

PhD Project Advertisement

Project title: Insects for sustainable animal feed: Livestock farming in a climate change challenged world

Project No: FBS2023-59-Theodoridou-qr

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Project description:

Insects' potential as an alternative feed/food source is growing due to current trends toward global recognition of the imperative need to address contemporary agricultural systems' environmental impacts and enhance food and feed security. Insects are a potential alternative protein source as they grow and reproduce quickly, have high feed conversion efficiency, and be reared on bio-waste streams and transform waste biomass into a high-value feed resource. It is technically feasible to produce insects on a large scale, as sustainable protein in pig and poultry diets. Insect protein includes essential amino acids (lysine, methionine, and leucine) limited in protein vegetable origin. High protein levels (40-44%) and amino acid profiles are better than soy meal and similar to fish meal. Protein digestibility is essential when considering the nutritive value of insects. However, little information is available.

This project aims to provide further information regarding the inclusion of insects as feed ingredient in livestock animals. For this purpose, different *in vitro* trials will be conducted, assessing the effects of the use of different insect species and industrial processing treatments on the quality of the insect derived products. These studies will include for the first time the application of infrared spectroscopy techniques (FT-IR) to predict the chemical composition and *in vitro* digestibility of insects. Insects may act as an antimicrobial agent, with the potential to control various foodborne pathogens. Insect protein has been the source of different potent bioactive peptides capable of diverse biological functions. Therefore, after digestion in the animal gut, insect protein can generate peptides with antimicrobial properties that can potentially tackle bacterial pathogen infection. This is primarily associated with the growing problem of antibiotic resistance, a matter of global concern, which has triggered the search for alternatives to antibiotics in livestock production. This study will compare the pre-biotic potential of different insect derived products vs soya in simulated *in vitro* fermentation system.

Training opportunities:

Training will be provided via all partners and will cover cross-disciplinary transferable skills to enhance student's future career prospects. At Queen's University Belfast the student will have animal nutrition related training on: analytical methods: i) feed chemical composition (i.e. protein, fibre), ii) determination of the feed bioactive compounds iii) *in vitro* fermentation monogastric and ruminant model and iv) learn different spectroscopy techniques. At University of Reading, the student will be trained for (i) analysis on mineral profile of different insects and ii) different processing methods. QUB offer a Careers Development Programme where student can participate in a range of interactive workshops covering communicating postgraduate research skills to employers, effective academic applications, preparing for job interviews and research student can drop in at the Graduate School with a draft CV or application and get advice on how best to present relevant skills and experience.

Student profile:

Ideal candidates will have an upper second class degree in a related science (e.g. animal science, veterinary, food science, biology; microbiology), and a background/interest in farm animal nutrition. The ability to learn skills around research conduct/ethics and communication, microbiology, feed analysis, *in vitro* models are important.

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](#).