A 3-year PhD scholarship for a research project on chlorinated paraffins characterisation in food is available at LABERCA (Nantes, France). The project will be starting in January 2021.

Proposal title

Quantitative measurement of chlorinated paraffins to better characterize their occurrence in food matrices

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 January 2021. 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.

Chlorinated paraffins (CPs) are unbranched saturated hydrocarbon chains (C10 to C30), which contain from 30 to 70 % chlorine (*w/w*). They are classified as short (SCCP), medium (MCCP) and long (LCCP) chains. Their robust analysis is now required for the implementation of official controls to ensure the application of future regulations. A survey of official and private laboratories in the EU and beyond revealed a wide variety of methods currently used. In addition, results from the inter-laboratory trials on organohalogen compounds organised by the European Union Reference Laboratory (EURL, Freiburg, Germany) showed that the main challenge relates to the accurate quantification of mixtures of SCCPs and MCCPs, and thus their future monitoring in complex food samples. In addition, the EURL strongly encourages laboratories to conduct further studies to develop robust quantitative methods dedicated to CPs in foods.

The PhD work will consist in identifying and treating the analytical critical points in order to conduct a robust quantitative analysis of CPs in foods of animal origin. After an exhaustive and critical review of the literature on CPs and on their measurement, the PhD student will draw up a strategy of quantification applied to food samples. At the experimental level, a first work will focus on the comparison of the most suitable ionization techniques. Then, supercritical, liquid and gas chromatographies (1D and 2D) will be investigated according to their analytical relevancies, always coupled to mass spectrometry. Finally, the behaviour of CPs as complex mixtures in matrices will be investigated in order to compare the different approaches. Chemometrics will be implemented to create a proper data processing dedicated to CPs. The ultimate analytical strategy will be validated on real samples and would be carried out in other laboratories to improve its reproducibility.

Further information

For further information please contact Dr. Emmanuelle Bichon (emmanuelle.bichon@oniris-nantes.fr).

Qualifications

- Strong chemical background with a M.Sc. in 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)
  - Analytical chemistry
  - Chemometrics
- Good laboratory skills
- Good collaboration and communication skills (written and spoken English)
- Structured and analytical working approach

Coordination / Supervision

Emmanuelle BICHON, PhD (ORCID)
Ronan CARIOU, PhD, HDR (ORCID, 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 Oniris.

Application

Please submit your application no later than **15th November 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 November 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 carried out under management quality system combining accreditation (ISO 17025:2017) and certification (ISO9001:2015).

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