

INTERNSHIP 5: INVESTIGATING THE NUTRIENT RETENTION DYNAMICS OF BIOCHAR, IMPLICATIONS FOR MALAYSIAN OIL PALM AGRONOMY

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Internship Location: UKCEH Lancaster, Lancaster Environment Centre, Library Avenue, Bailrigg, Lancaster, LA1 4AP

Project Description:

We seek to further our understanding of biochar nutrient dynamics to better determine the viability of biochar as an agricultural amendment, with potential impacts on soil health, crop productivity, and greenhouse gas emissions. The intern will be primarily involved in laboratory-based work, contributing to active research, helping to develop methods/experiments and build capacity for future biochar research within the plant soil interactions (PSI) group. These experiments will feed into ongoing international work investigating the ability of biochar to improve soils health under oil palm agriculture, a rapidly growing land use and cause of extensive soil degradation across Southeast Asia.

Tasks:

1. Research, plan and test lab-based methods for measuring adsorption and desorption of nutrients from biochar samples. This is building on existing work within the group, which will serve as the pilot for the work of this internship.
2. Carry out an experiment based on above-mentioned methods to determine the adsorption/desorption dynamics of Malaysian oil palm-derived biochar.
3. Conduct a desk-based literature review into the relevance of adsorption isotherms to the work of the PSI group.
4. (Subject to experiment timing) Contribute to lab-based soil incubations investigating potential nitrous oxide suppression by biochar and enhanced rock weathering to Malaysian oil palm soils.

Expected Outcomes:

1. The primary outcome of the internship is to provide the intern with experience of working in a functional and field leading environmental research lab. This will range from basic lab skills through to operating analytical instrumentation and helping in the design of experiments.
2. The intern will gain some knowledge of the greenhouse gas removal field of research as well as soil biogeochemistry more broadly.
3. Multiple standard operating procedures (SOP's) detailing a rigorous, repeatable, and feasible method for understanding the nutrient dynamics of biochar.
4. Contribution to novel and field-leading greenhouse gas removal research.

Required Skills and Background:

Essential:

- Currently in undergraduate or postgraduate (**not** including PhD) education at university or have graduated within the six months prior to the start of the internship (30th June 2025)
- Basic understanding of good lab practice, including safe operation and quality assurance.
- Basic understanding of soil biogeochemistry, knowledge of nature-based greenhouse gas removal technologies desirable.
- Ability to understand and follow a standard operating procedure (SOP) to achieve robust and repeatable results in lab-based experiments.
- Ability to take the initiative and make well-reasoned decisions independently, while following guidelines/instruction of supervisors.

- Keen to learn new skills and get involved in practical research.