

## RINGKASAN

Plastik menjadi salah satu pengemas yang banyak digunakan karena memiliki keunggulan, yaitu ringan, kuat, mudah dibentuk, dan harganya terjangkau. Namun, dibalik keunggulan yang dimiliki, hal ini menyebabkan peningkatan cemaran lingkungan karena limbah plastik yang dibuang akan sangat sulit terurai. Oleh karena itu, diperlukannya alternatif bahan pengemas dengan karakteristik seperti plastik konvensional namun bersifat ramah lingkungan, yaitu bioplastik atau *biodegradable film*. Penelitian ini bertujuan untuk 1. Mengetahui karakteristik *biodegradable film* berbahan dasar tapioka dengan berbagai macam metode modifikasi. 2. Mengetahui karakteristik *biodegradable film* berbahan dasar tapioka termodifikasi dengan berbagai konsentrasi *plasticizer* sorbitol. 3. Mengetahui interaksi metode modifikasi pati dan konsentrasi *plasticizer* sorbitol terhadap karakteristik *biodegradable film*.

Penelitian ini dilaksanakan di Laboratorium Teknologi Pertanian, Fakultas Pertanian, Universitas Jenderal Soedirman selama 2 bulan mulai bulan Oktober 2021 hingga Desember 2021. Penelitian ini menggunakan rancangan percobaan yaitu Rancangan Acak Lengkap (RAL) faktorial yang terdiri dari dua faktor dengan tiga kali ulangan. Faktor yang digunakan yaitu metode modifikasi pati (M) dengan taraf M1 = asetilasi, M2 = *autoclaving cooling*, dan M3 = fermentasi dan konsentrasi sorbitol (S) dengan taraf S1 = 4%, S2 = 5%, dan S3 = 6% (b/v). Pada penelitian ini dilakukan pengujian sifat fisik yang meliputi ketebalan, kecerahan ( $L^*$ ), biodegradabilitas, transparansi, dan *water vapor transmission rate* (WVTR), dan sifat kimia meliputi kadar air dan kadar abu. Variabel fisik dan kimia dianalisis menggunakan ANOVA *two way* dan uji lanjut *Duncan Multiple Range Test* (DMRT) dengan taraf 5%. Perlakuan terpilih dibandingkan dengan kontrol menggunakan uji T.

Hasil penelitian menunjukkan metode modifikasi pati meningkatkan ketebalan dan transparansi *film* serta menurunkan kadar abu *film*; konsentrasi sorbitol meningkatkan ketebalan, biodegradabilitas, *water vapor transmission rate* (WVTR), dan kadar air serta menurunkan kadar abu *film*. Interaksi metode modifikasi pati meningkatkan transparansi, biodegradabilitas, dan *water vapor transmission rate* (WVTR), serta cenderung menurunkan kadar abu. Berdasarkan hasil penelitian diperoleh perlakuan terpilih yaitu *biodegradable film* dari pati yang dimodifikasi dengan metode fermentasi dan penambahan sorbitol konsentrasi 4% (M3S1).

Kata kunci : *Biodegradable film*, tapioka, modifikasi pati, asetilasi, *autoclaving cooling*, fermentasi, konsentrasi *plasticizer*, sorbitol.

## SUMMARY

*Plastic is one of the most widely used packaging materials because its light, strong, easy to shape, and affordable prices. However, behind its advantages, this causes an increase in environmental pollution because the plastic waste that is disposed of will be very difficult to decompose. Therefore, there is a need for alternative packaging materials with characteristics such as conventional plastics but environmentally friendly, namely bioplastics or biodegradable films. This study aims to know : 1. The characteristics of tapioca-based biodegradable films with various modification methods. 2. The characteristics of biodegradable films made from modified tapioca with various concentrations of sorbitol plasticizer. 3. The interaction of starch modification method and concentration of sorbitol plasticizer on the characteristics of biodegradable films.*

*This research was conducted at the Agricultural Technology Laboratory, Faculty of Agriculture, Jenderal Sudirman University for 2 months from October 2021 to December 2021. This study used a Completely Randomized Design (CRD) consisting of two factors with three replications. The factors used were starch modification method (M) with a level of M1 = acetylation, M2 = autoclaving cooling, and M3 = fermentation and sorbitol concentration with a level of S1 = 4%, S2 = 5%, and S3 = 6% (w/v). The physical properties observed in this study were thickness, brightness ( $L^*$ ), biodegradability, transparency, and water vapor transmission rate (WVTR), and chemical properties were water content and ash content. Physical and chemical variables were analyzed using two-way ANOVA and continued Duncan Multiple Range Test (DMRT) with a level of 5%. Selected treatment was compared with controls using the T test.*

*The results showed that the starch modification method increased the thickness and transparency of the film and reduced the ash content of the film; The concentration of sorbitol increases the thickness, biodegradability, water vapor transmission rate (WVTR), and moisture content and reduces the ash content of the film. The interaction of starch modification method increased transparency, biodegradability, and water vapor transmission rate (WVTR). Based on the research results, the selected treatment was biodegradable film from starch modified by fermentation method and the addition of 4% sorbitol concentration (M3S1).*

*Keywords : Biodegradable film, tapioca, starch modification, acetylation, autoclaving cooling, fermentation, plasticizer concentration, sorbitol.*