

PhD Project Advertisement

Project No/title: FBS2026 59 Oruna-Concha ra / *SALTERA – Seaweed-derived Alternatives for Low-sodium Taste Enhancement and Reduction Applications*

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Project Details

Excessive dietary salt intake increases blood pressure and the risk of developing heart disease and strokes. To address this, the primary recommendation in the recent National Food Strategy is to introduce a sugar and salt reformulation tax, creating an incentive for manufacturers to reduce salt in their products. Seaweed are rich in flavour-enhancing compounds like glutamate providing odour-induced taste enhancement and 'umami' (savory) flavours but they also contain high concentrations of non-sodium, salt-forming elements which could be extracted and concentrated from seaweed processing water to create low-sodium salts. Furthermore, seaweed is considered a valuable source of plant-based protein with potential for versatile applications in various industries due to their multiple functionalities and this project will take a novel approach to use seaweed proteins to enhance the umami taste when used in food formulations. A life cycle assessment will be conducted to ensure that seaweed valorisation is environmentally sustainable and viable.

Research aims: H1-Seaweed-derived salts and taste-enhancing compounds can be optimally isolated, purified and used; creating novel, low-sodium salt and flavour enhancer products, that reduce sodium content without compromising taste.

H2-Enzymatic processing of seaweed proteins can produce glutamate-rich peptides with high umami potential, enhancing flavour and enabling further sodium reduction in food products.

What you will do: During the duration of this PhD the student will:

- Prepare and characterise seaweed extracts as well as seaweed wash and liquid fractions for their salts, and umami content using multiple ultra- and nano-filtration membranes and state-of-the-art analytical techniques (ICP-MS, UHPLC-MS and SPME-GC-MS)
- Assess the performance of resulting extracts as food ingredients in sensory and consumer trials to reduce overall NaCl inclusion. Cutting-edge food science methods will be used to assess products' physico-chemical, structural, flavour, colour and sensory properties.
- Extract seaweed proteins and subject them to novel processing methodologies to generate umami-rich-peptides which will be characterised and then tested as food ingredients in consumer trials.
- Carry out TEA and LCA, carbon foot printing and energy demand analysis to assess the environmental performance from harvest (i.e. upstream), through to processing design and remaining supply chain and end use.

References:

1. <https://www.nationalfoodstrategy.org/>
2. [Seasonal variation in the chemical composition of the bioenergy feedstock Laminaria digitata for thermochemical conversion. - Aberystwyth University](#)
3. [Umami the Fifth Basic Taste: History of Studies on Receptor Mechanisms and Role as a Food Flavor - PubMed](#)
4. [Extraction and analysis of free amino acids and 5'-nucleotides, the key contributors to the umami taste of](#)

[seaweed - PubMed](#)

5. [Effect of transglutaminase on taste characteristics of pea protein hydrolysates through altering the composition of amino acids and peptides - ScienceDirect](#)

Student profile

Essential for project: A background in food science, food technology, nutrition or related subjects

Desirable for project: Knowledge on ingredient functionality and sensory evaluation as well as prior experience in analytical techniques such as liquid chromatography and/or gas chromatography will be desirable.

Minimum requirements for all FoodBioSystems applicants: An upper 2nd class degree (or equivalent) in a subject relevant to the project. Candidates with a lower class of Bachelors degree, but merit or above at Masters level will also be considered. Demonstrable skills in problem-solving, team-working, communication and time management.

Training

Project specific training opportunities: The successful applicant will be based at the University of Reading. Aberystwyth University will provide a placement within a 3-month period (year 1) providing training and support for extraction and membrane filtration protocols. In year 2, the student can experience processing in AU's food-grade pilot-scale facility. At UoR the student will gain experience in analytical techniques such as LC-MS and GC-MS for the analysis of tastants and aroma compounds (Y1) as well as training in the design and implementation of new product development trials, sensory trials and enzymatic processes in their Food Processing and Sensory Science Centres (Y2-Y3). Reading University will also provide training in LCA methodology, techno-economic evaluation and simulation techniques including commercial software training, through online and in-person contact (Y1-3) Experience of a commercial seaweed biorefinery including access for LCA data collection is a further, unique opportunity within this DTP.

FoodBioSystems training opportunities: Throughout their studentship, all FoodBioSystems doctoral researchers participate in cohort training that covers four key themes: food systems, big data (data analytics and modelling), business, and research fundamentals. All doctoral researchers complete a placement: either project-related with a non-academic (CASE) partner, or unrelated to the project and outside the academic environment (PIPS). Details of training are available on the DTP website: <https://research.reading.ac.uk/foodbiosystems/training/>.

Project supervision style

The student will be met at least weekly in-person by the principal supervisor with a monthly meeting documented to assess progress, problems, training requirements and forthcoming events. They will also be invited to attend monthly lab group meetings. When based at AU a similar weekly meeting will be held, with opportunity to join weekly group meetings too; in addition to ad hoc support meetings and training sessions. A monthly online meeting with all supervisors will be scheduled for updates and project discussion across the supervisory team; individual meetings and planning meetings will also occur with the relevant supervisors as required. Following all meetings, if action is required, the student should email the problem/situation to the lead supervisor who will commence a response to the problem/situation within 3 working days. For document review, the student should receive a response within 2 weeks.

Stipend (Salary)

FoodBioSystems DTP students receive an annual tax-free stipend (salary) that is paid in instalments throughout the year. For 2025/26 this is £20,780 and it will increase slightly each year at rate set by UKRI.

Equity Diversity and Inclusion

The FoodBioSystems DTP is committed to equity, 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](#) and include:

- Offering reasonable adjustments at interview for shortlisted candidates who have disclosed a disability or specific learning difference.
- [Guaranteed interview](#) and [applicant mentoring](#) schemes for applicants, with UK home fees status, from eligible under-represented ethnic groups who also meet academic eligibility criteria and the student profile essential for the project.

These are opt-in processes.

Our studentships can be offered to home students on a part-time basis, and studentship end date and stipend payments will be amended to reflect the part-time registration. The minimum registration for DTP funded part-time students is 0.5 FTE (studying an average of 20 hours per week over 8 years). We regret that part time registration is not available to international students due to complexities of visa restrictions.

Funding note

We welcome applications from candidates with Home/ROI fees and international fees status. This studentship is funded by UKRI and covers stipend, fees at Home/ROI rate, and research costs.

Costs that must be found from other sources or met by the individual student include:

The difference between international and Home/ROI fees at University of Reading, visa fees, healthcare surcharge, relocation costs and guarantor services.

Information about fees is available at <https://www.reading.ac.uk/doctoral-researcher-college/funding/fees/fees-new-students>

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