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school of environmental sciences

The Research Seminar Presentation by

Connor Kiselchuk

will be held on

Tuesday March 10th, 2020

At 3:15 pm

Alexander Hall 265

Precision Aerobic Composting: A step towards closing the carbon loop in controlled environment agriculture

In order to feed a growing population, total agricultural output must increase by some 50% compared to 2013. Carbon dioxide enriched 'Plant Factories' are perfectly suited to an urban environment. The flow of carbon through a Plant Factory is very linear and as such they require a constant input to replace the carbon locked in the outgoing food. While carbon dioxide enrichment is a common practice, it demands the constant manufacture of bottled carbon dioxide; a process that requires the combustion of fossil fuels. These high-intensity urban farms generate waste biomass that requires disposal. Ideally, this waste biomass should not be considered waste at all as it represents a significant portion of the carbon that was used to produce the food commodity. On-site recapture and reuse of this carbon has the potential to significantly improve the resource utilization efficiency of these food production systems. Aerobic composting is one method of recovering evolved carbon dioxide from organic waste which can make for a more sustainable, profitable, and ecologically responsible business. C:N ratios of organic waste derived from hydroponically grown Bush Beans and Romaine Lettuce will be investigated. This measure is correlated to overall composability and will inform the assembly of optimal 'compost recipes'. These recipes should return the maximum amount of carbon at a decomposition rate that is feasible for use as a waste management system. To put the recipes into practice, bench-scale aerobic reactors will be constructed to compost various waste mixtures and confirm that indeed they are optimal, with carbon dioxide evolution being the response metric.

Everyone is welcome to attend

(This is a Research Proposal presentation by students in ENVS*6900)