BioChar’s Removal of Contaminants in Agricultural Soil

Tannis Breure Undergraduate Environmental Engineering
Mentor: Rebecca Muenich, PhD, Clinton Williams, PhD
School of Sustainable Engineering and the Built Environment

Motivation

- *Escherichia coli* (E. coli) threatens agricultural fields frequently, decreasing farmer’s crop yields and impacting human health of the consumer.
- An affordable and effective solution to remove E. coli from arid agricultural soils has not yet been found.
- BioChar has shown promise in removing contaminants in agricultural soils, but the effects are unknown in arid soil.

Experimental Procedure

![Fig. 1 Column Experiment Schematic](image1)

**Expected Results**

- In accordance with literature and previous research on non-arid soils, BioChar should remove between 70-99% of E. coli from arid soils.
- These results can be utilized in urban agriculture and large-scale farming to increase crop production and minimize the adverse effects of E. coli.

Computational Method

- Analysis of functional groups and heat of pyrolysis of the BioChar
- Compare to pharmaceutical removal in sand
- Program used to model BioChar’s E. coli removal
- MATLAB method compared to Hydrus removal of pharmaceuticals from wastewater.

Conclusions and Next Steps

- BioChar has also shown promise in removing pharmaceuticals from wastewater, by utilizing the computational model for pharmaceutical removal, assumptions and parallels can be drawn to model E. coli removal as well.
- Future experiments should be conducted with arid agricultural soil.