KARAKTERISTIK SIFAT ENERGI BERBAGAI JENIS BIOMASSA *Eucalyptus pellita* F. Muell SERTA PENGARUH SUHU KARBONISASI TERHADAP SIFAT ARANGNYA

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Intisari

Eucalyptus pellita F. Muell merupakan salah satu tanaman yang dikembangkan oleh Hutan Tanaman Industi (HTI) untuk memenuhi kebutuhan industri pulp dan kertas serta kayu pertukangan. Potensi limbah sisa kegiatan penebangan tanaman ini cukup besar, sedangkan pemanfaatannya belum optimal. Salah satu upaya memanfaatkan limbah tebangan adalah dengan menjadikan limbah tebangan sebagai sumber energi. Penelitian ini bertujuan untuk mengetahui karakteristik energi berbagai jenis biomassa limbah tebangan *E. pellita* serta sifat arangnya pada suhu pengarangan yang berbeda.

Penelitian ini menggunakan lima jenis biomassa yang berasal dari limbah tebangan *E. pellita* yaitu batang pangkal, batang ujung, cabang, ranting, dan daun. Lima jenis biomassa tersebut kemudian dibuat sampel. Uji energi menggunakan standar ASTM, meliputi kadar air, berat jenis, kadar zat volatile, kadar abu, kadar karbon terikat, dan nilai kalor. Selain itu, kelima jenis biomassa tersebut juga diseragamkan ukurannya menjadi 10 x 1 cm (terkecuali daun) untuk diarangkan pada suhu pengarangan 300°C dan 400°C dan dianalisis sifat energinya.

Hasil penelitian menunjukkan bahwa perbedaan jenis biomassa *E. pellita* memiliki sifat energi yang berbeda nyata pada kadar air, kadar zat volatile, kadar abu, dan kadar karbon terikat, sedangkan nilai kalor dan berat jenisnya tidak berbeda secara statistik. Interaksi antara berbegai jenis biomassa dan suhu pengarangan memberikan pengaruh yang berbeda nyata pada arang *E. pellita* kecuali nilai kalor. Kombinasi perlakuan terbaik adalah batang ujung dengan suhu pengarangan 400°C yaitu rendemen 33,33%, kadar air 1,66 %, berat jenis 0,39, kadar volatile 27,14%, kadar abu 0,54%, kadar karbon terikat 72,32 %, dan nilai kalor 8145,38 kal/g.

Kata kunci: *Eucalyptus pellita*; biomassa;energi; suhu; arang.

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THE CHARACTERISTIC OF ENERGY PROPERTIES OF *Eucalyptus pellita* F. Muell BIOMASS AND THE EFFECT OF CARBONIZATION TEMPERATURE TO THEIR CHARCOAL QUALITY

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ABSTRACT

Eucalyptus pellita F. Muell is species developed by Industrial Plantation Forest (HTI) to fulfill the pulp, paper and timber industry. The potential of residual waste is quite big, but the utilization is not optimal yet. One effort to utilize the logging waste is by changing it into an energy source. This research aims to know the energy properties of various types of *E. pellita* biomass and charcoal properties in different carbonization temperature.

This study used five types of biomass waste from *E. pellita* such as base stem, stem end, branches, twigs and leaves. These five types of biomass were converted into samples according to the type of energy analysis. The energy testing on this research used ASTM standard such as moisture content, specific gravity, ash, volatile matter, fixed carbon and calorific value. Those five types of biomass were cut into 10 x 1 cm (except for leaves), converted into charcoal at temperature 300° C and 400° C and analyzed their energy properties.

The results of this research show that the five types of *E. pellita* biomass have different energy properties in moisture content, volatile matter content, ash content and fix carbon content, while specific gravity and caloric value are not statistically different. The interaction between types of biomass and carbonization temperature gives effect on charcoal properties of *E. pellita* except on caloric value. The best treatment combination in this research is stem end with carbonization temperature 400°C, where the yield is 33,33%, moisture content is 1,66%, specific gravity is 0,39, volatile matter is 27,14%, ash is 0,54%, fixed carbon is 72,32% and calorific value is 8145,38 cal/g.

Keywords: *Eucalyptus pellita*; biomass; energy; temperature; charcoal

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