

Evaluation of cotton stalk-derived biochar as a potential carrier for microbial inoculants

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ABSTRACT

The study was conducted to explore the feasibility of utilizing biochar produced from cotton stalks as a carrier medium in preparing biofertilizer formulations, focusing primarily on studying its physicochemical attributes suitable as carrier material. The biochar was synthesized through pyrolysis in heap method and evaluated for characteristics vital to supporting microbial life and suitability for agricultural use. Analytical results of cotton stalk biochar revealed an alkaline pH of 8.8 and electrical conductivity (EC) of 2.9 dSm⁻¹. Nutrient profiling indicated a substantial presence of essential elements, notably nitrogen, phosphorus, potassium and carbon. The biochar also exhibited notably high water holding capacity (129.96%), suggesting that it can effectively support microbial viability. These results indicate the potentiality of this biochar in enhancing biofertilizer efficacy and contributing to environmentally sustainable agriculture.

Keywords: *Biochar, Carrier Material, Microbial Inoculants and Sustainable Agriculture*