

PhD Project Advertisement

Project title: Enhancing seaweed aquaculture for alternative animal feeds

Project No: FBS2023-04-Anguilano-bq

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Project description:

Seaweed has caught the attention of many consumers for its high nutrient content and its sustainability. In recent years, interest in seaweeds has grown exponentially with increasing interest and research from the Agrifood sector owing to its anti-methanogenic properties in ruminants. While the greatest reduction (>80%) has been observed by *Asparagopsis Taxiformis* a tropical/subtropical species, brown species have demonstrated a reduction of 30% and in parallel antimicrobial action which would strongly limit the use of antibiotics as supplement in animal feed which cause a large number of deaths globally and leave the UK outside of the regulations of the EU, lagging behind in a transformative healthier food system. The proposed research will look at native brown species. However, this now poses another major challenge of availability of biomass if these solutions are to be translated to industry. Globally there are almost 1.5 billion head of cattle, and with a growing population, this figure is set to increase. Therefore, new and innovative solutions are required to grow seaweed biomass in accessible farming settings. Current seaweed farming methods focus on strategies to grow seaweed on rope. The aim of the project is to develop and manufacture bio-based polymer matrix composite that could favour the farming of these species on rocky shores. In addition, the project aims to understand how the bio-based polymer substrate matrix affects the nutrient levels in the seaweeds and potentially enhance it. To do so you will conduct an evaluation of which rocks are the favourite substrates and how these can be integrated into the polymeric matrix using mineral waste streams. How this affects the manufacturing processes, the nutrients concentration and the overall energy and environmental impact will be all part of the doctoral programme.

Current methods based on ropes or on composite materials do not fully exploit circularity, lessening the positive environmental impact that seaweed cultivation could have in coastal areas.

Aim and objectives

This project aims to develop a novel growing medium for seaweed aquaculture which integrates plastic and mineral waste and generates selectivity and high yield.

The specific objectives are:

1. Develop and define the link between seaweed and natural rocks and connect it with potential waste stream supply looking at chemical composition, blendability, availability to generate a database of media-cultivar-waste stream;
2. Develop and trial innovative seaweed growth media and understand the factors affecting seeding, yield and selectivity (surface properties; material composition; material changes and degradation in use) and material durability;
3. Assess the impact of the substrate composition on the nutrients in the seaweed and concentrations of specific bioactives.

Training opportunities:

This project provides flexible industrial placement opportunity with aquaculture farmers and naval engineers with expertise in coastal seaweed growth and institutional placement for experimental work. Ad-hoc training will be provided by supervisors and their research teams including standard training courses such as academic writing, public speaking,

poster presentations etc provided by BUL graduate school.

Student profile:

This project would be suitable for students with experience in polymer science and processing, material science or chemistry/mineralogy or/and a degree in environmental science, process engineering, chemical engineering, environmental engineering or similar, manufacturing, 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 2022/23 this will be £19,668 (including London supplement) 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](#).