

Improving soil phosphorus availability and yield of Zea mays L. using biochar and compost derived from agro-industrial wastes

ABSTRACT

Tropical soils such as Ultisols fix phosphorus (P) because of their characteristically high contents of aluminium and iron. Organic amendments could be used to mitigate P fixation. This study aimed to: i) improve soil P availability, nutrients uptake, and yield of Zea mays L. using biochar and pineapple leaf residues compost; and ii) determine if the use of biochar and pineapple leaf residues compost could exert a residual effect on P. Two cycles of field trials were carried out and the test crop used was Zea mays L. hybrid F1. At harvest, the plants were harvested, partitioned into leaves and stems, and analysed. Soil samples were also collected and analysed. The results suggest that the soil total P, available P, inorganic P, and organic P recovered from the treatments with the organic amendments were higher compared with the nonorganic amendments. The availability of soil macro-nutrients in the soils and Zea mays L. yield were higher in the treatments with the organic amendments in the first and second field trials. Amending chemical fertilisers with organic amendments have a larger residual effect than chemical fertilisers only and can be used to ameliorate P fixation of acid soils to improve maize production on acid soils.

Keyword: Acid soils; Soil phosphorus fixation; Pineapple leaf residues compost; Biochar; Zea mays L.