

ABSTRACT

The rapid development of electroplating, textile, and mining industries has caused serious environmental problems such as air, water, and soil pollution due to heavy metals, which reduce soil productivity and affect the population of soil-fertilizing microbes, resulting in less fertile or barren soil. This research aims to reduce heavy metal content and transform barren soil into productive land for rice plant growth using activated microparticle carbon derived from soursop leaf extract. The research process includes the preparation of activated microparticle carbon from soursop leaf extract, characterization of the carbon material using FTIR, BET, SEM, and PSA, adsorption tests of the activated carbon on heavy metals and barren soil to improve barren soil productivity. FTIR results showed the presence of an additional C-N group (1358 cm^{-1}). The highest adsorption capacity of the activated carbon was 93.13% for Cu, and also showed the ability to enhance barren soil productivity, as indicated by better and more effective rice plant growth. The planting medium formula that provided the highest rice plant productivity was barren soil, compost, and KA DSS (2:1:1) (w/w).

Keyword: Activated carbon, soursop leaf extract, barren soil, rice plant