CAPACITY OF BIOCHAR SOURCES AS A SOIL AMENDMENT IN ENHANCING USE EFFICIENCY OF SYNTHETIC FER TILIZERS AND SOIL PESTICIDES

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Agricultural pollution occurs either by accumulation or leaching of nutrients and pesticides in soil and water. Soil organic amendments are known to increase fertilizer use efficiency and to retain elements of pesticides through which serve as sources of minimizing agricultural pollution. Biochar is a proven soil amendment with concentrated carbon rich source possessing unique characteristics of soil improvement properties. Nevertheless, understanding of biochar and availability of genuine sources are poor in Sri Lanka. Hence, the present study attempted to produce biochar through pyrolysis using *Eucalyptus grandis, Gliricidia sepium, Caliandra colothyrus, Pinus sabiniana*, jungle tree species, coconut shell and paddy husk. Amongst the different sources evaluated, paddy husk biochar (biochar PH) showed the highest characteristics viz. particle size, water holding capacity, pH and conversion rate. The highest and lowest conversion rates were seen with paddy husk and *Eucalyptus grandis* as 42% and 15% respectively. There was no correlation between conversion rates and calorific value of biochar sources. All sources showed basic pH varied from 7.6 to 9.0. Capacities of Biochar PH1 (5-8 mm particles) and biochar PH2 (<1 mm particles) were compared with Caliandra charcoal (3 mm particles) at the rate of 1% in fresh soil weight basis for enhancing use ef ficiency of urea and urea+TSP+MOP mixture and toxicity absorbance of carbofuran in glasshouse conditions. Biochar PH1 showed significantly ($p<0.05$) greater nitrogen retention. Also, it exhibited high carbofuran absorbance proved through larvicidal effects in the leachates. Bioassays conducted with tomato and tea did not result significant changes of growth parameters indicating the long term impacts of biochar. Results proved potentials of biochar as a soil organic amendment and showed the capacity of minimizing agricultural pollution through reduced nitrate leaching and soil pesticide retention.

Key words: Agricultural pollution, Biochar, Carbofuran retention, Nitrate leaching, Soil amendments