

Master Degree (M2) Final Project

(6 months project)

in the framework of the Chair MANTA (MAriNE maTerIAls)

Development of novel approaches for the valorization of red algae biomass using green technologies

Research Group:

In the MANTA research chair, led by Dr. Susana Fernandes, we use marine organisms and the marine environment as a source of inspiration for the development of novel functional (bio)materials and processes combining chemistry, biology, materials science and biotechnology.

The MANTA chair aims at mimicking remarkable phenomena and hierarchical structures observed in the aquatic environment to design functional and environmentally sustainable (bio)materials based on marine molecules and assess their impact on human health and marine ecosystems. To do so, the project considers 4 key areas: (1) marine by-product and bioresources valorization; (2) marine bio-inspiration for ecofriendly chemistry and development of materials and processes for marine environment; (3) impact of the materials on the marine environment and on marine organisms; and (4) impact of biomaterials on the human health.

More information about the research group is available in the website:

<https://iprem.univ-pau.fr/fr/collaborations/chaieres/manta/presentation.html>

Project description:

Red algae (Rhodophyta) are known as a unique source of polysaccharides, such as agar and carrageenans. The industrial extraction process for these polysaccharides generates extreme amounts of by-products, which are frequently discarded since they are considered as wastes, leaving a large undervalued algal biomass. Nevertheless, processing by-products obtained from red algae are recognized as important sources of a broad spectrum of compounds with functional and biological properties. Thus, the search of new approaches that will successfully increase the value of algal biomass is nowadays a primary goal. In this context, the main objective of this project is to develop alternative greener and efficient extraction approaches (sequential separation) for obtaining the integral seaweed compounds of the red alga *Gelidium sesquipedale* (biomacromolecules and bioactive molecules). Also, the integral utilization/valorization of this raw material with biological properties of interest for food, cosmetic, medical and pharmaceutical applications is incentivized. From a scientific perspective, this project involves different eco-friendly methods to generate multiple bio-based products from a single source. In particular, chemical, enzymatic and ultrasonic treatments will be used to improve efficiency and selectivity of the extraction of marine molecules. Finally, seaweed extracts will be characterized using different analytical methods, optical and magnetic spectroscopies, mass spectrometry, diffraction methods, imaging and biochemical characterization.

Key Words: eco-friendly extraction, emerging technologies, cascaded valorization, biomacromolecules, bioactive compounds, *Gelidium sesquipedale*.

Requirements:

The candidate should have experience and knowledge in (blue) biotechnology and/or green chemistry and/or biopolymers chemistry/characterization. He (or she) will be able to manage marine biomass isolation strategies, perform its biological and physico-chemical characterization, and analyze data. The candidate should be in her (or his) last year of studies (M2 or L5) of biotechnology or biotechnology of marine resources or chemistry. The candidate will demonstrate multidisciplinary working skills, scientific rigor, a good level of English and a good ability to communicate and write in French and English.

Application:

Please submit your application by email to susana.fernandes@univ-pau.fr and natalia.castejon@univ-pau.fr

The application should include:

- CV
- Cover letter detailing the candidate's motivations in the scientific aspect of the project (one, or maximum two pages).

Starting date: January/February 2020 for 6 months.

For further information about the project, please contact

Susana Fernandes: susana.fernandes@univ-pau.fr

Natalia Castejón: natalia.castejon@univ-pau.fr

Please submit your application by **16th November 2020**