

ABSTRAK

Penelitian ini bertujuan untuk mengevaluasi pengaruh komposisi bahan baku (serbuk kayu jati dan ampas kopi) serta variasi tekanan terhadap sifat fisis dan mekanis *biopellet* sebagai bahan bakar alternatif. Limbah serbuk kayu jati dan ampas kopi yang belum termanfaatkan diolah menjadi *biopellet* menggunakan tiga komposisi campuran (75%:25%, 50%:50%, 25%:75%) dan tiga tekanan (88,56 MPa, 132,84 MPa, dan 177,13 MPa). Pengujian meliputi kadar air, nilai kalor, dan *durability index* dengan analisis statistik menggunakan ANOVA dua arah. Hasil penelitian menunjukkan bahwa peningkatan tekanan meningkatkan *durability index* dan mampu menurunkan kadar air *biopellet*, sementara komposisi bahan mempengaruhi kadar air dan nilai kalor. Kombinasi terbaik ditemukan pada komposisi 25% serbuk kayu jati dan 75% ampas kopi dengan tekanan 177,13 MPa. *Biopellet* yang dihasilkan memenuhi standar SNI dan memiliki potensi sebagai bahan bakar terbarukan untuk mendukung kemandirian energi nasional.

Kata kunci: *Biopellet*, serbuk kayu jati, ampas kopi, tekanan, nilai kalor, energi terbarukan.

ABSTRACT

This study aims to evaluate the effect of raw material composition (teak wood powder and coffee grounds) and pressure variations on the physical and mechanical properties of biopellets as alternative fuels. Unutilized teak wood powder and coffee grounds waste were processed into biopellets using three mixture compositions (75%:25%, 50%:50%, 25%:75%) and three pressures (88.56 MPa, 132.84 MPa, and 177.13 MPa). Tests included water content, calorific value, and durability index with statistical analysis using two-way ANOVA. The results showed that increasing pressure increased the durability index and was able to reduce the water content of biopellets, while the composition of the materials affected the water content and calorific value. The best combination was found in the composition of 25% teak wood powder and 75% coffee grounds with a pressure of 177.13 MPa. The resulting biopellets met SNI standards and had the potential as renewable fuels to support national energy independence.

Keywords: *Biopellets, teak wood sawdust, coffee grounds, pressure, calorific value, renewable energy.*