PENGARUH SUHU DAN WAKTU TOREFAKSI TERHADAP KUALITAS BRIKET DARI TOREFAKSI LIMBAH SERBUK GERGAJIAN KAYU MINDI (*Melia azedarach* L)

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INTISARI

Torefaksi merupakan produk yang dihasilkan dari proses pirolisis biomassa parsial dan terkontrol yang terjadi pada kisaran suhu 200 - 280 ºC. Manfaat torefaksi adalah peningkatan nilai kalor jika dibandingkan dengan bahan baku asal,sehingga mengurangi higroskopisitas kayu. Penelitian ini bertujuan untuk memanfaatkan dan mengolah limbah serbuk gergajian kayu mindi (*Melia azedarach* L.) menjadi sumber energi terbarukan dengan nilai kalor tinggi melalui proses torefaksi, mengetahui pengaruh variasi suhu dan waktu torefaksi, dan kombinasi suhu dan waktu torefaksi yang optimal.

Bahan penelitian limbah serbuk gergajian kayu mindi (*Melia azedarach* L.) berasal dari Industri Penggergajian UD. Tonoputro Kecamatan Cangkringan, Kabupaten Sleman, Provinsi DIY. Selama proses torefaksi, biomassa mengalami perubahan sifat fisik dan kimia. Kandungan karbon dalam produk briket meningkat pada suhu torefaksi dan waktu torefaksi yang lebih tinggi dan lebih lama, sementara kandungan hidrogen dan oksigen menurun, meningkatkan nilai kalor dari biomassa. Oleh karena itu penelitian ini menggunakan metode rancangan acak lengkap dengan 2 faktor perlakuan yaitu suhu torefaksi (225 °C, 250 °C, dan 275 °C) dan waktu torefaksi (30 menit, 60 menit, dan 90 menit) dengan masing – masing perlakuan lima kali ulangan. Serbuk gergajian kayu Mindi ditorefaksi dan dikonversi menjadi briket, tiap briket dibuat dengan lima kali pengulangan. Briket kemudian diuji kualitasnya berdasarkan sifat fisika (kadar air, berat jenis, nilai kalor) dan sifat kimia (kadar abu, kadar zat mudah menguap, kadar karbon terikat).

Pada penelitian ini diketahui kadar nilai kalor briket dari torefaksi limbah serbuk gergajian kayu Mindi meningkat sebesar 15,47 % jika dibandingkan dengan bahan baku. Serbuk gergajian kayu Mindi (*Melia azedarach* L) yang ditorefaksi memiliki karakteristik kualitas sebagai berikut : rata – rata kadar air 10,163%, rata – rata berat jenis 0,682, nilai kalor 3927,329 kal/gram, kadar abu 1,728%, kadar zat mudah menguap 64,849% dan kadar karbon terikat 23,259%.

Kata kunci : Torefaksi, Limbah Kayu, Briket

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THE EFFECT OF TORREFACTION TEMPERATURE AND TIME TOWARDS BRIQUETTE QUALITY MADE FROM WHITE CEDAR (*Melia azedarach* L) WOOD SAWDUST WASTES TORREFACTION

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ABSTRACT

Torrefaction is a product which is made from partial and controlled biomass pyrolisis occurred at temperature around 200 - 280 ºC. The benefit of torefaction is the increase in calorific value when compared to the origin raw material, there by reducing the hygroscopicity of the wood.This study is purposed to utilize and to process white cedar (*Melia azedarach* L.) sawdust wastes into renewable energy sources with high calorific value through torrefaction process, find out the effect of various torrefaction temperature and time and optimum combination of torrefaction temperature and time.

The study material was white cedar (*Melia azedarach* L.) sawdust wastes came from UD. Tonoputro Sawing Mill Industry, Cangkringan Subdistrict, Sleman Regency, DIY Province. During torrefaction processes, the biomass will undergo the change on physical and chemical characteristics. Carbon content on briquette product increases on higher or longer torrefaction temperature and longer time, whereas hydrogen and oxygen content will be decreased, increasing calorific value. Thus, this study used complete randomized design with 2 treatment factors, which were torrefaction temperature (225 °C, 250 °C, and 275 °C) and torrefaction time (30 minutes, 60 minutes, dan 90 minutes) with five replications on each treatment. White cedar wood sawdust was torrefacted and converted into briquettes, each briquette was made with five replications. The briquettes' quality was then tested based on the physical characteristics (moisture content, specific gravity, calorific value) and the chemical characteristics (ash content, volatile content, fixed carbon content).

The results showed that there was 15.47 % increase in calorific value compared with the raw material. The torrefacted white cedar (*Melia azedarach* L.) sawdust had quality characteristics as following: average moisture content of 10.163%, average specific gravity of 0.682, calorific value of 3927.329 cal/gram, ash content of 1.728%, volatile content of 64.849% and fixed carbon content of 23.259%.

Key words : Torrefaction, Mindi Sawdust, Briquette

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