

Biomass valorization/Innovative processes

Chemistry Master



Title: Spent coffee grounds valorization by supercritical CO₂ extraction

Context et objectives: The overconsumption of available resources on Earth is one of the major issues of the XXIst century. With around 5 million tons generate each year worldwide, spent coffee grounds is a renewable resource present in huge amount, which is also composed of high value molecules.¹ The spent coffee grounds valorization will be achieved thanks to the use of an innovative technology : supercritical CO₂ as extraction process for molecules of interest.²

The objectives of this internship will be to: i) study the influence of operative parameters of supercritical CO₂ extraction of target molecules from spent coffee grounds, ii) optimize the experimental conditions of extraction and iii) to characterize the obtained extracts.

Tasks:

- To do the bibliography about spent coffee grounds and supercritical fluids;
- To perform supercritical CO₂ extractions of molecules of interest from spent coffee grounds;
- To realize the characterization by physical-chemical analyses of extracts obtained.

Duration: 4-5 months from the availability of the intern (spring 2022)

Host laboratory : Environnement Dynamiques Territoires Montagnes (EDYTEM) – MATIERES Team, Université Savoie Mont Blanc, CNRS Le Bourget du Lac (73370, FRANCE)

<https://edytem.cnrs.fr/>

Supervisors: Alexandre VANDEPONSEELE, Dr Grégory CHATEL, Dr Christine PIOT, Pr Micheline DRAYE

To apply : Please send a CV and cover letter to the followings addresses : alexandre.vandeponseele@univ-smb.fr and gregory.chatel@univ-smb.fr



References :

- (1) Vandeponsele, A.; Draye, M.; Piot, C.; Chatel, G. Study of Influential Parameters of the Caffeine Extraction from Spent Coffee Grounds: From Brewing Coffee Method to the Waste Treatment Conditions. *Clean Technologies* **2021**, 3 (2), 335–350.
- (2) Vandeponsele, A.; Draye, M.; Piot, C.; Chatel, G. Subcritical Water and Supercritical Carbon Dioxide: Efficient and Selective Eco-Compatible Solvents for Coffee and Coffee By-Products Valorization. *Green Chem.* **2020**. <https://doi.org/10.1039/D0GC03146A>.