ABSTRAK

PENGARUH TEKANAN DAN PENAMBAHAN SERBUK GERGAJI TERHADAP KARAKTERISTIK BIOPELET DARI AMPAS KOPI (*SPENT COFFEE GROUND*)

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Biopelet ampas kopi dicetak menggunakan tekanan yang bervariasi dan penambahan bahan serbuk gergaji kayu bertujuan untuk menghasilkan biopelet berkarakteristik kuat dan berkualitas. Penelitian ini menggunakan metode Rancangan Acak Lengkap (RAL) Faktorial dengan dua faktor yaitu faktor tekanan (T) dengan 4 taraf besar tekanan yaitu 0.5 ton, 1.5 ton, 2.5 ton, dan 3.5 ton. Pada faktor rasio pencampuran bahan (P) terdapat 4 taraf yaitu 100%, 75%, 50%, dan 25% ampas kopi dengan pengulangan sebanyak 3 kali sehingga menghasilkan 48 unit percobaan.

Biopelet dicetak melalui proses densifikasi yang memanfaatkan teknologi berupa pengempaan dengan tekanan tinggi menggunakan alat pengepres hidrolik. Parameter yang diamati yaitu massa jenis pelet dan massa jenis curah (*Bulkdensity*), uji kadar air, uji kadar abu, uji nilai kalor, uji warna pelet dan bahan, uji banting, dan uji getar serta uji higroskopis. Hasil penelitia menunjukkan Bahan baku ampas kopi (*Spent coffee ground*) mempunyai karakteristik sebagai berikut: Nilai massa jenis ampas kopi sebesar 0.46 gr/cm^3, nilai kadar air bahan nilai 10.03% dan nilai kalor 19,88 MJ/kg. Sedangkan pada bahan serbuk gergaji kayu diketahui nilai massa jenis sebesar 0,23 gr/ml, nilai kadar air bahan 9,55% dan nilai kalor sebesar 13,52 MJ/kg.Pada faktor variasi tekanan diketahui bahwa berpengaruh sangat nyata terhadap massa jenis pelet, *bulkdensity*, kadar air,

ketahanan banting dan setahanan getar, serta berpengaruh nyata terhadap warna pelet pada nilai warna kromatisasi (nilai a* dan nilai b*). Pada faktor rasio campuran bahan diketahui bahwa berpengaruh sangat nyata terhadap kadar air, kadar abu, nilai warna pelet, ketahanan banting dan ketahanan getar, serta berpengaruh nyata terhadap massa jenis pelet.

Kata kunci : Biomassa, Biopelet, Ampas Kopi, Densifikasi

ABSTRACT

THE INFLUENCE OF PRESSURE AND ADDITION OF SAWDUST POWDER ON THE CHARACTERISTICS OF BIO-PELLETS FROM SPENT COFFEE GROUND

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The bio-pellets were produced from spent coffee grounds using varying pressure and the addition of sawdust powder with the aim of creating strong and high-quality bio-pellets. This research employed a Completely Randomized Design (CRD) factorial method with two factors: pressure (T) with four levels of pressure, namely 0.5 ton, 1.5 ton, 2.5 ton, and 3.5 ton, and the mixing ratio of materials (P) with four levels: 100%, 75%, 50%, and 25% of spent coffee grounds, with three replications resulting in a total of 48 experimental units.

The bio-pellets were formed through a densification process utilizing high-pressure compression technology using a hydraulic press machine. The observed parameters included pellet density, bulk density, moisture content test, ash content test, calorific value test, pellet and material color test, impact resistance test, vibration test, and hygroscopicity test. The research findings indicated the following characteristics of the spent coffee grounds as raw material: The bulk density of the coffee grounds was 0.46 gr/ml, moisture content was 10.03%, and calorific value was 19.88 MJ/kg. Meanwhile, the sawdust powder had a bulk density of 0.23 gr/ml, moisture content of 9.55%, and calorific value of 13.52 MJ/kg. Regarding the variation in pressure, it was found to have a significant effect on pellet density, bulk density, moisture content, impact resistance, vibration resistance, and a significant effect on pellet color in terms of

chromaticity values (a and b* values). As for the mixing ratio of materials, it was found to have a significant effect on moisture content, ash content, pellet color, impact resistance, vibration resistance, and a significant effect on pellet density.*
Keywords : *Biomassa, Biopellet, Spent Coffee Grounds, Densification.*