



POSTGRADUATE RESEARCH OPPORTUNITY

PhD Project Title: Development of biochars of animal origin for agricultural applications

Project Description:

Circular Bovine and Ovine Co-Products Valorisation (CirCoVal) is a strategic project tailored to the need of Irish meat processors that will deliver the best sustainability practices to Irish primary producers. This project is based on this research and is created in collaboration with MTI and industrial partners, taking into consideration the Department of Food and Marine (DAFM), Irish government, and EU strategies for the meat industry and its green transition. The project will focus on the valorisation of meat co-products with the least value to the industry – currently a source of losses to their producers – and the purification wastewater. Several circular processes will be developed, scaled up, and economically assessed to provide a suite of potential options for the individual producers in the agri-food sector to choose from. These processes, which will have digital controls baked in, will also be transferrable to the horticulture sector.

This PhD project will develop and demonstrate an efficient process for utilisation of solid end-of-the-cycle materials of animal origin to produce biochars via optimised pyrolysis method with the emphasis on maximisation of biochar production, including characterisation and safety assurance, both chemical and pathogenic.

This will be followed by a creation of fertilisers from end-of-process materials such as biochar and anaerobic digestate for agricultural applications through several interlinked objectives. Treated end-of-process products, anaerobic digestates and pyrolytic biochar particularly, will be tested in the plant growth chambers within TUS followed by the application to test-sites across the partner farms. The dual approach to waste valorisation for agricultural applications will provide key insights into the benefits and impacts of end-of-process fertilisers and soil amendments products on plant health and development, as well as the diversity and abundance of the rhizosphere microbiome. Rigorous compositional assessment of the waste-derived fertilisers and soil amendment products will be carried out pre-, intra- and post-application, and will include nutritional and physiochemical analysis, of fertilisers, and soil amendment products directly, amended soils, and selected plant species. Characterisation and assessment of rhizosphere microbial diversity and abundance will be used as an indicator of application *impact*.

Duration of Project: 48 months

Funding Agency: Department of Agriculture Food and Marine (DAFM), Ireland.

Type of Degree Offered: PhD



Minimum Qualifications/Experience Necessary/Any Other Requirements: [list relevant undergraduate programmes]

- Candidates with primary degrees in Agricultural studies, Agroecology, or other Life science discipline.
- Minimum classification of *First-class honours or 2.1 with relevant master's degree with at least one publication or industrial experience in Life science discipline* are strong desirables.
- Experience in standard soil assessment techniques and/or pyrolysis is a strong advantage.
- IELTS [International English Testing System] Applicants must have a minimum of 6.0 with a component score no less than 6.0.

Research Supervisors: Dr Lena Madden Dr Peter Downey Dr Catherine Collins.

For further information please contact: Lena.Madden@tus.ie

Closing date for receipt of completed application forms: 1st August 2025.

Please submit your completed application to: pro@tus.ie

Please reference **Project Title** in all correspondence.

Download the TUS Scholarship application form here:

<https://tus.ie/rdi/research/office/funded-research/>