

## ABSTRAK

### SIFAT FISIK DAN SIFAT MEKANIK PAPAN PARTIKEL LIMBAH BROMELAIN BERDASARKAN VARIASI KOMPOSISI PEREKAT *POLYVINYL ACETATE*

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Limbah bromelain dari industri pengolahan nanas memiliki potensi sebagai bahan baku alternatif papan partikel ramah lingkungan karena ketersediaannya yang melimpah serta kandungan lignoselulosa yang dapat berfungsi sebagai matriks komposit. Penelitian ini bertujuan menganalisis sifat fisik dan sifat mekanik papan partikel limbah bromelain dengan variasi komposisi perekat *Polyvinyl Acetate* (PVAc). Kajian pustaka mengacu pada teori komposit berbasis kayu, mekanisme ikatan perekat *Polyvinyl Acetate* (PVAc), serta standar mutu papan partikel menurut SNI 03-2105-2006. Metode penelitian menggunakan rancangan acak lengkap dengan variasi komposisi perekat pada papan partikel berukuran 30 × 30 cm dengan ketebalan 1 cm. Parameter pengujian meliputi kadar air, kerapatan, dan *Modulus of Rupture* (MoR) menggunakan metode *oven-dry* dan uji lentur tiga titik.

Hasil penelitian menunjukkan bahwa peningkatan komposisi *Polyvinyl Acetate* (PVAc) cenderung meningkatkan kerapatan dan keteguhan patah papan, serta menurunkan kadar air karena peningkatan kualitas ikatan antar partikel. Nilai kadar air dan kerapatan seluruh sampel berada memenuhi standar SNI 03-2105-2006, sedangkan *Modulus of Rupture* (MoR) menunjukkan variasi belum memenuhi SNI 03-2105-2006 papan partikel. Kesimpulannya, limbah bromelain berpotensi sebagai bahan baku papan partikel ramah lingkungan dengan performa optimal pada komposisi perekat tertentu. Penelitian lanjutan disarankan pada variasi bahan baku, ukuran partikel, jenis perekat alternatif, dan pengujian tambahan seperti uji *Scanning Electron Microscopy* (SEM) serta *Fourier Transform Infrared Spectroscopy* (FTIR).

Kata kunci: *papan partikel, limbah bromelain, Polyvinyl Acetate* (PVAc).

## ABSTRACT

### PHYSICAL PROPERTIES AND MECHANICAL PROPERTIES OF BROMELAIN WASTE PARTICLE BOARD BASED ON VARIATIONS IN THE COMPOSITION OF *POLYVINYL ACETATE ADHESIVE*

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Bromelain waste from the pineapple processing industry has the potential as an alternative raw material for environmentally friendly particle board due to its abundant availability and lignocellulose content that can function as a composite matrix. This study aims to analyze the physical properties and mechanical properties of bromelain waste particle boards with variations in the composition of *Polyvinyl Acetate* (PVAc) adhesives. The literature review refers to the theory of wood-based composites, the bonding mechanism of *Polyvinyl Acetate* (PVAc) adhesive, and particle board quality standards according to SNI 03-2105-2006. The research method used a complete random design with variations in adhesive composition on particle boards measuring  $30 \times 30$  cm with a thickness of 1 cm. The test parameters include moisture content, density, and *Modulus of Rupture* (MoR) using *the oven-dry* method and a three-point bending test.

The results showed that increasing the composition of *Polyvinyl Acetate* (PVAc) tended to increase the density and fracture strength of the boards, as well as decreasing the moisture content due to improved bond quality between particles. The moisture content and density values of the entire sample met the SNI 03-2105-2006 standard, while *the Modulus of Rupture* (MoR) showed variations that did not meet SNI 03-2105-2006 particle board. In conclusion, bromelain waste has the potential to be a raw material for environmentally friendly particle board with optimal performance on certain adhesive compositions. Further research is recommended on raw material variations, particle sizes, alternative adhesive types, and additional tests such as *Scanning Electron Microscopy* (SEM) and *Fourier Transform Infrared Spectroscopy* (FTIR) assays.

Key words: *particle board, bromelain waste, Polyvinyl Acetate* (PVAc).