A 3-year PhD scholarship for a research project on non-targeted analysis of substances related to potential persistent organic pollutants is available at LABERCA (Nantes, France). The project will be starting in fall 2020*.

Proposal title

Chemical contaminants of emerging concern: early detection in environmental matrices and characterisation of their transfer to Human *via* the food web using innovative non-targeted screening analytical strategies

Abstract

A 3-year PhD scholarship is available at the "Laboratoire d'Étude des Résidus et Contaminants dans les Aliments" (LABERCA), a joint research unit between the "National Research Institute for Agriculture, Food and Environment" (INRAE) and the "National College of Veterinary Medicine, Food Science and Engineering" (Oniris), starting in fall 2020. The position will be based in Nantes (France).

We offer an interesting and challenging position in an international environment which will contribute enhancing risk analysis related to persistent organic pollutants (POPs) and improving chemical environmental and food safety, in a public health perspective. The student undertaking the project will receive extensive training in a range of modern analytical techniques including cutting-edge state-of-the-art chromatography coupled with multidimensional and high resolution mass spectrometry techniques.

Due to the multiplicity of chemical substances placed on the market and potentially released in the environment, including food matrices, it is now widely acknowledged that the number of molecules monitored by standard targeted chemical analyses is not enough for a comprehensive picture of the real state of contamination. Potential sources of contamination may therefore remain unknown. The main objectives of this PhD thesis are (i) to identify poorly or undescribed halogenated chemical contaminants of emerging concern (CECs) in environmental sentinel species (e.g. gull egg, marine mammal blubber) susceptible to concentrate them, (ii) to characterise their fate along the environment-food continuum, including seafood products, a dietary category well-known to convey a wide range of POPs, and breastmilk.

The strategy will include coupling the acquisition of global chemical fingerprint by ultra-high resolution mass spectrometry (e.g. LC/GC-Q-Exactive) to automated bioinformatics tools for filtering and data analysis purposes, taking advantage of the mass defect as discriminating criteria (Léon et al., 2019). The untargeted analysis will be implemented through several chromatographic separation techniques with appropriate ionisation modes, in order to investigate various accessible fractions and thus to extend the coverage of chemicals of interest to maximize the discovery of relevant halogenated signals. The selected signals of interest will be subjected to a structural identification work. This global research work will require an in-depth bibliographic review, an extended analytical work and a database construction.

Further information

For further information please contact the project coordinator, Dr. Ronan Cariou (ronan.cariou@oniris-nantes.fr).

*: The final approval of the financial support is under progress.

Qualifications

- Strong chemical background with a M.Sc. in Chemistry, Chemical Engineering, Analytical Chemistry or equivalent
- Hands on experience with analytical method development and advanced data analysis within chromatography and mass spectrometry (multidimensional and/or high resolution MS) workflows
- Experience or knowledge about one or more of the following areas will be an advantage:
  - Persistent Organic Pollutants (POPs)
  - Organic chemistry
  - Exposomics
  - Multivariate data analysis
  - Programming
- Good laboratory skills
- Good collaboration and communication skills (written and spoken English)
- Structured and analytical working approach

Coordination / Supervision

Ronan CARIOU, PhD, HDR (Scopus)
Gaud DERVILLY, PhD, HDR (Scopus)

Salary and appointment terms

The salary and appointment terms are consistent with the current rules for PhD degree students. The period of employment is 3 years and contracted directly with INRAE.

Application

Please submit your application no later than **10th July 2020**. Applications must be submitted as **one pdf file** containing all materials to be given consideration. The file must include:

- A letter motivating the application (cover letter)
- Curriculum vitae
- Details of Master's results (and MSc diploma if available)

Ideally, interviews and selection will take place by the end of July 2020. Candidates may apply prior to obtaining their master's degree, but cannot begin before having received it.

LABERCA's general domain of activity is the chemical food safety, in a global risk assessment perspective: generation and interpretation of exposure and body burden data, study of the transfer and metabolism of investigated chemicals from their sources to the consumers through the food chain. From an analytical point of view, the two main areas of competence of the laboratory are the treatment of complex biological samples for isolating the studied substances present at (ultra-)trace level, and the hyphenated measurement of these compounds by various mass spectrometric coupling techniques. Besides these targeted approaches, the laboratory has been developing over the last 10 years an expertise in untargeted approaches (metabolomics) to reveal biomarkers of chemical exposure. The analytical platform is considered as one of the most complete at the national and European level (> 15 last generation MS instruments). All these activities (assays and research) are conducted under management quality system combining accreditation (ISO17025) and certification (ISO9001:2008).

You can read more about LABERCA on www.laberca.org