

PENGARUH KOMPOSISI BAHAN BAKU DAN TEKANAN KEMPA TERHADAP SIFAT FISIKA-KIMIA BRIKET ARANG DARI BATANG DAN CANGKANG KELAPA SAWIT (*Elaeis guineensis* Jacq)

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Abstrak

Indonesia merupakan negara produsen kelapa sawit terbesar dengan hasil produksi mencapai 54% dari total produksi dunia. Luas areal kelapa sawit di Indonesia pada tahun 2017 mencapai 12,29 juta hektar. Perkembangan perkebunan kelapa sawit memberikan dampak pada jumlah limbah yang dihasilkan dari kegiatan peremajaan maupun pengolahan kelapa sawit. Limbah kelapa sawit yang belum dimanfaatkan secara optimal antara lain batang dan cangkang kelapa sawit. Penelitian ini bertujuan untuk memanfaatkan batang kelapa sawit (BKS) dan cangkang kelapa sawit (CKS) menjadi briket arang sebagai alternatif energi terbarukan.

Penelitian ini menggunakan rancangan acak lengkap (*Completely Randomized Design*) dengan dua faktor perlakuan yaitu komposisi bahan baku BKS: CKS (4:1, 3:2, 2:3, dan 1:4) dan tekanan kempa (1.000 psi, 1.500 psi, dan 2.000 psi) dengan masing-masing perlakuan lima kali ulangan. Proses pembuatan briket arang dilakukan dengan cara mencampurkan perekat (dibuat dengan perbandingan (pati: air) 1:16) sebanyak 5% dari 27 gram serbuk arang, kemudian campuran perekat dan serbuk arang dicetak menggunakan kempa hidraulik dan dikeringkan. Briket arang yang dihasilkan diuji kualitasnya dengan parameter sifat fisika (kadar air, berat jenis, dan nilai kalor) dan sifat kimia (kadar zat mudah menguap, kadar abu, dan kadar karbon terikat).

Hasil penelitian menunjukkan briket arang yang dihasilkan memiliki sifat-sifat sebagai berikut: kadar air 7,10-9,56%; berat jenis 0,66-0,83; nilai kalor 6.568,46-6.963,08 kal/gram; kadar zat mudah menguap 26,70-34,16%; kadar abu 3,60-7,62%; dan karbon terikat 52,21-62,14%. Briket arang dengan kualitas terbaik dihasilkan oleh komposisi bahan baku 1:4 (BKS: CKS) dan tekanan kempa 2.000 psi. Briket arang terbaik dihasilkan dengan spesifikasi: kadar air 7,56%; berat jenis 0,83; nilai kalor 6.963,08 kal/gram; kadar zat mudah menguap 26,70%; kadar abu 3,60%; dan kadar karbon terikat 62,14%. Hasil pengujian menunjukkan briket arang yang dihasilkan telah memenuhi standar perdagangan Indonesia, Jepang, dan Amerika untuk parameter kadar air, nilai kalor, kadar zat mudah menguap, kadar abu, dan karbon terikat.

Kata kunci: batang dan cangkang kelapa sawit, briket arang, komposisi bahan baku, tekanan kempa, sifat fisika-kimia

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**THE EFFECTS OF MATERIALS COMPOSITION AND COMPRESSION
PRESSURE ON PHYSICAL-CHEMICAL PROPERTIES OF CHARCOAL
BRIQUETTE MADE FROM OIL PALM TRUNK AND
OIL PALM SHELL (*Elaeis guineensis* Jacq)**

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Abstract

Indonesia is the largest producer of palm oil with production reaching 54% of total world production. The area of palm oil plantation in Indonesia reached 12.29 million hectares in 2017. The development of oil palm plantations has an impact on the amount of waste generated from replantation activities and palm oil processing. Palm oil waste that has not been utilized optimally include palm oil trunk and shells. This study aims to utilize oil palm trunk (OPT) and oil palm shells (OPS) into charcoal briquettes as renewable energy alternatives.

This study used a Completely Randomized Design with two treatment factors: the ratio of material composition of OPT and OPS (4:1, 3:2, 2:3, and 1:4) and compression pressure (1,000 psi, 1,500 psi, and 2,000 psi) with five repetitions on each treatment. Charcoal briquettes were made by mixing adhesive (made using a (starch: water) 1:16 ratio) with as much 5% of 27 grams of charcoal powder. The adhesive and charcoal powder mixture was then printed using hydraulic press and dried off. The charcoal briquettes produced are tested for their quality with physical properties (moisture content, specific gravity, and calorific value) and chemical properties (volatile matter, ash content and fixed carbon).

The results showed that the charcoal briquettes of oil palm trunk and oil palm shell has the following characteristics: moisture content 7.10-9.56%; density 0.66-0.83; calorific value 6,568.46-6,963.08 cal/gram; volatile matter 26.70-34.16%; ash content 3.60-7.62%; and fixed carbon 52.21-62.14%. Charcoal briquettes with the best quality produced by composition of 1:4 (OPT: OPS) material and 2,000 psi pressures. This best charcoal briquettes has the quality as follows: moisture content 7.56%; specific gravity 0.83; calorific value 6,963.08 cal/gram; volatile matter 26.70%; ash content 3.60%; and fixed carbon 62.14%. The test results indicated that the charcoal briquettes produced already meet Indonesian, Japanese and American trade standards for moisture content, calorific value, volatile matter, ash content, and fixed carbon parameters.

Keywords: oil palm trunk and shell, charcoal briquette, material composition, compression press, physical-chemical properties

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