

PENGARUH PENAMBAHAN KARBON AKTIF SERABUT SIWALAN (*BORASSUS FLABELLIFER*) KE DALAM BRIKET SAMPAH ORGANIK TERHADAP KUALITAS PEMBAKARAN BRIKET

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ABSTRAK

UISI berpotensi dalam menghasilkan energi biomassa dengan memanfaatkan sampah organik di lingkungan kampus. Sampah organik di lingkungan kampus UISI berupa ranting pohon kering, daun kering dan kayu. Briket adalah bahan bakar padat yang terdapat kandungan karbon jika dibakar bisa menyala dalam waktu yang cukup lama dan memiliki nilai kalori tinggi.Karbon aktif adalah suatu material karbon berpori dengan luas permukaan 300 hingga $3500\text{ m}^2/\text{g}$ melalui proses pirolisis disertai aktivasi. Penambahan bahan karbon aktif berasal dari serabut siwalan (*Borassus Flabellifer*). Penelitian ini bertujuan untuk mengetahui pengaruh variasi komposisi penambahan karbon aktif terhadap karakteristik pembakaran briket.Briket yang digunakan berukuran diameter 3.5 cm dan tinggi 3 cm dengan ukuran partikel sebesar 50-100 meshdibuat menggunakan alat pres hidraulik.Dalam penelitian ini menggunakan 4 perbandingan variasi komposisi karbon aktif dan arang sampah organik yaitu 5% : 85%, 10% : 80%, 15% : 75% dan 20% : 70%, Perekat yang digunakan 10% dari total bahan padat. Pengujian yang dilakukan yaitu uji proksimat yang meliputi kadar air, kadar abu, kadar zat mudah menguap dan kadar karbon terikat, pengujian**bomb calorimeter**, pengujian karakteristik pembakaran yang meliputi waktu penyalaan awal,lama waktu pembakaran dan perhitungan laju pembakaran.Hasil dari pengujian *proximate*,kadar air antara 5,06% - 5,42%, kadar abu diantara 23,03% - 24,31%, kadar *volatile*antara 23,64% - 25,04% dan kadar *fix carbon*46,51% - 46,89%. Sedangkan nilai kalor tertinggi dihasilkan oleh variasi komposisi 20% karbon aktif sebesar 4716,3 kal/g. pada uji karakteristik pembakaran di hasilkan waktu nyala awal terbaik dimiliki oleh komposisi 20% dengan waktu 120 detik. Pada waktu lama proses pembakaran terbaik dimiliki oleh komposisi 5% sebesar 75,3 menit. Sedangkan laju pembakaran terbaik dihasilkan variasi 20% dengan laju sebesar 0,177 g/menit.

Kata Kunci: Briket, Karbon Aktif, Laju Pembakaran, Sampah Organik

THE EFFECT OF ADDITIONAL ACTIVATED CARBON FABRIC SIWALAN (BORASSUS FLABELLIFER) TO ORGANIC WASTE BRICKETS ON QUALITY OF BRICKET COMBUSTION

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ABSTRACT

UISI has the potential to produce biomass energy by utilizing organic waste in the campus environment. Organic waste in the UISI campus is in the form of dried tree branches, dried leaves and wood. Briquettes are solid fuels that have carbon content if burned can burn for a long time and have a high caloric value. Activated carbon is a porous carbon material with a surface area of 300 to 3500 m² / g through the pyrolysis process accompanied by activation. The addition of activated carbon material comes from siwalan fibers (Borassus Flabellifer). This study aims to determine the effect of variations in the composition of the addition of activated carbon to the combustion characteristics of briquettes. The briquettes used are 3.5 cm in diameter and 3 cm in height with a particle size of 50-100 mesh made using hydraulic press. In this study using 4 comparisons of variations in the composition of activated carbon and organic charcoal, namely 5%: 85%, 10%: 80%, 15%: 75% and 20%: 70%, Adhesives used 10% of the total solid material. The tests carried out are the proximate test which includes water content, ash content, volatile substances and bound carbon content, testing the calorimeter bomb, testing the combustion characteristics which include the initial ignition time, combustion time and calculation of the combustion rate. The results of the proximate test, the water content between 5.06% - 5.42%, the ash content between 23.03% - 24.31%, volatile content between 23.64% - 25.04% and fix carbon levels 46.51 % - 46.89%. While the highest calorific value is produced by variations in the composition of 20% activated carbon by 4716.3 cal / g. in the combustion characteristic test the best initial flame time is obtained by the composition of 20% with a time of 120 seconds. For a long time the best combustion process is owned by a composition of 5% at 75.3 minutes. While the best combustion rate produced variations of 20% with a rate of 0.177 g / minute.

Keywords: Activated Carbon, Briquette, Combustion Rate, Organic Waste