Geophysical Research Abstracts
Vol. 19, EGU2017-5512, 2017
EGU General Assembly 2017

Crafting biochars to reduce N2O and CO_2 emissions while also improving soil quality

Jeff Novak (1), Jim Ippolito (2), Kurt Spokas (3), Gilbert Sigua (4), Claudia Kammann (5), Nicole Wrage-Monnig (6), Nils Borchard (7), Michael Schirrmann (8), Jose Maria Estavillo (9), Teresa Fuertes-Mendizabal (10), Sergio Menendez (11), and Maria Luz Cayuela (12)

(1) US Department of Agriculture, ARS-CPRC, Florence, USA (jeff.novak@ars.usda.gov), (2) Colorado State University, Fort Collins, Colorado, USA (jim.ippolito@colostate.edu), (3) US Department of Agriculture, ARS-St.Paul, Minnesota, USA (kurt.spokas@ars.usda.gov), (4) US Department of Agriculture, ARS-CPRC, Florence, USA (gilbert.sigua@ars.usda.gov), (5) Geisenheim University, Geisenheim, Germany (claudia.kammann@hs-gm.de), (6) University of Rostock, Rostock, Germany (nicole.wrage-monnig@uni-rostock.de), (7) Center for International Forestry Research, Indonesia (nils.borchard@gmail.com), (8) Leibniz Institute, University of Potsdam, Potsdam, Germany (mschirrmann@atb-potsdam.de) , (9) University of Basque, Bilbao, Spain (jm.estavillo@ehu.eus), (10) University of Basque, Bilbao, Spain (teresa.fuertes@ehu.eus), (11) University of Basque, Bilbao, Spain (sergio.menendez@ehu.eus), (12) Spanish National Research Council, Madrid, Spain (mlcayuela@cebas.csic.es)

Biochar used as an amendment has been linked to nitrous oxide (N2O) emission reductions, a decrease in nitrogen (N) leaching, and soil quality improvements (e.g., soil carbon sequestration, pH, etc.). While numerous articles will support these three facts, conversely, there are reports of no to marginal influences. One reason for the mixed biochar performance could be related to applying biochar with incorrect chemical and physical characteristics. As a means to increase biochar efficiency, we introduced the concept of crafting biochars with properties attuned to specific soil deficiencies. Implementing this concept requires a literature review to identify salient biochar characteristics that reduces N2O emissions, impacts N availability, while also improving soil quality. Thus, scientists from the USDA-ARS and through a coalition of European scientists under the FACCE-JPI umbrella have conceived the DesignChar4food (d4f) project. In this project, scientists are working collaboratively to further this concept to match the appropriate biochar for selective soil quality improvement, retain N for crops, and promote greenhouse gas reductions. This presentation will highlight results from the d4f team compromising a meta-analysis of articles on biochar:N2O dynamics, N availability, and how designer biochars can target specific soil quality improvements.