

ABSTRAK

PENGARUH SUHU PEMANASAN PADA SCREW OIL PRESS MACHINE TERHADAP KARAKTERISTIK BIOPELET DARI BIJI ASAM JAWA

(Rafiq Fadillah : 2026 : 59 Halaman)

Peningkatan kebutuhan energi mendorong pengembangan energi terbarukan yang berasal dari biomassa. Salah satu limbah biomassa yang berpotensi dimanfaatkan adalah biji asam jawa karena mengandung lignoselulosa yang dapat diolah menjadi biopellet. Penelitian ini bertujuan untuk menganalisis pengaruh variasi suhu pemanasan pada Screw Oil Press Machine terhadap karakteristik biopellet berbahan baku biji asam jawa serta menentukan suhu pemanasan yang menghasilkan biopellet sesuai standar SNI 8675:2018. Penelitian dilakukan menggunakan metode eksperimen dengan variasi suhu pemanasan 75°C, 100°C, 125°C, 150°C, 175°C, dan 200°C pada putaran screw tetap sebesar 35 Hz. Parameter yang dianalisis meliputi nilai kalor, kadar air, kadar abu, kadar zat terbang, fixed carbon, kerapatan, laju pembakaran, dan drop test. Hasil penelitian menunjukkan bahwa peningkatan suhu pemanasan memberikan pengaruh terhadap karakteristik biopellet. Nilai kalor meningkat dari 4.798,93 kal/g menjadi 5.514,78 kal/g, kadar air menurun dari 17,35% menjadi 13,57%, kadar abu menurun menjadi 1,54%, kadar zat terbang menurun menjadi 60,68%, fixed carbon meningkat menjadi 24,21%, kerapatan meningkat menjadi 1,406 g/cm³, laju pembakaran menurun menjadi 0,0155 g/s, serta nilai drop test menurun menjadi 0,3356% pada suhu 200°C. Berdasarkan hasil penelitian, suhu pemanasan 200°C menghasilkan karakteristik biopellet terbaik. Beberapa parameter telah memenuhi persyaratan SNI 8675:2018, seperti nilai kalor, kerapatan, kadar zat terbang, dan fixed carbon, sedangkan kadar air dan kadar abu masih memerlukan perbaikan melalui proses pengeringan atau optimasi proses produksi.

Kata kunci : Biopellet, biji asam jawa, Screw Oil Press Machine, suhu pemanasan, biomassa, SNI 8675:2018.

ABSTRACT

EFFECT OF HEATING TEMPERATURE IN A SCREW OIL PRESS MACHINE ON THE CHARACTERISTICS OF TAMARIND SEED BIOPELLET

(Rafiq Fadillah : 2026 : 59 Pages)

The increasing demand for energy has encouraged the development of renewable energy derived from biomass. One of the biomass wastes with considerable potential is tamarind seeds, which contain lignocellulosic components that can be processed into bio-pellets. This study aimed to analyze the effect of heating temperature variations in a Screw Oil Press Machine on the characteristics of bio-pellets produced from tamarind seeds and to determine the optimum heating temperature for producing bio-pellets that comply with SNI 8675:2018 standards. The research employed an experimental method with heating temperature variations of 75°C, 100°C, 125°C, 150°C, 175°C, and 200°C, while maintaining a constant screw rotation speed of 35 Hz. The parameters analyzed included calorific value, moisture content, ash content, volatile matter, fixed carbon, density, combustion rate, and drop test. The results showed that increasing the heating temperature significantly affected the characteristics of the bio-pellets. The calorific value increased from 4,798.93 cal/g to 5,514.78 cal/g, moisture content decreased from 17.35% to 13.57%, ash content decreased to 1.54%, volatile matter decreased to 60.68%, fixed carbon increased to 24.21%, density increased to 1.406 g/cm³, the combustion rate decreased to 0.0155 g/s, and the drop test value decreased to 0.3356% at a heating temperature of 200°C. Based on the findings, a heating temperature of 200°C produced the best bio-pellet characteristics. Several parameters met the requirements of SNI 8675:2018, including calorific value, density, volatile matter, and fixed carbon, while moisture content and ash content still require improvement through more effective drying or optimization of the production process.

Keywords : Biopellets, Tamarind Seeds, Screw Oil Press Machine, Heating Temperature, Biomass, SNI 8675:2018.