



PHYSICOCHEMICAL PROPERTIES OF SAGO BARK BIOCHAR AND ITS POTENTIAL AS PLANT GROWTH MEDIA

(Sifat Fizikokimia Bio-Arang Sisa Kulit Sagu dan Potensinya Sebagai Media Pertumbuhan Tanaman)

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Abstract

Biochar application as a soil amender can alter soil physical properties with its effects on soil aeration, water holding capacity, soil workability and plant growth. Sago biochar (SBB) was produced through carbonization of the sago bark waste in an oxygen free environment. This study aims to improve the morphological characteristics and physicochemical properties of SBB. The SBB was chemically treated using HCl and NaOH. The morphological characteristics of samples were analysed using SEM and BET. Meanwhile, the physicochemical analysis was performed using FTIR, CHN analyser and AAS. The treated sago biochar (TSB) showed the highest surface area (158.82 m²/g) and can be classified as macropores (53.4 nm). This indicates that the TSB has large pores influencing the cohesiveness of soil particles, water storage, and increase in water holding capacity (97.63%). It also had the highest Ca and Mg (6.67% and 4.37%, respectively) which can assist in the production of chlorophyll in plant. TSB also showed a higher micronutrient concentration (Mn, Cu, and Fe) particularly the Fe concentration (2.00 mg/kg). The findings suggested that TSB could be used to improve soil qualities such as water holding and nutrients content, indicating that it has a good potential as a soil amender.

Keywords: chemical modification, plant growth study, biochar, soil amender, *Metroxylon sagu* Rottb

Abstrak

Bio-arang diaplikasikan sebagai bahan pembaikpulih tanah di mana ia dapat mengubah sifat fizikal tanah dan memberi pengaruh terhadap pengudaraan tanah, daya tahan air, kemampuan kerja tanah dan pertumbuhan tanaman. Bio-arang sisa kulit sagu (SBB) dihasilkan melalui pengkarbonan sisa kulit sagu dalam persekitaran bebas oksigen. Kajian ini bertujuan untuk menambahbaik ciri morfologi dan sifat fizikokimia SBB. SBB dirawat secara kimia menggunakan HCl dan NaOH. Ciri morfologi pada sampel dianalisis menggunakan SEM dan BET. Sementara itu, analisis fizikokimia dilakukan dengan menggunakan FTIR, CHN dan AAS. SBB yang dirawat (TSB) mempunyai luas permukaan tertinggi (158.82 m²/g) dan boleh dikelaskan sebagai makropori (53.4 nm). Ini menunjukkan bahawa TSB mempunyai liang besar yang akan mempengaruhi kejelekitan zarah tanah, penyimpanan air, dan peningkatan daya tahan air (97.63%). TSB mempunyai kandungan Ca dan Mg tertinggi (masing-masing sebanyak 6.67% and 4.37%) yang dapat membantu dalam penghasilan klorofil dalam tumbuhan. TSB juga menunjukkan