

**PENGEMBANGAN KEMASAN AKTIF BERBASIS PATI
SAGU DAN SELULOSA BAKTERI DENGAN MINYAK
ATSIRI JERUK GUNUANG OMEH UNTUK
PENYIMPANAN BIJI KOPI HIJAU**

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ABSTRAK

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Penelitian ini bertujuan mengembangkan kemasan aktif berbasis pati sagu dan selulosa bakteri dengan penambahan minyak atsiri kulit jeruk Gunuang Omeh untuk menjaga mutu biji kopi hijau selama penyimpanan. Film dibuat dengan metode solution casting (konsentrasi minyak atsiri 0, 0,5, dan 1 g) lalu dikarakterisasi sifat fisik-mekanik, FTIR, XRD, dan aktivitas antimikroba. Kemasan diaplikasikan sebagai penutup toples kopi selama 1 bulan. Hasilnya, minyak atsiri mengandung D-limonene 86,09%. Penambahan minyak atsiri tidak berpengaruh signifikan terhadap sifat fisik-mekanik film, namun secara signifikan meningkatkan zona hambat terhadap *E. coli* dan *S. aureus* konsentrasi 1 g menghasilkan hambatan sangat kuat terhadap *E. coli* (22,28 mm) dan kuat terhadap *S. aureus* (12,96 mm). Setelah penyimpanan, kadar air dan pH biji kopi tidak berbeda nyata, tetapi total fenolik dan kapasitas antioksidan meningkat signifikan pada kemasan dengan 1 g minyak atsiri (21,87 mg GAE/g dan IC_{50} 116,21 ppm), meskipun aroma khas kopi menurun akibat dominasi jeruk. Kesimpulannya, kemasan aktif dengan 1 g minyak atsiri efektif sebagai antimikroba dan meningkatkan senyawa bioaktif kopi hijau, namun perlu pengembangan lanjutan untuk memperbaiki sifat mekanik dan menjaga aroma asli kopi.

Kata Kunci: Kemasan Aktif, Pati Sagu, Selulosa Bakteri, Minyak Atsiri Kulit Jeruk; Biji Kopi Hijau

DEVELOPMENT OF ACTIVE PACKAGING BASED ON SAGO STARCH AND BACTERIAL CELLULOSE WITH GUNUANG OMEH ORANGE PEEL ESSENTIAL OIL FOR GREEN COFFEE BEAN STORAGE

ABSTRACT

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This study aimed to develop an active packaging based on sago starch and bacterial cellulose with the addition of Gunuang Omeih orange peel essential oil to maintain the quality of green coffee beans during storage. Films were prepared using the solution casting method (essential oil concentrations of 0, 0.5, and 1 g) and then characterized for physical-mechanical properties, FTIR, XRD, and antimicrobial activity against *Escherichia coli* and *Staphylococcus aureus*. The packaging was applied as a lid for glass jars containing coffee beans over a 1-month storage period. The results showed that the essential oil contained 86.09% D-limonene. The addition of essential oil did not significantly affect ($p>0.05$) the film's water solubility, water vapor absorption, tensile strength, elongation, or Young's modulus, but significantly ($p<0.05$) increased the inhibition zone; the 1 g concentration produced a very strong inhibition zone against *E. coli* (22.28 mm) and a strong inhibition zone against *S. aureus* (12.96 mm). After storage, the moisture content and pH of the coffee beans showed no significant differences among treatments, but the total phenolic content and antioxidant capacity increased significantly with the packaging containing 1 g of essential oil, reaching 21.87 mg GAE/g and an IC_{50} of 116.21 ppm, respectively, although the intensity of the typical coffee aroma decreased due to the dominance of orange scent. In conclusion, the active packaging with 1 g of essential oil was effective as an antimicrobial and capable of enhancing the bioactive compounds of green coffee beans; further development is needed to improve mechanical properties and preserve the original coffee aroma.

Keywords: Active Packaging, Sago Starch, Bacterial Cellulose, Orange Peel Essential Oil; Green Coffee Beans.