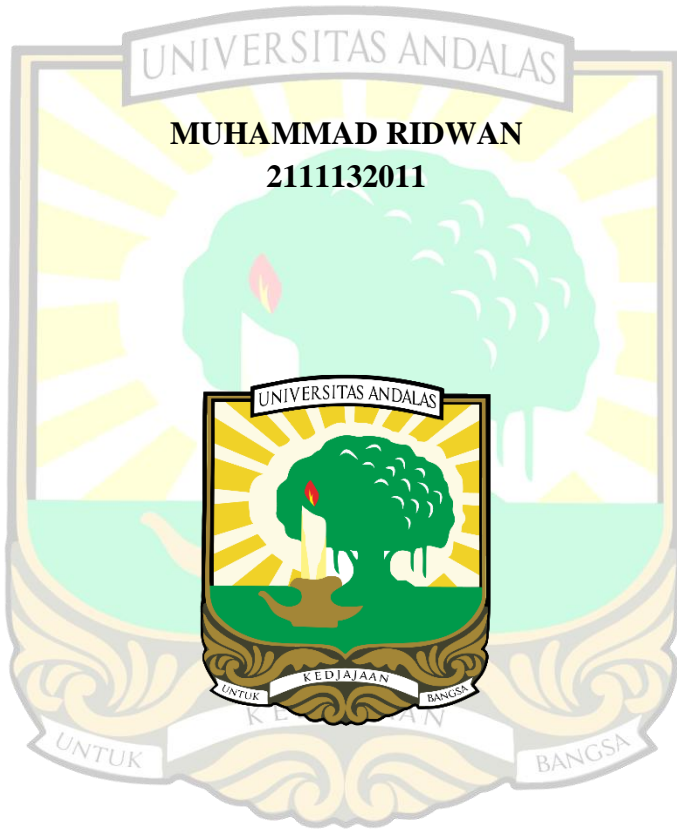


**PENGARUH KONSENTRASI KALSIUM
HIDROKSIDA ($\text{Ca}(\text{OH})_2$) DAN MASSA
SELULOSA TERHADAP SIFAT FISIK DAN
MEKANIK KERTAS SENI PUTIH BERBASIS
SELULOSA BAKTERI**



**FAKULTAS TEKNOLOGI PERTANIAN
UNIVERSITAS ANDALAS
PADANG
2026**

PENGARUH KONSENTRASI KALSIMUM HIDROKSIDA ($\text{Ca}(\text{OH})_2$) DAN MASSA SELULOSA TERHADAP SIFAT FISIK DAN MEKANIK KERTAS SENI PUTIH BERBASIS SELULOSA BAKTERI

Muhammad Ridwan, Risa Meutia Fiana, Alfi Asben

ABSTRAK

Peningkatan kebutuhan kertas mendorong pengembangan bahan baku alternatif yang ramah lingkungan. Selulosa bakteri memiliki potensi sebagai bahan baku kertas karena memiliki kemurnian tinggi dan struktur fibril yang halus. Penelitian ini bertujuan menganalisis pengaruh konsentrasi kalsium hidroksida (A), yang terdiri dari tiga taraf: A1 = 0,5 g, A2 = 1 g, dan A3 = 1,5 g, dan massa selulosa bakteri (B), yang terdiri dari tiga taraf, yaitu: B1 = 1,8 g, B2 = 2,1 g, dan B3 = 2,4 g terhadap sifat fisik dan mekanik kertas seni putih berbasis selulosa bakteri. Penelitian menggunakan rancangan acak lengkap (RAL) faktorial dengan dua faktor, yaitu konsentrasi kalsium hidroksida dan massa selulosa bakteri. Data dianalisis menggunakan analisis ragam (ANOVA) dua arah dan dilanjutkan dengan uji DMRT (*Duncan's New Multiple Range Test*) pada taraf 5%. Perlakuan terbaik diperoleh pada kombinasi A3B2 (kalsium hidroksida 1,5 g dan massa selulosa bakteri 2,1 g) dengan gramatur 76,8 g/m², kadar air 4,45%, derajat putih 78,50%, dan kekuatan tarik 13,76 MPa. Karakterisasi gugus fungsi dengan FTIR menunjukkan keberadaan gugus fungsi khas selulosa pada puncak serapan lebar yang muncul pada bilangan gelombang sekitar 3397,67 cm⁻¹. Hasil analisis ekonomi dengan metode *full costing* mendapatkan harga jual kertas seni putih dengan gramatur 76,8 g/m² sebesar Rp1.714,99/lembar, sehingga selulosa bakteri berpotensi dikembangkan sebagai bahan baku kertas seni putih yang memenuhi acuan mutu SNI 7274:2008.

Kata kunci: fermentasi, harga pokok produksi, kalsium hidroksida, kertas seni putih, selulosa bakteri

THE EFFECT OF CALCIUM HYDROXIDE (Ca(OH)₂) CONCENTRATION AND CELLULOSE MASS ON THE PHYSICAL AND MECHANICAL PROPERTIES OF WHITE ART PAPER BASED ON BACTERIAL CELLULOSE

Muhammad Ridwan, Risa Meutia Fiana, Alfi Asben

ABSTRACT

Increasing demand for paper is driving the development of alternative, environmentally friendly raw materials. Bacterial cellulose has potential as a paper raw material due to its high purity and fine fibril structure. This study aims to analyze the effects of calcium-hydroxide concentration (A), consisting of three levels: A1 = 0.5 g, A2 = 1 g, A3 = 1.5 g, and bacterial cellulose mass (B), consists of three levels: B1 = 1.8 g, B2 = 2.1 g, B3 = 2.4 g on the physical and mechanical properties of white art paper based on bacterial cellulose. The study employed a completely randomized design (CRD) with two factors: calcium hydroxide concentration and bacterial cellulose mass. The data were analyzed using two-way analysis of variance (ANOVA) and followed by the DNMRT (*Duncan's New Multiple Range Test*), at the 5% level. The best treatment was achieved with the combination of A3B2 (calcium hydroxide 1.5 g and bacterial cellulose mass 2.1 g), with a grammage of 76.8 g/m², a water content of 4.45%, a whiteness of 78.50%, and a tensile strength of 13.76 MPa. The FTIR characterization of functional groups showed the presence of typical cellulose functional groups, indicated by a broad absorption peak at a wavenumber of around 3397.67 cm⁻¹. The results of the economic analysis using the full costing method yielded a selling price of white art paper with a grammage of 76.8 g/m² of IDR 1.714,99 per sheet, so that bacterial cellulose has the potential to be developed as a raw material for white art paper that meets the quality standards of SNI 7274:2008.

Keywords: bacterial cellulose, calcium hydroxide, cost of production, fermentation, white art paper