

ABSTRAK

ANALISA PENGARUH VARIASI KOMPOSISI CANGKANG SAWIT DAN TANDAN KOSONG KELAPA SAWIT SEBAGAI BAHAN BAKU BIOPELET TERHADAP KINERJA KOMPOR BIOMASSA

(Dellya Anggraini, 2026: 70 Halaman, 10 Tabel, 37 Gambar)

Pemanfaatan limbah biomassa kelapa sawit sebagai bahan bakar alternatif merupakan salah satu upaya mendukung pengembangan energi terbarukan. Cangkang kelapa sawit memiliki nilai kalor tinggi, sedangkan tandan kosong kelapa sawit (TKKS) tersedia dalam jumlah melimpah sehingga keduanya berpotensi dimanfaatkan sebagai bahan baku biopellet. Penelitian ini bertujuan untuk menganalisis pengaruh variasi rasio massa cangkang kelapa sawit dan TKKS terhadap karakteristik biopellet serta kinerja pembakaran pada kompor biomassa. Penelitian dilakukan secara eksperimen dengan lima variasi komposisi biopellet, yaitu 100:0, 75:25, 50:50, 25:75, dan 0:100. Pengujian meliputi analisis proksimat (*inherent moisture, ash content volatile matter, dan fixed carbon*), nilai kalor, serta kinerja kompor biomassa berdasarkan temperatur pembakaran, *Fuel Consumption Rate* (FCR), dan efisiensi termal.

Hasil penelitian menunjukkan bahwa variasi komposisi bahan baku memengaruhi karakteristik biopellet dan performa pembakaran. Semakin tinggi proporsi cangkang kelapa sawit, nilai kalor dan kandungan *fixed carbon* cenderung meningkat sehingga menghasilkan temperatur pembakaran yang lebih tinggi, nilai FCR yang lebih rendah, dan efisiensi termal yang lebih baik. Dengan demikian, biopellet berbahan campuran cangkang kelapa sawit dan TKKS berpotensi menjadi bahan bakar alternatif yang ramah lingkungan dan dapat digunakan pada kompor biomassa.

Kata kunci: Biopellet, biomassa, cangkang kelapa sawit, tandan kosong kelapa sawit, kompor biomassa, analisis proksimat, nilai kalor.

ABSTRACT

ANALYSIS OF THE EFFECT OF VARIATIONS IN OIL PALM SHELL AND EMPTY FRUIT BUNCH COMPOSITION AS BIOPELET RAW MATERIALS ON THE PERFORMANCE OF A BIOMASS STOVE

(Dellya Anggraini, 2026: 70 Pages, 10 Tables, 37 Figures)

The utilization of oil palm biomass waste as an alternative fuel is one of the efforts to support the development of renewable energy. Oil palm shell has a high calorific value, while empty fruit bunches (EFB) are abundantly available, making both materials potential raw materials for biopellets. This study aimed to analyze the effect of the mass ratio of oil palm shell and empty fruit bunches (EFB) on the characteristics of biopellets and the combustion performance of a biomass stove.

The study was conducted experimentally using five biopellet compositions, namely 100:0, 75:25, 50:50, 25:75, and 0:100. The tests included proximate analysis (moisture content, ash content, volatile matter, and fixed carbon), calorific value, and biomass stove performance based on combustion temperature, Fuel Consumption Rate (FCR), and thermal efficiency. The results showed that the composition of the raw materials significantly affected the characteristics of the biopellets and their combustion performance. A higher proportion of oil palm shell increased the calorific value and fixed carbon content, resulting in higher combustion temperatures, lower Fuel Consumption Rate (FCR), and higher thermal efficiency. Therefore, biopellets made from a mixture of oil palm shell and empty fruit bunches (EFB) have the potential to be used as an environmentally friendly alternative fuel for biomass stoves.

Keywords: *biopellets, oil palm shell, empty fruit bunches (EFB), biomass stove, proximate analysis.*