

Characterization of tablets made from mixture of charred agricultural residues with and without embedded fertilizer

ABSTRACT

Densification of biochar can reduce transportation and handling costs, as well as significantly decrease loss of biochar during soil application. Although the nutrient-rich biochar tablets may be a potential cost-effective slow-release fertilizer in soil, there is a lack of information on characterization of mixtures of rubber tree twigs and rice residues tablets with embedded NPK fertilizer. Objective of this work was to determine the physical and chemical properties of biochar tablets with and without embedded fertilizer. Biochar tablets were produced by blending of charred rice husk, rice straw, rubber tree twigs, and starch and followed by tableting. Their production with embedded fertilizer was similar to production process of tablets without it, except adding the NPK fertilizer to blending phase prior to tableting. Fourier-transform infrared spectra analysis indicates was utilized for determination of presence of ammonium and phosphorus substances in the biochar tablets with embedded fertilizer (BFs). The NPK fertilizer significantly increased tablet density and total contents of nitrogen, phosphorus, potassium, calcium and magnesium. The presence of higher amount of nutrients in BFs suggests that it could release nutrients for plant use.

Keyword: Biochar; Carbon; Nutrient; Rice husk; Rubber tree twigs