

**KARAKTERISASI *FILM* BIOKOMPOSIT
BERBASIS PATI BENGGUANG (*Pachyrhizus
erosus*) DENGAN PENAMBAHAN MIKROFIBRIL
SELULOSA DARI TANDAN KOSONG KELAPA
SAWIT**

SKRIPSI

MUHAMMAD FADIL SYAHPUTRA

2011132025



Dosen Pembimbing:

- 1. Dr. Ira Desri Rahmi, S.TP., M.Si**
- 2. Risa Meutia Fiana, S.TP., M.P**

**FAKULTAS TEKNOLOGI PERTANIAN
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Karakterisasi *Film* Biokomposit Berbasis Pati Bengkuang (*Pachyrhizus erosus*) dengan Penambahan Mikrofibril selulosa dari Tandan Kosong Kelapa Sawit

Muhammad Fadil Syahputra, Ira Desri Rahmi, Risa Meutia Fiana

ABSTRAK

Penelitian tentang Karakterisasi *Film* Biokomposit Berbasis Pati Bengkuang (*Pachyrhizus erosus*) dengan Penambahan Mikrofibril Selulosa dari Tandan Kosong Kelapa Sawit (TKKS) bertujuan untuk mendapatkan informasi tentang pengaruh penambahan mikrofibril selulosa terhadap karakteristik fisik dan mekanik dari *film* biokomposit. Penelitian dilakukan menggunakan Rancangan Acak Lengkap satu faktorial dengan 5 perlakuan dan 3 kali ulangan. Data yang diperoleh dianalisis secara statistik menggunakan *Analysis of Variance* (ANOVA), jika berbeda nyata maka dilanjutkan dengan uji *Duncan's New Multiple Range Test* (DNMRT) pada taraf 5%. Penambahan konsentrasi mikrofibril selulosa dari TKKS menunjukkan hasil yang berbeda nyata terhadap ketebalan, warna, daya serap air, kuat tarik, dan elongasi *film* biokomposit. Perlakuan terbaik didapatkan pada perlakuan E, yaitu penambahan 4 % mikrofibril selulosa TKKS dengan rata-rata ketebalan 0,25 mm, daya serap air 9,65 %, warna 25,31 %, kuat tarik 1,43 Mpa, dan elongasi 12,58 %. Nilai tambah yang didapatkan sebesar Rp 12.982/kg dan rasio nilai tambah sebesar 36,06 %. Kemudian dilakukan uji lanjut *Fourier Transform Infra Red* (FTIR) untuk mengidentifikasi gugus kimia dan menganalisis komposisi bahan serta sampel terbaik yang dihasilkan. Didapatkan puncak serapan pada daerah $3200-3400\text{ cm}^{-1}$, 2900 cm^{-1} , 1640 cm^{-1} , dan daerah $1000-1200\text{ cm}^{-1}$ sebagai "*fingerprint region*" untuk polisakarida.

Kata Kunci: bengkuang, *film* biokomposit, mikrofibril selulosa, pati, tandan kosong kelapa sawit

Characterization of Yam Bean (*Pachyrhizus erosus*) Starch-Based Biocomposite *Film* with Oil Palm Empty Fruit Bunches Microfibrillated Cellulose Addition

Muhammad Fadil Syahputra, Ira Desri Rahmi, Risa Meutia Fiana

ABSTRACT

Research on the Characterization of Yam Bean (*Pachyrhizus erosus*) Starch-Based Biocomposite *Film* with Oil Palm Empty Fruit Bunches (OPEFB) Microfibrillated cellulose Addition aimed to determine the effect of adding microcellulose on the physical and mechanical characteristics of the biocomposite *film*. This research was conducted using a single factor Completely Randomized Design (CRD) consisting 5 treatments and 3 replications. The data obtained were statistically analyzed using Analysis of Variance (ANOVA). If significant differences were found, the analysis was continued with Duncan's New Multiple Range Test (DNMRT) at a 5% significance level. The addition of OPEFB microcellulose concentration showed a significant effect on the thickness, color, water absorption, tensile strength, and elongation of the biocomposite *film*. The best result was obtained in treatment E, which involved the addition of 4% OPEFB microcellulose, yielding an average thickness of 0.25 mm, water absorption of 9.65%, a color value of 25.31%, tensile strength of 1.43 MPa, and elongation of 12.58%. The added value obtained was IDR 12,982/kg, with an added value ratio of 36.06%. Further analyses were then conducted using a Fourier Transform Infrared (FTIR) spectroscopy to identify chemical groups and analyze the material's composition also the best resulting sample. Absorption peaks were observed at $3200-3400\text{ cm}^{-1}$, 2900 cm^{-1} , 1640 cm^{-1} , and $1000-1200\text{ cm}^{-1}$ as the "fingerprint region" for polysaccharides

Key Word: biocomposite *film*, microfibrillated cellulose, oil palm empty fruit bunches, starch, yam bean