INTISARI

Tandan kosong kelapa sawit (TKKS) merupakan sumber lignoselulosa yang berpotensi sebagai bahan baku papan partikel. Kandungan ekstraktif dan lemak diduga dapat menghambat proses perekatan, baik perekat sintetik maupun alami. Penelitian ini berfokus pada pengaruh penghilangan ekstraktif TKKS dan jumlah perekat sukrosa-*ammonium dihydrogen phosphate* (SADP) terhadap sifat fisik dan mekanik papan partikel TKKS, beserta analisis keberlanjutan papan partikel TKKS.

Penelitian ini menggunakan rancangan acak lengkap dengan dua faktor yaitu perlakuan ekstraktif (perlakuan perebusan selama 60 menit dan tanpa perlakuan perebusan) dan jumlah perekat SADP (0wt%-15wt%) berdasarkan berat kering partikel komposisi 85wt%/15wt%. Dimensi papan 25 cm x 25 cm x 1 cm dengan target kerapatan 0,8 g/cm^3. Metode pengempaan menggunakan siklus tiga langkah dengan suhu 180^{o}C selama 10 menit. Standar pengujian sifat fisika dan mekanika mengacu *Japan Industrial Standard* A 5908-2003. Data rerata pengujian dianalisis menggunakan ANOVA dan *Honestly Significant Difference*. Aspek ekonomi dianalisis berdasarkan nilai IRR, NPV, BCR, BEP, PBP, dan ROI, kemudian aspek lingkungan menginvestigasi emisi gas metana (CH_4) dan karbon dioksida (CO_2).

Hasil analisis menunjukkan bahwa perlakuan perebusan dapat meningkatkan sifat fisika dan mekanika papan. Jumlah perekat SADP berpengaruh nyata terhadap sifat fisik dan mekanik papan. Papan partikel dengan jumlah SADP 15wt% memenuhi JIS A 5908 tipe 8 dengan nilai kerapatan 0,62 g/cm3, kadar air 6,86%, penyerapan air 49,55%, modulus patah 10,34 MPa, dan keteguhan rekat internal 0,30 MPa sedangkan pengembangan tebal 13,04% dan modulus elastisitas 1,58 GPa tidak memenuhi standar. Kelayakan ekonomi menghasilkan nilai IRR 40,45%, NPV Rp 6.300.488.472, BCR 1,15, BEP Rp 79.588, PBP 5,84 tahun, dan ROI 19,53%. Analisis lingkungan pemanfaatan TKKS menjadi papan partikel dapat mereduksi emisi gas CH_4 9,14 Gg/tahun dan CO_2 75,38 Gg/tahun.

Kata kunci : *ammonium dihydrogen phosphate*, papan partikel, sukrosa, TKKS

ABSTRACT

Oil palm empty fruit bunches (OPEFB) are potential source of lignocellulose as a raw material particle board. Extractive and fat contents are thought to inhibit the gluing process, either synthetic or natural adhesives. This research focuses on effect OPEFB extractive removal and the amount of sucrose-ammonium dihydrogen phosphate (SADP) adhesive on physical and mechanical properties particle board, along with an analysis sustainability of OPEFB particle board.

This study used completely randomized design with two factors, namely extractive treatment (boiling treatment for 60 minutes and without treatment) and amount SADP adhesive (0wt%-15wt%) based on dry weight particle composition 85wt%/15wt%. Dimensions board are 25 cm x 25 cm x 1 cm with a target density of 0.8 g/cm^3. Compression method uses a three-step cycle with a temperature of 180^{o}C for 10 minutes. Physical and mechanical properties based on Japan Industrial Standard A 5908-2003. Average data were analyzed ANOVA and Honestly Significant Difference. Economic aspects were analyzed based on IRR, NPV, BCR, BEP, PBP, and ROI, then environmental aspects investigated methane (CH_4) and carbon dioxide (CO_2) gas emissions.

Results of the analysis showed, the boiling treatment could improve the physical and mechanical properties. Amount of SADP adhesive has a significant effect on physical and mechanical. Particle board with 15wt% SADP complies with JIS A 5908 type 8 with a density of 0.62 g/cm^3, moisture content of 6.86%, water absorption of 49.55%, modulus of rupture of 10.34 MPa, and internal bond strength of 0.30 MPa while the thickness swelling of 13.04% and modulus of elasticity of 1.58 GPa did not meet standard. Economic feasibility value IRR 40.45%, NPV Rp 6,300,488,472, BCR 1.15, BEP Rp 79,588, PBP 5.84 years, and ROI 19.53%. Environmental analysis of the use of OPEFB into particle board can reduce gas emissions CH_4 9.14 Gg/year and CO_2 75.38 Gg/year.

Keywords: ammonium dihydrogen phosphate, particleboard, sucrose, OPEFB.