scientific field, Speciality**: Food Biotechnology, Food Science, Physiology

**Thesis director**: DIMITROV Krasimir, Professor, [krasimir.dimitrov@polytech-lille.fr](mailto:krasimir.dimitrov@polytech-lille.fr)

**Co-supervisor (non HDR)**: PRADAL Delphine, Assistant Professor, [delphine.pradal@icam.fr](mailto:delphine.pradal@icam.fr)

VAUCHEL Peggy, Assistant Professor, [peggy.vauchel@polytech-lille.fr](mailto:peggy.vauchel@polytech-lille.fr)

**Planned (co)-funding** : Doctoral contract, 50% Hauts-de-France region, 50% ICAM (in progress)

**Title of the thesis** : Optimization of continuous green extraction of biomolecules from chicory by-products

### THESIS SUBJECT (ABOUT 1/2 PAGE)

Some by-products of the food industry, currently considered as waste, are sources of molecules of interest and can therefore be valorized through the extraction of these functional biomolecules. The obtained extracts could be used as food or cosmetic ingredients. To extract target biomolecules, innovative processes, called "green", make it possible to obtain better extraction yields by using less time, safe solvents, less energy and generating less environmental impacts. However, these processes are mainly studied in batch mode on relatively small volumes at a laboratory scale. In order to prepare the realization of such green extractions on larger TRL levels (pilot, industrial), the thesis project aims to study the efficiency of ultrasound-assisted extraction in continuous mode for the recovery of antioxidants from 3 chicory by-products supplied by the industrial partner Leroux. Ultrasound-assisted extraction will be studied both on a laboratory scale and on a pilot scale. We will focus on the study of the technological constraints linked to the implementation of the process in continuous mode with these 3 co-products. The performance of the process (extraction yields, antioxidant activity of the extracts, energy consumption, and environmental impacts) will be evaluated by seeking the optimal conditions for the treatment and valorization of large volumes of by-products.

**Expected date of recruitment** : 1<sup>st</sup> October 2024

**Contact (e-mail address)** : [krasimir.dimitrov@polytech-lille.fr](mailto:krasimir.dimitrov@polytech-lille.fr), [delphine.pradal@icam.fr](mailto:delphine.pradal@icam.fr), [peggy.vauchel@polytech-lille.fr](mailto:peggy.vauchel@polytech-lille.fr)

#### **Additional remarks/comments:**

We are looking for a candidate who has validated an engineering training or a 2R master's degree. The candidate should have training in the fields of chemical engineering and/or biochemical sciences. The candidate should have skills in experimentation, analytical, writing and communication (in French and English). Knowledge of eco-design and Life cycle assessment of products and processes will be an asset. Excellent interpersonal skills and a good ability to work in a team. The doctoral student will be registered at the SMRE Doctoral School. It will carry out its activities in the research laboratory located in the premises of Polytech Lille (University of Lille).

