

**PENGARUH SUHU KEMPA DAN JUMLAH ASAM SITRAT TERHADAP  
SIFAT PAPAN PARTIKEL BATANG KELAPA SAWIT  
(*Elaeis guineensis* Jacq.)**

Oleh :  
**Saibun Adelin<sup>1</sup> dan Ragil Widyorini<sup>2</sup>**

**INTISARI**

Ketersediaan limbah batang kelapa sawit dalam jumlah besar di Indonesia dapat dijadikan sebagai bahan baku pembuatan papan partikel tanpa perekat. Saat ini pembuatan papan partikel tanpa perekat sintetik mulai dikembangkan dengan menggunakan bahan pengaktif seperti asam sitrat. Penambahan asam sitrat sampai jumlah tertentu dapat digunakan untuk meningkatkan sifat papan terutama sifat kestabilan dimensi papan. Penerapan suhu kempa yang optimal juga harus dilakukan, agar papan yang dihasilkan dapat memenuhi standar industri papan partikel dan efisiensi energi. Penelitian ini bertujuan untuk mengetahui pengaruh jumlah asam sitrat dan suhu pengempaan terhadap sifat papan partikel dari batang kelapa sawit.

Penelitian ini menggunakan rancangan acak lengkap pada dua faktor yang berbeda, yaitu suhu kempa (180°C dan 200°C) dan jumlah asam sitrat (0%, 5%, dan 10%). Pembuatan papan partikel menggunakan tekanan kempa 2MPa selama 15 menit dengan target kerapatan 0,9 g/cm<sup>3</sup>. Partikel batang kelapa sawit yang digunakan berukuran lolos saringan 10 mesh dengan kadar air kering udara sebesar 9,14%. Sifat papan partikel yang diuji meliputi sifat fisika (kerapatan, kadar air, pengembangan tebal dan penyerapan air) dan sifat mekanika (modulus elastisitas, modulus patah dan keteguhan rekat internal) berdasarkan standar JIS A 5908-2003.

Hasil penelitian menunjukkan bahwa interaksi suhu kempa dan jumlah asam sitrat berpengaruh nyata terhadap sifat kadar air dan pengembangan tebal papan partikel batang kelapa sawit. Peningkatan suhu kempa menurunkan secara nyata nilai kerapatan, kadar air dan pengembangan tebal papan partikel batang kelapa sawit. Penambahan asam sitrat meningkatkan kestabilan dimensi, modulus elastisitas dan modulus patah papan partikel batang kelapa sawit. Sifat papan partikel terbaik diperoleh dengan kombinasi suhu kempa 180°C dan jumlah asam sitrat 10% dengan nilai rata-rata kerapatan (0,74 g/cm<sup>3</sup>), kadar air (4,9%), pengembangan tebal (2,02%), penyerapan air (55,98%) modulus elastisitas (11531 kgf/cm<sup>2</sup>), modulus patah (49,23 kgf/cm<sup>2</sup>), dan internal bonding (1,96 kgf/cm<sup>2</sup>).

Kata kunci: papan partikel tanpa perekat, papan partikel, batang kelapa sawit, suhu kempa, asam sitrat.

---

<sup>1</sup>.Mahasiswa Jurusan Teknologi Hasil Hutan, Fakultas Kehutanan, Universitas Gadjah Mada

<sup>2</sup>.Staf Pengajar Jurusan Teknologi Hasil Hutan, Fakultas Kehutanan, Universitas Gadjah Mada

**EFFECT OF PRESSING TEMPERATURE AND AMOUNT OF CITRIC  
ACID ON PROPERTIES OF PARTICLEBOARD OIL PALM  
(*Elaeis guineensis* Jacq.) TRUNK**

**By:  
Saibun Adelin<sup>1</sup> and Ragil Widyorini<sup>2</sup>**

**ABSTRACT**

Availability of oil palm trunk waste in Indonesia can be used as raw material for binderless particleboard. Recently, citric acid is used to improve binderlessboard properties, especially for its dimensional stability. The application of optimum pressing temperature is important to fulfill the industry standards and energy efficiency of particleboard production. This study aimed to determine the effect of amount of citric acid and pressing temperature on properties of particle board manufactured from oil palm trunk.

The study used a completely randomized design with two difference factors: i.e. pressing temperature (180°C and 200°C) and amount of citric acid (0%, 5%, and 10%). Particleboard manufactured from oil palm trunk was hot pressed on pressing pressure 2 MPa during 15 minutes with 0,9 g/cm<sup>3</sup> target density. Oil palm trunk particles were passed through 10 mesh screen and were then air dried to a moisture content of around 9.14%. The physical properties (density, moisture content, thickness swelling and water absorption) and mechanical properties (modulus of elasticity, modulus of rupture and internal bond strength) of particleboard was evaluated according to JIS A 5908-2003.

The results showed that interaction of pressing temperature and amount of citric acid affected significantly to moisture content and thickness swelling. The pressing temperature affected to density, moisture content, and thickness swelling, while the amount of citric acid affected to thickness swelling, modulus of elasticity and modulus rupture of binderless particleboard properties. The best properties of particleboard were formed by 180°C pressing temperature and 10% amount of citric acid with the value of density 0.74 g/m<sup>3</sup>, moisture content 4.9%, thickness swelling 2.02%, water absorption 55.98% modulus of elasticity 11531 kgf/cm<sup>2</sup>, modulus of rupture 49.23 kgf/cm<sup>2</sup>, and internal bond strength 1.96 kgf/cm<sup>2</sup>.

**Keywords:** binderlessboard, particleboard, oil palm trunk, pressing temperature, citric acid.

---

<sup>1</sup> Student of Forest Products Technology Department, Faculty of Forestry, UGM

<sup>2</sup> Lecturer of Forest Products Technology Department, Faculty of Forestry, UGM