Preparation of Biochar as a Soil Amendment from Rice Husk and Corn Cob by Slow Pyrolysis Process

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ABSTRACT

Biochar is a light weight, highly porous material with high carbon content, a portion which has a stable chemical structure resistant to decay. However, there are no established farmer scale pyrolyzers and pyrolysis methods to produce good quality rice husk biochar (RH-BC) and corn cob biochar (CC-BC). In this experiment, an attempt was made to modify the existing pyrolyzer (Kunthaniya) for RH-BC and to develop a new pyrolyzer (CCP) for CC-BC. Temperature changes in the pyrolysis process were monitored. Slow pyrolysis was practiced as it is the process to produce biochar as soil amendment. Total elemental analysis, Nutrient content analysis and proximate analyses were carried out for feedstocks as well as for RH-BC and CC-BC. Modified pyrolyzer (RHP) produced slow pyrolysis condition while Kunthaniya did not give slow pyrolysis condition. BC yield (%) was quantitatively similar in Kunthaniya and RHP nonetheless BC produced by Kunthaniya contained incompletely carbonized particles and ash to the amount of 21%. Firewood consumption was 20 times higher in Kunthaniya than in RHP and production efficiency was almost half (0.59) in Kunthaniya compared to RHP. Corn cob pyrolyzer (CCP) was well under slow pyrolysis condition. Rice husk biochar (RH-BC) and CC-BC showed quantitative differences, and more similarities than differences qualitatively. Biochar were alkaline in pH, while Vm /FC ratio of both RH-BC and CC-BC was greater than 1.0 showing susceptibility for biological decay. RH-BC and CC-BC contained high quantities of Ca, Mg, K and P.

Key words: Biochar, Corn cob, Rice husk, Slow pyrolysis

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