

MASTER (M2) Final project

(6 months research project)

In the framework of the Chair MANTA (MARiNe maTerIAls)

Development of a biorefinery process using green extractions for the valorization of a local red seaweed

Institute of Analytical Sciences and Physico-Chemistry for Environment and Materials (IPREM)

<https://iprem.univ-pau.fr/fr/index.html>

Université de Pau et des Pays de l'Adour (UPPA), Anglet, France

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.html>

Research project:

Today, the red seaweed *Gelidium sesquipedale*, harvested by fishermen in the French Basque country, are almost exclusively used as a source of agar-agar. 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. However, processing by-products obtained from this red algae are recognized as important sources of compounds with functional and biological properties that can be used in cosmetics, nutraceuticals, pharmaceuticals or the food industry for instance. In this context, the main objective of this project is to develop alternative greener and efficient extraction techniques for obtaining the integral seaweed compounds of the red algae

Gelidium sesquipedale (polymers such as proteins and agar but also small molecules) following a biorefinery process approach. 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 electric treatments will be used to improve efficiency and selectivity of the extraction of the compounds. Enzymatic assisted extraction will be of a particular interest during this project. The seaweed extracts will then be biochemically characterized using different analytical methods and the physical-mechanical properties of the agar gels will be evaluated.

Key-Words: eco-friendly extraction, enzymatic assisted extraction, biorefinery process, polymers and small molecules, red seaweed.

Requirements:

The candidate should have experience and knowledge in (blue) biochemistry or biotechnology and/or green chemistry. Knowledge about enzymes would be beneficial. The candidate will develop green extraction strategies, perform the physico-chemical characterization of the extracted compounds, and analyze data. The candidate should be in her/his last year of studies (M2 or engineering school). 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 amandine.adrien@univ-pau.fr

The application should include:

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

Starting date: January/February 2022 for 6 months.

For further information about the project, please contact

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

Amandine Adrien: amandine.adrien@univ-pau.fr

Please submit your application by **15th of December 2021, 6 pm.**