Nottingham BBSRC DLA Programme : Designing Low-UPF Mycelium-Based Meat Alternatives: Linking Structure and Proteins Bio-Accessibility to Sensory Performance (CASE project)

University of Nottingham, School of Biosciences

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About

Thanks to £14m of funding awarded by the Biotechnology and Biological Sciences Research Council (BBSRC), the University of Nottingham and Nottingham Trent in partnership with the National Biofilms Innovation Centre (NBIC) are offering fully funded innovative four-year cohort-based training in frontier science.

Postgraduate researchers will be recruited to a research cluster within each of the overarching research areas:

- Alternative and Emerging Protein sources for Sustainable food and feed (Sustainable Agriculture and Food Security) - Cluster lead Professor John Brameld
- RIC@N-DLA: Multiscale RNA Science from mechanisms to applications (Bioscience for Human Health) – Cluster lead Dr Federico Dajas-Bailador
- Future Genomes Across Life – Engineering biology for sustainability and innovation (Biotechnology for Sustainable Growth) – Cluster lead Professor Thorsten Allers

Project description

We invite applications for a BBSRC fully funded CASE studentship to investigate designing low-UPF Mycelium-based meat alternatives. This sits under our Sustainable Agriculture and Food Security theme and is offered through partnership with Adamo Foods.

Mycelium is a unique food material: a naturally fibrous, protein-rich biomass with intrinsic structure, eliminating the need for extensive processing typically required to produce whole-cut meat alternatives. This makes mycelium particularly attractive as a base for low-ultra-processed food (low-UPF) steak analogues.

This study will establish integrated structure–process–nutrition–sensory relationships for mycelium-based steak products to develop the necessary fundamental understanding to deliver an ultrarealistic fungi-based steak resembling both structurally and nutritionally beef steaks.

Aims and objectives

To establish a mechanistic understanding of fungi hyphae self-assembly and optimise how ingredient selection, processing and post-harvest levers influence structure, sensory performance, protein quality and digestibility, and shelf-life of mycelium-based steak analogues under low-UPF constraints.

1. Impact of post-harvest processing and ingredient selection on mycelium self-assembly

This work component aims at understanding and characterising how minimal, clean-label strategies modulate mycelium structure by controlling the self-assembly of fungi hyphae.

2. Steak formulation levers and protein digestibility assessment

This work component aims at formulating mycelium-based steak and at evaluating its protein digestibility.

For selected steak, we will measure in-vitro protein digestibility and digestion kinetics, to establish amino acid bio-accessibility and quantify how structure and processing influence digestion rate and peptide/ amino acid release.

3. Optimised mycelium fermentation scale-up and consumer acceptance

This component aims at identifying a suitable and scalable fermentation strategy to deliver mycelium product(s) with the desirable mechanical and protein bio-accessibility characteristics. To deliver this the student will have the opportunity to work withing Adamo Foods' facility for up to 6 months.

This component will also investigate how mycelium steaks evolve over shelf-life to identify low-processing strategies to maintain nutritional and sensory quality during storage.

Why choose this project?

The Division of Food, Nutrition and Dietetics (FND) hosts state of the art facilities for the characterisation of food ingredients properties, food manufacturing and analysis and the in-vitro digestion assessment of ingredients and finished food products.

In the last two years, a strong collaboration has been established between the academic supervisory team in FND and Adamo Foods through five UKRI funded projects, three of which are ongoing.

The successful candidate will join this interdisciplinary team, gaining access to a wide range of expertise. They will receive continuous academic guidance and mentorship from academic supervisors, while receiving support from dedicated technical and research staff in the laboratory with training on techniques. The student will work alongside fermentation scientists and process engineers at Adamo Foods gaining a thorough exposure and training on key aspects of fungi proteins production and functionality in foods.

Adamo Foods has recently opened a state-of-the-art 6,000 ft^2 R&D and pilot-scale innovation facility in Nottingham, designed to support both academic and industrial research. The site houses extensive fermentation capabilities, including a 500 L air-lift fermenter, a 100 L static fermenter, and multiple 10 L and 3 L stirred-tank systems. These assets enable controlled experimentation across scales—from exploratory bench work to process-relevant pilot runs. The facility also includes full downstream processing capability, allowing harvesting, dewatering and heat-treating of up to 150 kg of finished biomass per batch.

All relevant facilities, equipment and biomass outputs will be made available to support the proposed project, providing an integrated environment for strain development, fermentation optimisation, product formulation and scale-up. Adamo will also host an on-site placement, ensuring hands-on training and immersion in a commercial R&D setting.

For informal enquiries about the project please contact Dr Vincenzo Di Bari.

Requirements

Applications are invited from candidates with backgrounds in Bioscience, Biochemistry, Microbiology, Biotechnology, Chemistry, Chemical/Biochemical/Process Engineering, Environmental Science, Pharmacy, Computer Science, Maths or related disciplines who

have/expect to graduate with a first/upper-second UK honours degree, or equivalent qualifications gained outside the UK.

Applications are also welcome from candidates with a 2:2 undergraduate degree or lower, who hold a Masters degree in a relevant area or three or more years of full-time work experience relevant to your undergraduate degree, or to the PhD projects you are applying for.

Funding details

Funding is available for four years from October 2026. The award covers tuition fees at the UK rate, plus an annual stipend. The UK Research and Innovation (UKRI) stipend is tax free and was set at £20,780 for 2025/26 entry.

UK and International candidates are eligible to apply.