

PhD Project Advertisement

Project title: Alternative oil production from microbial cell factories for food applications

Project No: FBS2024-088-Chatzifragkou-rq

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Project description:

Lipids represent key ingredients for the food industry and they mostly derive from oil seed crops. With increasing world population and reduced availability of cultivable land, conventional methods of producing lipids alone cannot not satisfy increasing demand. As such, lipids produced by microorganisms could offer a sustainable alternative to plant derived lipids. Oleaginous microorganisms (fungi, yeast, algae) may contain >20% of lipids in their entire dry biomass. They are stored inside the cells as lipid droplets and are of similar composition to that of plant oils (e.g., soybean, sunflower, and palm oil). Microbial lipids could potentially substitute hydrogenated oils, which are associated with obesity, metabolic syndrome, and cardiovascular diseases, and promote the development of healthier food systems.

In this exciting project, we aim to fully utilise oleaginous microorganisms as a sustainable resource of lipids rich in polyunsaturated fatty acids and bioactive components. The project will focus on the production of microbial lipids using oleaginous yeasts that are safe to be used in food. Food waste streams (used cooking oils, expired fruit juices, whey permeate) will be used as substrates for microbial oil production, aiming at tailoring the fatty acid composition of the produced lipids for food applications.

The 4-year project provides an exciting opportunity to work with an Internationally recognized scientific team from leading UK Institutions to gain expertise in industrial fermentation and lipid technology for food applications.

Training opportunities:

The successful student will receive world class training from the University of Reading (UoR) and Queen's University Belfast (QUB) in both wet and dry lab methods. Specifically, at UoR the student will be fully trained in microbial fermentations at different cultivation modes as well as oil extraction methods, enzyme technology and process optimisation. In UoR and QUB, the student will be offered dedicated training in texture analysis and rheology, and in UoR they will have access to the Chemical Analysis Facility (CAF), and receive training on Optical Spectroscopy, X-ray Diffraction and Thermal Analysis for the characterisation of lipid-based structures. Additionally, at QUB, the student will have access to lipidomics analytical platform and will receive training in vibrational spectroscopy, via a dedicated 2-month placement split in Year 2 and 3 of their study.

Student profile:

This project would be suitable for students with at least a BSc honours degree at upper second class level (or equivalent) in Food Science, Food Technology, Chemistry, Industrial Biotechnology or a closely related subject.

Stipend (Salary):

FoodBioSystems DTP students receive an annual tax free stipend (salary) that is paid in instalments throughout the year. For 2023/24 this is £18,622 and it 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](#).