

PENGARUH RASIO UKURAN PARTIKEL DAN JUMLAH PEREKAT ASAM SITRAT-SUKROSA TERHADAP SIFAT PAPAN PARTIKEL DARI AMPAS INDUSTRI PATI AREN

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INTISARI

Ampas pengolahan pati aren (*Arenga pinnata*) yang telah diuraikan menjadi partikel kasar dan partikel halus berpotensi untuk dimanfaatkan sebagai bahan baku pembuatan papan partikel. Penelitian ini bertujuan untuk mengetahui pengaruh interaksi rasio campuran partikel kasar dan partikel halus serta jumlah perekat asam sitrat-sukrosa terhadap sifat fisika dan mekanika papan partikel.

Papan partikel berukuran 25 cm x 25 cm x 1 cm dengan target kerapatan 0,8 g/cm³ dibuat menggunakan tiga macam rasio ukuran partikel kasar dan partikel halus ampas pengolahan pati aren (100:0, 75:25, dan 50:50) dengan tiga macam jumlah perekat (10%, 15%, dan 20%). Ukuran partikel halus adalah lolos 10 *mesh* dan tertahan 60 *mesh*, sementara partikel kasar berbentuk menyerupai wol kayu dengan panjang rata-rata 6,84±3,23 cm. Metode pengempaan menggunakan siklus tiga tahap. Standar pengujian yang digunakan mengacu *Japan Industrial Standard A 5908* (2003). Data hasil pengujian dianalisis menggunakan analisis varians (ANOVA) dan pengujian lanjut *Honestly Significant Difference (HSD)*.

Hasil analisis menunjukkan interaksi faktor rasio ukuran partikel dan jumlah perekat berpengaruh nyata terhadap nilai modulus patah dan modulus elastisitas. Faktor rasio ukuran partikel berpengaruh nyata terhadap pengembangan tebal dan penyerapan air, sedangkan faktor jumlah perekat berpengaruh nyata terhadap nilai kadar air, pengembangan tebal, penyerapan air, dan keteguhan rekat internal papan partikel ampas pati aren. Sifat papan partikel optimal diperoleh pada perlakuan rasio ukuran partikel kasar dan partikel halus (100:0) dengan jumlah perekat 20%. Nilai sifat fisika-mekanika yang diperoleh, yaitu kerapatan 0,76 g/cm³, kadar air 8,16%, pengembangan tebal 20,21%, penyerapan air 64,74%, modulus patah 24,37 MPa, modulus elastisitas 4,11 GPa, dan keteguhan rekat internal 0,32 MPa. Sifat papan partikel tersebut memenuhi standar *JIS A 5908* (2003) tipe 18 kecuali nilai pengembangan tebalnya.

Kata kunci: papan partikel, aren, ampas pati aren, rasio ukuran partikel, jumlah perekat

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THE EFFECT OF PARTICLE SIZE RATIO AND THE AMOUNT OF CITRIC ACID-SUCROSE ADHESIVE ON THE PROPERTIES OF PARTICLE BOARD MADE FROM INDUSTRIAL SUGAR PALM SOLID WASTE

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ABSTRACT

The solid waste from the processing of sugar palm flour (*Arenga pinnata*) which has been broken down into coarse and fine particles was used as raw material for making particle boards. This study aimed to determine the effect of the interaction between coarse and fine particle ratios and the amount of citric acid-sucrose adhesive on the physical and mechanical properties of particle board.

Particle boards with the size of 25 cm x 25 cm x 1 cm and target density of 0.8 g/cm³ have been made using three different ratios of sugar palm flour processing solid waste coarse particles and fine particles mixture (100:0, 75:25, and 50:50) with three different amounts of adhesive (10%, 15%, and 20%). The fine particles were particles with a size that passed 10 mesh retained 60 mesh, while the coarse particles were particles in the form of wood wool with an average length of 6.84±3.23 cm. The pressing method used a three-steps cycle. The test standard used refers to Japan Industrial Standard A 5908 (2003). Test data were then analyzed using Analysis of Variance (ANOVA) and further testing of Honestly Significant Difference (HSD).

The analysis showed that the interaction between the particle size ratio and the amount of adhesive had a significant effect on the modulus of rupture and the modulus of elasticity. The ratio of the particle's mixture has a significant effect on the thickness swelling and water absorption, while the adhesive amount has a significant effect on the value of moisture content, thickness swelling, water absorption, and internal bonding of the palm stem waste particle board. Optimal particle board properties were obtained in the treatment of coarse and fine particles mixture ratio of (100:0) with an adhesive amount of 20%. The physical-mechanical properties values obtained were density 0.76 g/cm³, moisture content 8.16%, thickness swelling 20.21%, water absorption 64.74%, modulus of rupture 24.37 MPa, modulus of elasticity 4.11 GPa, and the internal bonding 0.32 MPa. The particle board properties met the JIS A 5908 (2003) type 18 standard except for the thickness swelling value.

Keywords: particle board, sugar palm, sugar palm solid waste, particle mixture ratio, adhesive amount

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