

## ***ABSTRACT***

### **THE EFFECT OF PRESSURE AND PARTICLE SIZE ON THE CHARACTERISTICS OF EMPTY BAND BIOPELLETS PALM OIL (TKKS)**

*Biopellet* is a biomass-based solid fuel that has the potential to be developed into alternative energy because it has renewable properties. This study was conducted to determine the characteristics of good biomass from oil palm empty fruit bunches (TKKS), to determine the effect of pressure variations and particle size variations on biomass from oil palm empty fruit bunches (TKKS). This research method uses a completely randomized design with two factors, namely the pressure factor and the particle size factor. The analysis carried out is the analysis of water content, density, strength, color, ash content, and *bulk density*. The moisture content of the treatment pellet (T4P1) had the lowest moisture content of 9.91%. The highest density in the treatment pellet (T4P4) was 1.06 g/cm<sup>3</sup>. Strength analysis in treatment (T4P1) had the lowest lost weight of 0.10. Treatment (T1P1) had a color change value ( $\Delta E$ ) of 10.78. Analysis of the ash content of the material in the treatment (P3) has the lowest value of 12.18. Analysis of bulk density in treatment (T3P1) had the highest value of 0.62 g/ml.

Analysis of water absorption weight gain occurred in the first five days after being placed in an open space, the highest weight gain occurred on the first, second and third days. After a week the weight on the *biopellets* can increase or decrease.

Fine particle size is slower to absorb water compared to other particle sizes. As for the highest pressure of 173 MPa, it is slower to absorb water compared to other pressures.

**Key words** : Moisture content, Color, Absorption, Density, Strength.

## ABSTRAK

### **PENGARUH TEKANAN DAN UKURAN PARTIKEL TERHADAP KARAKTERISTIK BIOPELLET TANDAN KOSONG KELAPA SAWIT (TKKS)**

*Biopellet* merupakan bahan bakar padat berbasis biomassa yang berpotensi untuk dikembangkan menjadi energi alternatif karena mempunyai sifat dapat diperbaharui. Penelitian ini dilakukan untuk mengetahui karakteristik biomassa yang baik dari tandan kosong kelapa sawit (TKKS), Untuk mengetahui pengaruh Variasi tekanan dan variasi ukuran partikel terhadap biomassa dari tandan kosong kelapa sawit (TKKS). Metode penelitian ini menggunakan rancangan acak lengkap dua faktor yaitu faktor tekanan dan faktor ukuran partikel. Analisis yang dilakukan yaitu analisis kadar air, massa jenis, kekuatan, warna, kadar abu, dan bulk density. Kadar air pellet perlakuan (T4P1) memiliki kadar air terendah 9,91%. Massa jenis tertinggi pada pellet perlakuan (T4P4) sebesar 1,06 g/cm<sup>3</sup>. Analisis kekuatan pada perlakuan (T4P1) memiliki bobot hilang paling rendah sebesar 0,10. Perlakuan (T1P1) memiliki nilai perubahan warna ( $\Delta E$ ) sebesar 10,78. Analisis kadar abu bahan pada perlakuan (P3) memiliki nilai terendah 12,18. Analisis *bulk density* pada perlakuan (T3P1) memiliki nilai tertinggi sebesar 0.62 g/ml. Analisis daya serap air penambahan bobot terjadi pada lima hari pertama setelah diletakan di ruang terbuka penambahan bobot paling tinggi terjadi di hari pertama kedua dan ketiga.

Setelah seminggu bobot pada *biopellet* bisa bertambah dan bisa juga berkurang. Ukuran partikel halus lebih lambat dalam menyerap air dibandingkan dengan ukuran partikel lainnya. Sedangkan untuk tekanan paling tinggi 173 Mpa lebih lambat dalam menyerapan air dibandingkan dengan tekanan lainnya.

**Kata kunci :** Kadar air, Warna, Daya serap, Massa jenis, Kekuatan.