Geophysical Research Abstracts
Vol. 16, EGU2014-9885-1, 2014
EGU General Assembly 2014

Evaluation of Varying Biochars as Carrier Materials for Bacterial Soil Inoculants

Lauren Hale and David Crowley
United States (lhale003@ucr.edu)

The incorporation of biochar into agricultural soils for carbon sequestration and improved soil fertility creates an opportunity to simultaneously deliver plant-growth promoting rhizobacteria (PGPR). Many characteristics of biochar materials indicate that these particles could be conducive as inoculum carriers. This could provide a value-added component for biochar marketing and has an advantage over traditional carrier materials, which can be unsustainable or expensive to produce. Here, we assessed the suitability of 10 biochar types, made from 5 feedstocks at 2 pyrolysis temperatures (300°C and 600°C), to serve as carriers for 2 model PGPR strains, *Enterobacter cloacae* UW5 and *Pseudomonas putida* UW4. All biochars were characterized based on BET specific surface area, C-N content, pH, EC, and their abilities to adsorb bacterial cells from a liquid inoculum. Further studies incorporated qPCR to quantify the survival of inoculants after introduction into soils via biochar carriers. The biochars that performed well were further assayed for their influence on PGPR traits, 1-aminocyclopropane-1-carboxylate (ACC) deaminase and auxin production. Peat and vermiculite served as traditional carrier materials to which we compared the biochars. Our findings indicated that biochars varied in their interactions with our model PGPR strains. Based on our analysis several biochar types were able to serve as carriers which were as good, if not better than, the traditional carrier materials. Future work should seek to assess shelf life and varying inoculation methods for the biochar-inoculant complexes.