INTISARI

PENGEMBANGAN *SMART FOOD PACKAGING* MENGGUNAKAN LAPISAN *POLYLACTIC ACID* (PLA) BERBASIS KARBON AKTIF DAN ANTOSIANIN DARI BUNGA TELANG (*CLITORIA TERNATEA L.*)

Oleh
ADINDA NISA RAMADHANI
21/478648/PA/20762

Penelitian ini berfokus pada pembuatan lapisan *Polylactic Acid* (PLA) dengan penambahan karbon aktif dan antosianin dari bunga telang (*Clitoria ternatea L.*), serta mengeksplorasi peluang penggunaannya sebagai *smart food packaging*. Metode yang digunakan meliputi variasi komposisi film PLA dengan gliserin dan antosianin, serta penambahan karbon aktif dalam konsentrasi yang berbeda (0,04%; 0,08%; 0,12%; 0,16%). Lapisan tersebut dikarakterisasi menggunakan *Scanning Electron Microscopy* (SEM), *Fourier Transform Infrared Spectroscopy* (FTIR), dan spektrofotometri UV-Vis. Selain itu, pengujian sifat mekanik seperti kuat tarik dan sudut kontak dilakukan untuk mengevaluasi performa fisik film. Pengujian aktivitas antibakteri juga dilakukan untuk menilai potensi film sebagai bahan kemasan yang aman dan efektif. Hasil menunjukkan lapisan PLA yang dikembangkan bersifat *biodegradable*, serta mampu memperpanjang umur simpan makanan, sehingga berpotensi tinggi sebagai alternatif inovatif *smart food packaging*. Namun belum ditemukannya efek antibakteri signifikan dalam lapisan sehingga perlu dilakukan penelitian lebih lanjut dengan agen antibakteri lain.

Kata kunci: Antosianin, Bunga Telang, Karbon Aktif, PLA, *Smart Packaging*

ABSTRACT

THE DEVELOPMENT OF SMART FOOD PACKAGING USING POLYLACTIC ACID (PLA) LAYERS BASED ON ACTIVATED CARBON AND ANTHOCYANINS FROM BUTTERFLY PEA FLOWER (CLITORIA TERNATEA L.)

By
ADINDA NISA RAMADHANI
21/478648/PA/20762

This research focuses on the fabrication of Polylactic Acid (PLA) film layers with the addition of activated carbon and anthocyanins from Butterfly Pea Flower (Clitoria ternatea L.), as well as exploring the opportunities for its use in smart food packaging. The methods employed include variations in the composition of PLA films with glycerin and anthocyanins, along with the addition of activated carbon at different concentrations (0.04%; 0.08%; 0.12%; 0.16%). Characterization the layers were conducted using Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR), and UV-Vis spectrophotometry. Additionally, mechanical property tests such as tensile strength and contact angle were performed to evaluate the physical performance of the films. Antibacterial activity tests were also conducted to assess the potential of the films as safe and effective packaging materials. The results indicate that the developed PLA layer is biodegradable and capable of extending food shelf life, thus showing high potential as an innovative alternative for smart food packaging. However, no significant antibacterial effect has been found within the layer, necessitating further research with other antibacterial agents

Keywords: *Anthocyanin, Active Carbon, Butterfly Pea Flower, Polylactic Acid, Smart Packaging*