ABSTRAK

PENGARUH RASIO CAMPURAN SERBUK KAYU SENGON DAN TONGKOL JAGUNG TERHADAP KARAKTERISTIK DAN PERFORMA PEMBAKARAN BIOPELET PADA KOMPOR BIOMASSA

(Andre Gunawan Gymastiar, 2026: 90 Halaman, 18 Tabel, 13 Gambar)

Biopelet merupakan salah satu bahan bakar biomassa yang berpotensi menjadi energi alternatif ramah lingkungan. Penelitian ini bertujuan untuk mengetahui pengaruh rasio campuran serbuk kayu sengon dan tongkol jagung terhadap karakteristik biopelet serta performa pembakaran pada kompor biomassa. Variasi rasio yang digunakan yaitu 100:0, 75:25, 50:50, 25:75, dan 0:100. Karakteristik biopelet dianalisis melalui pengujian kadar air, kadar abu, kadar zat terbang (*volatile matter*), karbon terikat (*fixed carbon*), dan nilai kalor, kemudian dibandingkan dengan SNI 8021:2014. Performa pembakaran dievaluasi berdasarkan efisiensi termal, laju konsumsi bahan bakar (*Fuel Consumption Rate/FCR*), dan waktu pendidihan air (*Boiling Time*). Hasil penelitian menunjukkan bahwa seluruh variasi biopelet memenuhi standar SNI pada parameter kadar air, kadar zat terbang, dan nilai kalor, sedangkan kadar abu belum memenuhi standar. Rasio 100% serbuk kayu sengon menghasilkan karakteristik biopelet terbaik dengan kadar air dan kadar abu terendah, karbon terikat serta nilai kalor tertinggi. Pada pengujian pembakaran, rasio tersebut juga memberikan performa terbaik dengan efisiensi termal sebesar 30,82%, laju konsumsi bahan bakar sebesar 0,0475 kg/jam, dan waktu pendidihan air tercepat, yaitu 8,4 menit. Hasil penelitian menunjukkan bahwa peningkatan komposisi tongkol jagung cenderung menurunkan kualitas biopelet dan performa pembakaran.

Kata Kunci: Biopelet, Serbuk Kayu Sengon, Tongkol Jagung, Karakteristik Biopelet, Efisiensi Pembakaran

ABSTRACT

EFFECT OF THE MIXING RATIO OF SENGON (PARASERIANTHES FALCATARIA) WOOD SAWDUST AND CORNCOB ON THE CHARACTERISTICS AND COMBUSTION PERFORMANCE OF BIOPELLETS IN A BIOMASS STOVE

(Andre Gunawan Gymastiar, 2026: 90 Pages, 18 Tables, 13 Figures)

Biopellets are one of the renewable biomass fuels that have the potential to be used as an environmentally friendly alternative energy source. This study aimed to determine the effect of the mixing ratio of sengon wood sawdust and corncob on the characteristics of biopellets and their combustion performance in a biomass stove. The mixing ratios used were 100:0, 75:25, 50:50, 25:75, and 0:100. The biopellet characteristics were analyzed through proximate tests, including moisture content, ash content, volatile matter, fixed carbon, and calorific value, then compared with the Indonesian National Standard (SNI 8021:2014). The combustion performance was evaluated based on thermal efficiency, Fuel Consumption Rate (FCR), and Boiling Time. The results showed that all biopellet variations met the SNI requirements for moisture content, volatile matter, and calorific value, while the ash content did not meet the standard. The 100% sengon wood sawdust biopellet exhibited the best characteristics, with the lowest moisture and ash contents, the highest fixed carbon content, and the highest calorific value. In the combustion performance test, this composition also produced the best results, with a thermal efficiency of 30.82%, a Fuel Consumption Rate of 0.0475 kg/h, and the shortest boiling time of 8.4 minutes.

Keywords *: Biopellets, Sengon Wood Sawdust, Corncob, Biopellet Characteristics, Combustion Efficiency.*