

***ABSTRACT***

**MAKING BIOPELLET FUEL FROM SAWDUST WASTE**

**Oleh**

**Dea Permata Sari**

Alternative energy is an option to overcome the current energy crisis, one of the alternative energy that can be utilized is biomass which is very potential to be developed into renewable energy. Wood is one of the expected energy sources that can replace the fuel source. Wood-based fuels commonly used are sawdust. This study aims to process wood sawdust waste into biopellet fuel and determine the effect of wood powder size and the amount of adhesive produced. The research was conducted in July-August 2018 at the Laboratory of Agricultural Equipment and Machinery, Department of Agricultural Engineering, Faculty of Agriculture, University of Lampung. The main ingredients are wood powder and tapioca as adhesive. Wood powder that has been processed in the form of fiber / fiber. While the tools used are pellet printing, 20 and 60 mesh sieves, a set of briquette making tools including jacks, digital balance sheets, stopwatches, bomb calorimeters, proximate and ultimate test instruments, a set of combustion frames (small iron bench). So the results obtained from the physico-chemical characteristics of raw materials for wood powder have an average water content of 9.4%, ash content has an average of 6.04%, density has an average of 3,4002 g /

cm<sup>3</sup>, calorific value has average of 18,585 g/cm<sup>3</sup>. In four samples of P1 (smooth), P2 (mixed), P3 (medium), P4 (rough) this study has pellet characteristics having specific gravity ie P1 1.0280%, P2 1.018%, P3 1.0390%, P4 1.0857%. Water content hasan average of P1 13.48%, P2 14.33%, P3 13.26%, P4 14.42%. Ash content has an average of P1 2.42%, P2 2.395%, P3 0.98%, P4 1.01%. The average pellet weight before slamming smooth with 10% adhesive 1.0137, medium 15% 0.5662, rough 20% 0.628, 10% mixture 0.9244. Pellet weight after being slammed 10% 1.0113, medium 15% 0.5644, rough 20% 0.626867, mixture 10% 0.920567. Weight loss average of 10% 0.2380, medium 15% 0.3177, rough 20% 0.1803, mix 10% 0.4138. The results of this study are significantly different.

***Keywords: Biopellet, wood sawdust, pellet characteristics, wood powder characteristics.***

## **ABSTRAK**

### **PEMBUATAN BAHAN BAKAR BIOPELET DARI LIMBAH SERBUK GERGAJIAN**

**Oleh**

**Dea Permata Sari**

Energi alternatif merupakan pilihan untuk mengatasi krisis energi saat ini, salah satu energi alternatif yang bisa dimanfaatkan adalah biomassa yang sangat potensial untuk dikembangkan menjadi energi terbarukan. Kayu merupakan salah satu sumber energi yang diharapkan yang dapat menggantikan sumber bahan bakar minyak. Bahan bakar dari kayu yang umum digunakan secara langsung adalah sebetan dan serbuk gergaji. Penelitian ini bertujuan untuk mengolah serbuk limbah gergaji kayu menjadi bahan bakar biopellet dan mengetahui pengaruh ukuran serbuk kayu dan kadar perekat yang di hasilkan.

Penelitian dilaksanakan pada bulan Juli-Agustus 2018 di Laboratorium Daya Alat dan Mesin Pertanian, Jurusan Teknik Pertanian, Fakultas Pertanian, Universitas Lampung. Bahan utama adalah serbuk kayu dan tapioka sebagai perekat. Serbuk kayu yang telah diolah berupa serat/fiber. Penelitian dilakukan dengan 2 perlakuan, yaitu 3 level perekat (10%), (20%) dan 4 ukuran partikel dengan 3 kali ulangan sedangkan alat yang digunakan adalah pencetakan pellet, ayakan 20 dan 60 mesh, satu set alat pembuatan briket termasuk dongkrak, neraca digital, stopwatch, *bomb calorimeter*, perangkat instrumen uji proksimat dan ultimate, satu set kerangka pembakaran (bangku kecil dari besi).

Hasil yang didapatkan dari karakteristik fisiko kimia bahan baku serbuk kayu memiliki kadar air rata-rata 9,4% , kadar abu memiliki rata-rata 6,04% , berat jenis memiliki rata-rata 3,4002 g/cm<sup>3</sup> , nilai kalor memiliki rata-rata 18,585g/cm<sup>3</sup>. Dalam empat sampel P1 (halus), P2 (campuran), P3 (sedang), P4 (kasar) penelitian ini mempunyai karakteristik pellet memiliki berat jenis yaitu P1 1,0280 g/cm<sup>3</sup>, P2 1,018 g/cm<sup>3</sup>, P3 1,0390 g/cm<sup>3</sup>, P4 1,0857 g/cm<sup>3</sup>. Kadar air memiliki rata-rata yaitu P1 13,48%, P2 14,33%, P3 13,26%, P4 14,42%. Kadar abu memiliki rata-rata yaitu P1 2,47%, P2 2,39%, P3 0,98%, P4 1,01%. Rata-rata bobot pellet sebelum dibanting halus dengan perekat F1 1,0137%, sedang F2 0,5662%, kasar F3 0,628%, campuran F1 0,9244%. Bobot pellet setelah dibanting halus F1 1,0113 , sedang 15% 0,5644 , kasar 20% 0,626867 , campuran F1 0,9205% . Rata-rata weight loss halus F1 0,2380%, sedang F2 0,3177%, kasar F3 0,1803%, campuran F10,4138%. Hasil penelitian ini berbeda nyata

**Kata Kunci:** *Biopellet, Serbuk gergaji kayu, karakteristik pellet, karakteristik bahan serbuk kayu.*