

KARAKTERISTIK *EDIBLE FILM* BERBASIS PATI TALAS (*Colocasia esculenta* (L.) Schott var. *pratama*) DENGAN *PLASTICIZER* FRUKTOSA DAN APLIKASINYA SEBAGAI KEMASAN MINYAK BUMBU

INTISARI

Oleh :

HANIF ADITYA
22/504271/TP/13613

Peningkatan produksi sampah plastik *nonbiodegradable* di Indonesia yang mencapai 12% dari total 64 juta ton sampah per tahun mendorong pengembangan alternatif kemasan ramah lingkungan. *Edible film* berbasis pati merupakan salah satu solusi kemasan berkelanjutan yang dapat terurai secara alami, namun memerlukan penambahan *plasticizer* untuk memperbaiki sifat fisik dan mekaniknya. Penelitian ini bertujuan untuk mengevaluasi karakteristik pati talas (*Colocasia esculenta*) varietas pratama serta mengkaji pengaruh penambahan fruktosa sebagai *plasticizer* pada konsentrasi 1,6%; 1,8%; 2,0%; dan 2,2% terhadap sifat fisik dan mekanik *edible film* berbasis pati talas.

Karakterisasi pati meliputi analisis kadar air, morfologi granula menggunakan *Scanning Electron Microscope*, sifat termal menggunakan *Differential Scanning Calorimetry*, dan sifat pasta menggunakan *Rapid Visco Analyzer*. Pati talas varietas Pratama menghasilkan rendemen sebesar 22,56%, kadar air 9,73%, ukuran granula rata-rata 1,78 μm , suhu puncak gelatinisasi 79,90°C, dan viskositas puncak sebesar 3.290 cP. Hasil penelitian menunjukkan bahwa penambahan fruktosa sebagai *plasticizer* secara signifikan meningkatkan viskositas larutan pembentuk film (96,9–119,6 cP), ketebalan film (0,131–0,147 mm), persen pemanjangan (27,98–37,70%), kadar air (13,11–14,12%), dan laju transmisi uap air (0,0027–0,0036 $\text{g/m}^2\cdot\text{Pa}\cdot\text{s}$), serta meningkatkan kelarutan hingga konsentrasi 2,0%, namun menurunkan nilai kuat tarik dari 5,79 MPa menjadi 2,64 MPa. Parameter warna dan transmitansi tidak menunjukkan perbedaan nyata antarkonsentrasi perlakuan. Seluruh formula memenuhi standar *Japan Industrial Standard*. Penelitian ini menunjukkan bahwa pati talas varietas Pratama berpotensi dikembangkan sebagai bahan baku *edible film* ramah lingkungan dengan fruktosa sebagai *plasticizer* yang efektif untuk aplikasi kemasan minyak.

Kata Kunci: *edible film*, fruktosa, kemasan ramah lingkungan, pati talas, sifat fisik dan mekanik

CHARACTERISTICS OF TARO STARCH-BASED EDIBLE FILM (*Colocasia esculenta* (L.) Schott var. *pratama*) WITH FRUCTOSE PLASTICIZER AND ITS APPLICATION AS SEASONING OIL PACKAGING

ABSTRACT

By:

HANIF ADITYA
22/504271/TP/13613

The rising production of nonbiodegradable plastic waste in Indonesia, accounting for 12% of the total 64 million tons of waste generated annually, has accelerated the development of environmentally friendly packaging alternatives. Starch-based edible film represents a sustainable packaging solution that is naturally biodegradable, yet requires the incorporation of a plasticizer to improve its physical and mechanical properties. This study aimed to evaluate the characteristics of taro starch (*Colocasia esculenta*) var. pratama and to investigate the effect of fructose addition as a plasticizer at concentrations of 1.6%, 1.8%, 2.0%, and 2.2% on the physical and mechanical properties of taro starch-based edible film.

Starch characterization included moisture content analysis, granule morphology using Scanning Electron Microscopy, thermal properties using Differential Scanning Calorimetry, and pasting properties using a Rapid Visco Analyzer. Taro starch var. Pratama yielded a starch extraction yield of 22.56%, moisture content of 9.73%, average granule size of 1.78 μm , peak gelatinization temperature of 79.90°C, and peak viscosity of 3,290 cP. The results showed that fructose addition as a plasticizer significantly increased the viscosity of the film-forming solution (96.9–119.6 cP), film thickness (0.131–0.147 mm), elongation at break (27.98–37.70%), moisture content (13.11–14.12%), and water vapor permeability (0.0027–0.0036 $\text{g/m}\cdot\text{Pa}\cdot\text{s}$), as well as enhanced solubility up to a concentration of 2.0%, while reducing tensile strength from 5.79 MPa to 2.64 MPa. Color parameters and transmittance showed no significant differences across treatment concentrations. All formulations met the Japan Industrial Standard requirements. This study shows that taro starch var. Pratama holds considerable potential as a raw material for environmentally friendly edible film, with fructose serving as an effective plasticizer for oil seasoning packaging.

Keywords: edible film, fructose, environmentally friendly packaging, taro starch, physical and mechanical properties