



A PRELIMINARY INVESTIGATION OF BIOCHAR DERIVED FROM NEEM CHIPS FOR THE REMOVAL OF MANCOZEB, AN EMERGING CONTAMINANT

Thusalini Manoharan¹, Kannan Nadarajah¹

¹ Faculty of Agriculture, University of Jaffna, Sri Lanka

Presenting author: Manoharan Thusalini | mthusalini@gmail.com

Emerging contaminants (ECs) are either naturally or synthetically occurring chemical substances in the environment. ECs are found in all most all the products that are used by humans daily. There are many ECs polluting the environment resources in Sri Lanka due to intensive farming practices. This study comprehensively investigated the potential of neem biochar material pyrolyzed at different temperatures in removing mancozeb, a potential EC reported to significantly pollute water sources in Sri Lanka. Results revealed that biochar pyrolyzed at 900°C exposed higher adsorptive performance of 187.68 mg/g than biochar pyrolyzed at 300°C, 500°C and 700°C. The outcomes of the XRD suggest that the functional properties of biochar (surface functional group and carbon network) are strongly influenced by pyrolysis temperature. The biochar pyrolyzed at 900°C exhibited lower surface functional group and stronger hydrophobic carbon network.

Isotherm analysis using isotherm models (Langmuir, Freundlich and Temkin) indicated that the use of Freundlich model for explaining the nature of mancozeb adsorption to the surface of the neem chip biochar pyrolyzed at 900°C is well fitted. It is also suggested that the adsorption is heterogeneous and multilayer in nature. Moreover, the XRD analysis performed before and after adsorption of mancozeb indicated that hydrophobic functional groups actively participated in mancozeb adsorption. Hence, this innovative process of the use of biochar produced from neem chip for the removal of mancozeb makes an opening for the development of cost-effective and eco-friendly technology for commercial level EC removal applications.

Keywords: Biochar; ECs; Isotherm; Mancozeb; XRD