EFFECT OF BIOCHAR ON PHOSPHORUS AVAILABILITY AND FIXATION IN SELECTED RUBBER (*Hevea brasiliensis*) GROWING SOILS

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ABSTRACT

In most rubber [*Hevea brasiliensis* (A. Juss.) Muell. Arg.] growing soils Phosphorus (P) availability is very low and added P fertilizers become unavailable to the rubber plant due to strong fixation of it into Fe and Al oxide minerals prevalent in these soils. Some studies have observed that amending soils with biochar, a co-product of thermochemical conversion of lignocellulosic materials into advanced biofuels, has increased the P uptake and cut down chemical P fertilizer usage in rubber nursery plants. Therefore, a laboratory incubation study was undertaken to determine the dynamics of soil P availability in three rubber growing soils from Parambe (PR), Thanamalwila (TW), and Payagala (PY) after amending them with three different biochar (BC) types made from Rubber wood (RW), Gliricidia (GL), and Paddy husk (PD).

In P availability experiment, each soil type was amended with the 3 BC types at 3 different rates *viz*, 0, 2 and 5 by weight. The soil moisture content was maintained at 80% of water holding capacity (WHC) and P availability was determined at 0, 1, and 4 weeks after the incubation time period. Fixation capacity of soils amended with BC types and rates was assessed using the Portch and Hunter (1998) method.

Available P contents were different among the three rubber growing soils and were in the order Thanamalwila < Parambe < Payagala. BC produced from Gliricidia BC had the highest amount of available P while Paddy husk BC had the lowest. After amending soils with BC, the available P increased in order of Thanamalwila soil < Payagala soil < Parambe soil.

Among all soil types studied the Payagala soil had the lowest P fixation ability, and Parambe was the highest P fixing soil. Application of BC decreased the P fixation in Thanamalwila and Parambe soils but not in Payagala soils. The greatest decrease was observed with biochar produced from rubber wood and least decrease was with Paddy husk BC. BC can act as a source of P.

Keywords: Biochar, Fixation, *Hevea brasiliensis*, Amendment, Incubation, Availability