

PhD Studentship

Interactions of radioactive metals with the brown alga *Ascophyllum nodosum*: *in vivo* speciation and molecular mechanisms of the uptake

We are seeking a highly-motivated PhD candidate to join the [Human and Environmental Radiochemistry group](#) at Institut de Chimie de Nice, Nice, France, **starting from January 2022**. The PhD will be funded by ANR.

Context. Seawater is one of the top priority environmental compartments regarding radioactive metal pollution, as it is often the final receptacle for contaminated waters. Moreover, ocean decontamination is extremely challenging, because of strong dilution factors, streams and high salinity. A noteworthy example is the Fukushima accident in 2011, which had a major impact at world scale. As a result, marine organisms are exposed to radioactive metals (RM), which may affect their biological processes, with significant consequences for the environment and, eventually, human health. The complexity of marine environment is such that a **comprehensive mechanistic approach at cellular and molecular level** is necessary to describe RM reactivity and transfer processes, but still missing. This PhD project will fill in this gap by identifying the chemical forms (physico-chemical speciation) and the biochemical mechanisms associated to RM accumulation in model marine organisms. The results of this PhD project will provide new insight for the prediction of the **ecotoxicological risk linked to radioactive metal uptake** by marine organisms in case of nuclear contaminations.

PhD objectives. The PhD project will focus on the uptake of uranium (U-nat) and europium by the brown alga *Ascophyllum nodosum*. The PhD candidate will use a multi-scale mechanistic approach, at macroscopic, cellular and molecular levels, in order to (i) identify the **contaminated cellular compartments** of the algae, where RM are accumulated, (ii) investigate the RM ***in vivo* chemical speciation** and (iii) characterize the bio-chemical equilibria involved in RM interactions with algal **target biomolecules** (proteins, polysaccharides).

To obtain this information, the PhD candidate will use complementary spectroscopic methods (X-ray absorption spectroscopy, UV-vis, FTIR, fluorimetry, ICP-MS) imaging (TEM and STXM) and biochemistry techniques (protein and polysaccharide extraction and purification, proteomics).

Collaborative setting. The PhD work will be mainly carried out at [Université Côte d'Azur](#) (Nice, France). The PhD student will also have access to:

- [Roscoff Marine Station](#) (Roscoff, France)
- [SOLEIL Synchrotron](#) (Paris, France)
- [ALS synchrotron](#) (Berkeley, USA)

PhD candidate profile. Interest in working at the frontier between chemistry, biology and ecology. Skills: bio-inorganic chemistry, basic knowledge of spectroscopic methods.

To apply. Please send the following documents to maria-rosa.beccia@univ-cotedazur.fr:

- An up-to-date CV
- Master Degree transcripts
- One reference letter

Application Deadline : 10th December 2021