



# THE ROLE OF BIOCHAR IN ENHANCING SAFE USE OF UNTREATED WASTEWATER IN AGRICULTURE

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## Abstract

In many developing countries, water scarcity and the growing population are becoming problematic. Therefore, the reuse of wastewater for irrigation provides an alternative management option. Irrigation with poorly treated or untreated wastewater could, however, pose risk to human health due to the presence of a wide range of contaminants, including heavy metals, which can move into the edible parts of various crops such as potatoes (*Solanum tuberosum L.*) and spinach (*Spinacia oleracea L.*). The study aimed to investigate biosorbent role in the remediation of heavy metals in soil and crops irrigated with untreated wastewater. Both aboveground and belowground crops were selected to better assess the effect of rooting system on the plant uptake of heavy metals. To achieve this goal, a field lysimeter experiment was undertaken to elucidate the fate and transport of six water-borne heavy metals (Cd, Cr, Cu, Fe, Pb and Zn) in irrigation water applied to potatoes (cv. Russet Burbank) and spinach grown on a sandy soil. Plantain peel biochar (1% w/w) was incorporated in the top 0.1 m of soil. All the control and biochar treatments were replicated three times in a completely randomized design carried out on nine outdoor PVC lysimeters (1.0 m height × 0.45 m diameter). Overall, biochar amendment, having improved soil's pH and CEC, showed high potential in the immobilization of heavy metals in soil, thereby reducing their uptake by plants. Therefore, the application of biochar as soil amendment could result in safer use of wastewater irrigation for crops. The accumulation of heavy metals in soil and uptake by plant parts, however, were crop-dependent.

## About the Candidate

Coming from Nigeria, Christopher Nzediegwu joined McGill in Fall 2014 under the supervision of Dr. Shiv Prasher. Since then, he has participated in many extracurricular activities, including McGill-wide 3MT, where he was among the finalists in the 2017 edition. Presently, he is an On-Call Facilitator with TLS, McGill.

