

Influence of Biochar Application on Per- and Polyfluoroalkyl Substances (PFAS) in Two Vegetable Crops: A Paired Field and Greenhouse Study

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Abstract

Per- and poly-fluoroalkyl substances (PFAS) are a group of man-made chemicals and highly strong organic compounds (with multiple C-F bonds) found to be widely dispersed throughout the environment via anthropogenic activities; the application of biosolids in the farmland of Maine being a major problem. This study was conducted to observe the effects of dilution and adsorption of PFAS on PFAS-contaminated soil by adding biochar, PFAS-free soil, or compost in either of setup- greenhouse and field experiment. The use of climate-smart input biochar has some promising results in increasing crop productivity, ecosystem services, and sorption of heavy metals and PFAS from water samples. Thus, this study was conducted to assess the role of biochar in PFAS sorption from soils and reducing their availability to crops. Also, this study focuses on understanding the accumulation of PFAS in different edible plant parts like fruits in tomatoes, and leaves in lettuce under both greenhouse and field conditions. We are also recording physiological traits of plants like stomatal conductance, and chlorophyll content to see if there is any association between stomatal opening and closure with PFAS uptake by plants in varied dilution effects.