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TITLE:

PRODUCTION OF COFFEE CHAR AT DIFFERENT CARBONIZATION TEMPERATURES AS A POTENTIAL APPLICATION IN SOIL AMENDMENT

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AUTHOR'S DECLARATION

" I hereby declare that this report is the resof my own work except for quotations and summaries which have been duly acknowledged."

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ABSTRACT

This study examined the production of coffee charcoal from coffee grounds at different carbonization temperatures to assess its potential as a soil amendment and how different carbonization temperatures affected the composition and properties of biochar made from coffee grounds. The experiments were conducted using a furnace and pyrolysis method. Carbonization was performed at 400˚C, 500˚C and 600˚C for 40 minutes. The biochar yield decreased as the temperature increased and the values of the properties analyzed varied depending on the type of biochar and the temperature used (Khater et al., 2024). After pyrolysis was carried out, elemental analysis was performed to show the elemental values of nitrogen, carbon and hydrogen for each burning temperature. As the carbonization temperature increased, the carbon and nitrogen content increased while the hydrogen content decreased (Pituya, Sriburi, & Wijitkosum, 2017). Nitrogen is good for plant growth and can enhance plant growth, increase productivity, and help restore degraded ecosystems (Dong et al., 2022). Based on the results, pyrolysis at 600˚C for 40 minutes showed the highest percentage of nitrogen. As the temperature increased, more volatile compounds such as water and carbon dioxide were released, leaving more concentrated nitrogen in the char. At temperatures between 400˚C, 500˚C and 600˚C, nitrogen does not turn into gas, so it remains in the coffee char.

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