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EBNet Travel Bursary Support
Dr Meredith Barr,
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(TB202406)



The 10th International Conference on Engineering for Waste and Biomass Valorisation (WasteEng2024) 20-23 August 2024, Sendai, Japan

Presentation title:

'Lignocellulosic and Poultry Litter Biochars as a Two-Pronged Approach to Plant Nutrient Regulation'

Meredith's group investigates how the way in which biochars are produced affects which nutrients they release and immobilise in soil, which in turn affects their influence on the soil microbiome. She presented her research on controlling nutrient concentrations in soil using a combination of animal-waste-derived biochars as a slow-release fertilizer and plant-waste-derived biochars as a sorbent material.

Adsorbing excess nutrients from soil and releasing them only as required by plants prevents pollution of waterways by excess nutrients from agriculture. Nutrient pollution results in algal blooms. Regulating soil nutrients controls the growth of aquatic (micro)algae to preserve the aquatic ecosystem - critical to maintaining water security and aquacultural productivity. Moreover, controlling nutrient concentrations in soil facilitates engineering the soil microbiome, ensuring plant health, agricultural productivity, and thereby food security.

Poultry litter is widely used by farmers as a fertiliser (in some cases so excessively as to be responsible for severe nutrient pollution in nearby waterways). When converted to biochar, nutrient release is slowed, reducing the risk of nutrient pollution. It is also sterilised, neutralising the threat of pathogen pollution.

By pyrolysing this natural fertiliser, Meredith's research group engineers the composition of the soil microbiome by allowing symbionts to outcompete the far smaller concentrations of pathogens naturally introduced by wildlife. The research aims to prevent both soil and water pollution by valorising waste via control of environmental microbiota.



Dr Meredith Barr at WasteEng24

Meredith also chaired a session on waste and biomass gasification. She invited the audiences of both her presentation and this session to join her [EBNet Biochars for Pollution Prevention Working Group](#).

Two members of the Working Group attended WasteEng2024 where they gave two oral presentations, chaired a session, and presented a poster for a third working group member who could not attend.

Attendance was enabled by the travel bursary generously provided by EBNet, and has resulted in the discussion of several new collaborations as well as identification of a future conference of potential interest to working group members (Bio-Char IV).