

ABSTRAK

Pengembangan Briket Biomassa Berbahan Baku Limbah Batang Singkong, Limbah Batang Bambu, Limbah Tempurung Kelapa, dan Limbah Batang Karet Menggunakan Perekat Tapioka

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Pemanfaatan limbah biomassa seperti batang singkong, batang bambu, tempurung kelapa, dan batang karet sebagai bahan baku pembuatan biobriket merupakan solusi alternatif dalam pengolahan limbah yang efisien dan bernilai ekonomi. Penelitian ini bertujuan untuk mengetahui pengaruh variasi komposisi bahan baku dan konsentrasi perekat tapioka terhadap kualitas biobriket. Penelitian ini disusun dalam Rancangan Acak Lengkap (RAL) secara faktorial dengan dua faktor yaitu komposisi bahan baku (P1: 25:25:25:25, P2: 30:25:25:20, P3: 35:30:25:10) dan konsentrasi perekat (T1: 7%, T2: 10%) dengan tiga ulangan. Parameter yang diamati meliputi kadar air, kerapatan, *shatter resistance index*, kekuatan tekan, laju pembakaran, dan nilai kalor. Hasil penelitian menunjukkan bahwa semakin tinggi persentase batang singkong dalam komposisi bahan baku utama cenderung meningkatkan nilai kalor, *shatter resistance index*, dan menurunkan laju pembakaran. Sementara itu, semakin rendah konsentrasi perekat yang digunakan cenderung meningkatkan kerapatan, *shatter resistance index*, dan kekuatan tekan serta menurunkan laju pembakaran. Biobriket yang dihasilkan memiliki kadar air 5,95% - 7,95%, kerapatan 0,57 – 0,88 g/cm³, *shatter resistance index* 99,50% - 99,99%, kekuatan tekan 34,50 – 56,84 kg/cm², laju pembakaran 0,31 – 0,42 g/menit, dan nilai 5614,81 – 7278,24 kal/g.

Kata Kunci: limbah biomassa, biobriket, karakteristik, kalor tinggi, ramah lingkungan

ABSTRACT

Development of Biomass Briquettes from Cassava Stem Waste, Bamboo Stem Waste, Coconut Shell Waste, and Rubber Stem Waste Using Tapioca Adhesive

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Utilization of biomass waste such as cassava stems, bamboo stems, coconut shells, and rubber stems as raw materials for biobriquette production serves as an alternative solution for efficient and economically valuable waste management. This study aims to determine the effect of variations in raw material composition and tapioca binder concentration on the quality of biobriquettes. The research was designed using a Completely Randomized Design (CRD) in a factorial arrangement with two factors: raw material composition (P1: 25:25:25:25, P2: 30:25:25:20, P3: 35:30:25:10) and binder concentration (T1: 7%, T2: 10%) with three replications. The observed parameters included moisture content, density, shatter resistance index, compressive strength, combustion rate, and calorific value. The results showed that a higher percentage of cassava stems in the raw material composition tended to increase the calorific value and shatter resistance index, while decreasing the combustion rate. Meanwhile, a lower binder concentration tended to increase density, shatter resistance index, and compressive strength, while reducing the combustion rate. The resulting biobriquettes had a moisture content of 5.95% – 7.95%, density of 0.57 – 0.88 g/cm³, shatter resistance index of 99.50% – 99.99%, compressive strength of 34.50 – 56.84 kg/cm², combustion rate of 0.31 – 0.42 g/min, and calorific value of 5614.81 – 7278.24 cal/g.

Keywords: biomass waste, biobriquettes, characteristic, calorific value, environmentally friendly