

## ABSTRAK

### KARAKTERISTIK BAHAN BAKAR PADAT PRODUK TOREFAKSI BIOMASSA KULIT KOPI MENGGUNAKAN REAKTOR TOREFAKSI KONTINU TIPE TUBULAR

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Kebutuhan batu bara Indonesia terus melonjak namun sumber energi batu bara mengalami penurunan. Indonesia negara dengan kekayaan sumber energi baru terbarukan yang melimpah, namun pengembangannya belum optimal, salah satunya ialah biomassa. Kulit kopi dapat dimanfaatkan sebagai bahan bakar biomassa. Produksi tanaman kopi cenderung stabil bahkan meningkat dan nilai kalor yang dimiliki kulit kopi mentah cukup besar. Dengan banyaknya potensi dan besarnya nilai kalor kulit kopi, perlu dilakukan proses torefaksi untuk meningkatkan karakteristik kulit kopi agar mendekati karakteristik batu bara. Penelitian ini menggunakan konversi termal yaitu torefaksi variasi temperatur 250, 275 dan 300°C dengan waktu tinggal selama 30 menit. Peralatan yang digunakan yaitu reaktor torefaksi tipe kontinu tubular dengan pemanas LPG. Hasil penelitian ini dapat meningkatkan nilai kalor kulit kopi mentah. Nilai kalor tertinggi terdapat pada temperatur 275°C sebesar 6519 kkal/kg mengalami kenaikan sebesar 45% dari nilai kalor awal. Proses torefaksi mengurangi persentase *moisture content* dan *volatile matter*, meningkatkan persentase *fixed carbon* dan *ash*. *Mass yield* terus menurun berbanding lurus dengan kenaikan temperatur torefaksi. *Energy yield* yang tersimpan pada kulit kopi tertorefaksi terbesar pada temperatur 250°C sebesar 88,97%.

Kata Kunci: Biomassa, Torefaksi, Kulit Kopi, Nilai Kalor.

## **ABSTRACT**

### **SOLID FUEL CHARACTERISTICS OF COFFE HUSK BIOMASS USING TUBULAR TYPE CONTINOUS TOREFACTION REACTOR**

By

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*Indonesia's coal demand continues to soar, but coal energy sources have decreased. Indonesia is a country with abundant renewable energy sources, but its development has not been optimized, one of which is biomass. Coffee waste can be utilized as biomass fuel. Coffee plant production tends to stabilize and even increase and the calorific value of raw coffee skin is quite large. With so much potential and the high calorific value of coffee skin, it is necessary to carry out a torefaction process to improve the characteristics of coffee skin to approach the characteristics of coal. This research uses thermal conversion, namely torefaction at temperature variations of 250, 275 and 300°C with a residence time of 30 minutes. The equipment used is a tubular continuous type torefaction reactor with LPG heater. The results of this study can increase the calorific value of raw coffee skin. The highest calorific value was found at 275°C of 6519 kcal/kg, an increase of 45% from the initial calorific value. The torefaction process reduces the percentage of moisture content and volatile matter, increases the percentage of fixed carbon and ash. Mass yield continues to decrease directly proportional to the increase in torefaction temperature. The energy yield stored in the torefaction coffee husk was the largest at 250°C at 88.97%.*

*Keywords: Biomass, Torrefaction, Coffee Husk, Calorific Value.*