

ABSTRAK

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PENGARUH RASIO LIMBAH KOPI DENGAN POLIVINIL ALKOHOL (PVA) DAN KONSENTRASI GLISEROL TERHADAP KARAKTERISTIK FISIKOKIMIA *FILM* BIOKOMPOSIT

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(xiv + 47 halaman; 21 gambar; 2 tabel; 8 lampiran)

Polusi limbah plastik saat ini telah menjadi salah satu masalah besar lingkungan. Tingginya produksi dan konsumsi kopi di Indonesia menghasilkan limbah padat yang belum dimanfaatkan dengan baik. Oleh karena itu pada penelitian ini dilakukan pemanfaatan limbah kopi dengan material polivinil alkohol (PVA) dalam rangka pembuatan *film* biokomposit yang bersifat *biodegradable* sebagai pengganti kemasan plastik komersial sekali pakai. Penelitian ini bertujuan untuk menentukan pengaruh rasio PVA dan limbah kopi serta konsentrasi gliserol terhadap karakteristik fisikokimia film biokomposit. Penelitian dibagi menjadi 2 tahap, yaitu tahap pendahuluan dan utama. Pada tahap pendahuluan dilakukan analisis kadar air dan lignoselulosa terhadap limbah kopi, sedangkan pada tahap utama dilakukan pencetakan *film* biokomposit yang divariasikan dengan rasio PVA dan limbah kopi 100:0; 90:10; 80:20; 70:30; 60:40; dan 50:50, serta konsentrasi gliserol 2% dan 4% sebagai *plasticizer*. Analisis yang dilakukan terhadap *film* adalah analisis *biodegradability*, *water absorption*, tekstur yang mencakup *tensile strength*, *elongation*, dan modulus Young. Hasil analisis limbah kopi menunjukkan kandungan kadar air $10.9447 \pm 0.25\%$, kadar hemiselulosa $24.3078 \pm 0.94\%$, kadar selulosa $22.1045 \pm 0.91\%$ dan kadar lignin $35.56 \pm 3.59\%$ sehingga limbah kopi bisa dikarakteristikan sebagai *coffee silverskin* dengan sedikit *husk* dan *parchment*. *Film* biokomposit dengan karakteristik terbaik diperoleh pada formulasi 90:10 dan konsentrasi gliserol 2%, dengan *weight loss* pada uji *biodegradability* $6.82 \pm 0.09\%$ selama 7 hari, *tensile strength* 13.48 ± 1.4 MPa, *elongation* $301.78 \pm 3.79\%$, modulus Young 4.16 ± 0.08 MPa, dan *water absorption* $101.56 \pm 7.32\%$. *Film* biokomposit terbaik menunjukkan potensi dijadikan sebagai kemasan produk pangan.

Kata kunci : *biodegradable*, *film* biokomposit, gliserol, limbah kopi, polivinil alkohol, *plasticizer*

Referensi : 64 (2005-2022)

ABSTRACT

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EFFECT OF COFFEE BY-PRODUCT TO POLYVINYL ALCOHOL (PVA) RATIO AND GLYCEROL CONCENTRATION TOWARDS THE PHYSICOCHEMICAL PROPERTIES OF BIOCOMPOSITE FILM

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Plastic pollution is one of the biggest environmental concerns known to man. The high production and consumption rate of coffee in Indonesia produces large amounts of solid coffee by-products which have not been utilized properly. This research tries to tackle both problems by utilizing coffee by-products and polyvinyl alcohol (PVA) in order to create a biodegradable composite film as an alternative to commercial single use plastic packaging. The purpose of this research is to determine the effect of PVA to coffee by-product ratio and glycerol concentration towards the physicochemical properties of biocomposite films. This research is divided into 2 stages, which is the preliminary stage and the main research stage. Determination of moisture and lignocellulosic content towards a sample of coffee by-product was done. Films were then made with varied ratio of PVA and coffee by-product (100:0; 90:10; 80:20; 70:30; 60:40; and 50:50) with varying concentration of glycerol (2% and 4%) as plasticizer. The films were then analyzed for biodegradation capabilities, water absorption, and mechanical properties, consisting of tensile strength, elongation, and Young's modulus. Results of the analysis of coffee by-product yields a moisture content of $10.9447 \pm 0.25\%$, hemicellulose content of $24.3078 \pm 0.94\%$, cellulose content of $22.1045 \pm 0.91\%$ and lignin content of $35.56 \pm 3.59\%$ which characterizes said by-product to be mostly made of coffee silverskin, with a smaller percentage of husk and parchment. The chosen film with the best characteristic was obtained, which is the 90:10 PVA to by-product ratio with 2% of glycerol. Said film has a weight loss of $6.82 \pm 0.09\%$ in the biodegradability test after 7 days, tensile strength of 13.48 ± 1.4 MPa, elongation of $301.78 \pm 3.79\%$, Young's modulus of 4.16 ± 0.08 MPa, and water absorption of $101.56 \pm 7.32\%$. The chosen biocomposite film has the potential to be used as food packaging material.

Keywords : biocomposite film, biodegradable, coffee by-product, glycerol, plasticizer, polyvinyl alcohol

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