

Chemical and biological characteristics of organic amendments produced from selected agro-wastes with potential for sustaining soil health: a laboratory assessment

ABSTRACT

Sustaining soil health cannot be divorced from sustainable crop production. Organic, or natural, farming is being promoted as a good sustainable agriculture practice. One aspect of organic farming that could significantly enhance and sustain soil health, soil quality, and crop productivity is the use of high-quality soil conditioners or organic amendments produced from agro-wastes. Thus, the objective of this study was to characterize the chemical and biological properties of selected agrowastes with potential for use as organic amendments in sustaining soil health. Standard procedures were used to produce and characterize the soil conditioners, namely fermented plant juice (FPJ), fermented fruit juice (FFJ), palm kernel shell (PKS) biochar, and kitchen waste (KW) compost. The fermented juices (FPJ and FFJ), PKS biochar, and KW compost exhibited chemical and biological properties with good potential as soil conditioners or organic amendments to sustain soil health. The fermented juices contained important microbes that can solubilize P and K in soil for crop use. The high pH and C content of the biochar and compost and the high cation exchange capacity of the biochar are good indicators of the potential of these materials to sustain soil health in terms of the liming effect of acid soils, nutrient and water retention, nutrient reserves, and a suitable habitat for microbial life. Moreover, the organic amendments contain reasonable amounts of macro- and micro-nutrients, which could be released to increase soil fertility. Despite these potential benefits, field application of these organic amendments is necessary to evaluate their effects on soil health and crop production in both the short and long term.