

PhD Project Advertisement

Project title: Food Authenticity: Targeted and untargeted DNA barcoding approaches for traceability of cross-contamination and adulteration in animal and plant-based foods

Project No: FBS2023-03-Anastasiadi-cq

Lead supervisor: Maria Anastasiadi, Soils, Agrifood and Biosciences (SABS), School of Water, Energy and Environment (SWEE), Cranfield University

Email: m.anastasiadi@cranfield.ac.uk

Co-supervisors:

Katrina Campbell, Queen's University Belfast, Zoltan Kevei, Cranfield University, Fady Mohareb, Cranfield University, Tassos Koidis, Queen's University Belfast

Project description:

In recent years, there has been a shift in consumers' behaviours and attitudes to food, with increasing numbers demanding foods that are safe, nutritious, and from sustainable sources. Nowadays consumers choices are mainly driven by health concerns, environmental awareness and ethical and religious beliefs.

Food authenticity is also becoming a major concern as it can pose significant health risks such as infectious diseases and allergies. Examples include cross-contamination of food products with allergens such as milk, seafood and nuts which is the leading cause of recalls in the UK, or deliberately altering the composition of foods for financial profit (e.g. substituting expensive meat and vegetable oils such as olive oil with cheaper alternatives). Implementing robust authentication and traceability systems across the supply chain will help improve food safety and prevent food fraud.

One such approach is DNA barcoding technology which uses a short domain of DNA from a specific gene to achieve species identification and has already been implemented as a regulatory tool for identification and authentication of fish and seafood products in several countries across the globe.

DNA barcoding can also be combined with Next Generation Sequencing techniques (NGS) to enable the identification of all the ingredients presents in complex food matrices (Metabarcoding). These technologies have the potential to reduce the microbiological and toxicological risks associated with the consumption of food products and have promising applications in fraud detection.

The aim of this project is to explore the potential of DNA barcoding and metabarcoding approaches in conjunction with selected food characterisation methods to uncover the composition of food products and detect intentional food adulteration, or cross-contamination with other species during processing. You will be based within the bioinformatics team at Cranfield University and you will be using bioinformatics pipelines for processing NGS data, novel molecular techniques and high throughput bioassays and immunological methods in order to deliver a complete solution to the food industry and regulatory bodies to determine food integrity, quality, safety and authenticity.

Training opportunities:

This project is a collaboration between Cranfield University and Queen's University Belfast and the successful applicant will have the opportunity to receive training in the world leading bioinformatics and molecular biology facilities at Cranfield University as well as in food science, and immunoassays at the Institute for Global Food Security at Queen's University Belfast. The student will also have access to the CU Doctoral Researchers' Core Development (DRCD) programme and will attend national and international conferences in relevant subject areas. The student while at QUB will be a member of the Graduate School and will have opportunities to develop further transdisciplinary skills for example in leadership and management.

Student profile:

This project would be suitable for students with interdisciplinary skills with a degree in the following areas: biology,

bioinformatics, chemistry, nutrition, agriculture, plant science, food science or a closely related subject. We particularly welcome applicants from diverse and under-represented backgrounds.

Stipend (Salary):

FoodBioSystems DTP students receive an annual tax free stipend (salary) that is paid in instalments throughout the year. For 2022/23 this will be £17,668 and this will increase slightly each year at rate set by UKRI.

Equality Diversity and Inclusion:

The FoodBioSystems DTP is committed to equality, diversity and inclusion (EDI), to building a doctoral researcher(DR) and staff body that reflects the diversity of society, and to encourage applications from under-represented and disadvantaged groups. Our actions to promote diversity and inclusion are detailed on the [FoodBioSystems DTP website](#).

In accordance with UKRI guidelines, our studentships are offered on a part time basis in addition to full time registration. The minimum registration is 50% FT and the studentship end date will be extended to reflect the part-time registration.

For up to date information on funding eligibility, studentship rates and part time registration, please visit the [FoodBioSystems website](#).