

ABSTRAK

PENGARUH KECEPATAN PUTARAN SCREW TERHADAP KARAKTERISTIK BIOPELET BERBAHAN BIJI KETAPANG KETAPANG (*Terminalia catappa*) MENGGUNAKAN SCREW OIL PRESS MACHINE

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Biopellet merupakan salah satu bahan bakar padat berbasis biomassa yang berpotensi dikembangkan sebagai sumber energi terbarukan untuk mengurangi ketergantungan terhadap bahan bakar fosil. Biji ketapang (*Terminalia catappa*) memiliki potensi sebagai bahan baku biopellet karena mengandung komponen lignoselulosa yang mampu menghasilkan energi melalui proses pembakaran. Penelitian ini bertujuan menganalisis pengaruh kecepatan putaran *screw* terhadap karakteristik biopellet berbahan biji ketapang menggunakan *Screw Oil Press Machine*. Penelitian dilakukan secara eksperimen dengan variasi kecepatan putaran *screw* sebesar 15, 25, 35, 45, dan 50 Hz pada suhu operasi 150°C. Karakteristik biopellet dianalisis berdasarkan pengujian kadar air, kadar abu, kadar zat terbang (*volatile matter*), karbon terikat (*fixed carbon*), densitas, nilai kalor, laju pembakaran, dan *drop test*. Hasil penelitian menunjukkan bahwa variasi kecepatan putaran *screw* berpengaruh terhadap karakteristik biopellet yang dihasilkan. Peningkatan kecepatan putaran *screw* menghasilkan ukuran biopellet dengan nilai kalor, densitas, dan ketahanan mekanik (*drop test*) yang lebih baik, sedangkan laju pembakaran mengalami penurunan. Berdasarkan hasil pengujian, biopellet yang dihasilkan memiliki karakteristik yang baik dan sebagian besar parameter telah memenuhi persyaratan mutu berdasarkan SNI 8021:2014. Hasil penelitian menunjukkan bahwa kecepatan putaran *screw* merupakan salah satu parameter penting dalam menghasilkan biopellet biji ketapang berkualitas sebagai bahan bakar padat terbarukan.

Kata Kunci: Biopellet, *Terminalia catappa*, kecepatan putaran *screw*, karakteristik biopellet, *Screw Oil Press Machine*.

ABSTRACT

THE EFFECT OFF SCREW ROTATION SPEED ON THE CHARACTERISTICS OF BIO-PELLETS MADE FROM KETAPANG (TERMINALIA CATTAPA) SEEDS USING A SCREW OIL PRESS MACHINE

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Bio-pellets are one of the biomass-based solid fuels with significant potential as a renewable energy source to reduce dependence on fossil fuels. Terminalia catappa seeds are a promising raw material for bio-pellet production due to their lignocellulosic content, which can generate thermal energy through combustion. This study aimed to analyze the effect of screw rotational speed on the characteristics of bio-pellets produced from Terminalia catappa seeds using a Screw Oil Press Machine. The experiment was conducted using screw rotational speeds of 15, 25, 35, 45, and 50 Hz at a constant operating temperature of 150°C. The bio-pellets were characterized based on moisture content, ash content, volatile matter, fixed carbon, density, calorific value, burning rate, and drop test. The results showed that screw rotational speed significantly affected the characteristics of the produced bio-pellets. Increasing the screw rotational speed improved the calorific value, density, and mechanical strength (drop test), while the burning rate tended to decrease. Based on the experimental results, the produced bio-pellets exhibited favorable characteristics, and most of the tested parameters complied with the quality requirements specified in SNI 8021:2014. Therefore, screw rotational speed is considered an important operating parameter in producing high-quality Terminalia catappa bio-pellets as a renewable solid fuel.

Keywords: Bio-pellet, Terminalia catappa, screw rotational speed, bio-pellet characteristics, Screw Oil Press Machine.