**TITLE:** Analytical development for Se isotopic characterization in biological samples

**ABSTRACT:**

Se isotopes exhibit mass-dependent fractionation, which has been successfully used for tracking geochemical processes (i.e. species transformation, redox reactions in the environment, etc). Interestingly, despite its biological relevance, the investigation of Se isotopic signature in biological samples is scarce, restricted to few examples in bacteria, algae and plants. It is clearly due to the difficulty associated to precise Se isotopic ratio measurements in biological samples, which claims for advanced analytical strategies to overcome it. Indeed, high concentration of essential elements can hamper Se Hydride generation (HG), the most suitable sample introduction method regarding Se isotopic analyses by MC-ICPMS.

The project is based on the pioneer development of new analytical approaches for precise Se isotopic characterization by MC-ICP-MS in biological samples from animal origin. The developed methodology will be exploited on tracking the fate of Se in fish (model species).

**Keywords:** selenium, fish, isotopic signature, speciation, living organisms

**WORKING CONDITIONS**

<table>
<thead>
<tr>
<th>Laboratoire :</th>
<th>UMR 5254 CNRS-UPPA, Institut des Sciences Analytiques et de Physico-Chimie pour l’Environnement et les Matériaux (IPREM)</th>
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</thead>
<tbody>
<tr>
<td>Site web</td>
<td><a href="http://www.iprem.univ-pau.fr">www.iprem.univ-pau.fr</a></td>
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<tr>
<td>PhD Director:</td>
<td>David AMOUROUX</td>
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<tr>
<td>PhD co-Director:</td>
<td>Zoyne PEDRERO ZAYAS</td>
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<tr>
<td>Co encadrant :</td>
<td>Paco Bustamante ( LIENSs, Université de La Rochelle)</td>
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<tr>
<td>In Collaboration with:</td>
<td>Stéphanie Fontagné(INRA), Maite Bueno (IPREM), Florence Pannier (IPREM), Sylvain Berrail (IPREM), Yves Cherel (EBC), Thomas Lacoue-Labarthe ( LIENSs)</td>
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<tr>
<td>Place:</td>
<td>IPREM. Hélioparc, 2 Avenue du Président Angot 64053 Pau cedex 09</td>
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<tr>
<td>Start:</td>
<td>October 2019</td>
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<tr>
<td>Duration:</td>
<td>3 years</td>
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<tr>
<td>Employer (employer):</td>
<td>Université de Pau et des Pays de l’Adour (UPPA)</td>
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<td>Salaire mensuel brut (monthly salary before taxes):</td>
<td>1685 €</td>
</tr>
</tbody>
</table>

**HOST LABORATORY PROFILE**

The PhD will principally work at IPREM, specifically, he/she will be member of the Environmental Chemistry and Microbiology Cluster. The working group has a vast experience on environmental and analytical chemistry, trace metal speciation, stable isotope tracers and fractionation mechanisms.

To reach the outlined objectives, the project will be supported by the unique instrumental facilities of the host laboratory. This platform possess, among others, the state of the art instruments required for the
MISSION - ACTIVITES PRINCIPALES / MISSION – PRINCIPAL ACTIVITIES

I. Scientific Context

The PhD student will work on the frame of the research projects named MERSEL and BENESEL, funded by the Agence nationale de la recherche (ANR) and the Region Nouvelle Aquitaine, respectively. The analytical method to be developed will allow going well beyond the state of the art knowledge concerning the study of the fate of Se in fish.

II. Objectives

The PhD work will focuses on the development of analytical approaches for precise Se isotopic characterization by MC-ICP-MS in biological samples from animal origin for the first time.

III. Work plan

Several methods will be explored in order to achieve the quantitative and selective extraction of Se from biological samples. Analytical approaches for precise Se isotopic characterization by MC-ICP-MS will be settled. The established methodology will be applied to the analyses of model fish (organs) from aquaculture and marine mammals.

IV. Literature References


REQUIRED COMPETENCES

The candidate should have a Master (or BAC+5 homologated) on Analytical/Environmental Chemistry or Pharmacy.

Previous experience on hyphenated chromatographic techniques, mass spectrometry or stable isotopes would be appreciated.
### CRITERIA USED TO SELECT CANDIDATE

**Selection process steps:**
- Establishment of the selection committee.
- Evaluation of the applicants' CVs.
- Interview with the selected candidates and ranking.

**Criteria used in selection of the candidate:**
- The candidate's motivation, scientific maturity and curiosity.
- Previous experience on hyphenated chromatographic techniques, mass spectrometry or stable isotopes would be appreciated.
- Candidate's marks and rankings in M1 and M2.
- English proficiency.

### REQUIRED DOSSIER, DATE

Send an e-mail with your candidature containing:
- CV
- Cover letter detailing candidate's motivations
- Candidate's MSc marks and ranking
- Minimum two contact details for 2 referees

| Limiting date: | 23/07/2019 |

### CONTACTS

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