Pembuatan dan Karakterisasi *Edible film* dari Pati Ubi Jalar Termodifikasi *Heat Moisture Treatment* serta Aplikasinya sebagai Pengemas Dodol Nanas

Oleh:

Novita Indrianti
15/389504/PTP/01420

INTISARI

Edible film dari pati memiliki sifat barrier oksigen yang baik tetapi bersifat *brittle* dan kurang bagus dalam menahan migrasi uap air. Sifat fisik dan barrier *edible film* pati ubi jalar dapat ditingkatkan dengan modifikasi pati melalui *Heat Moisture Treatment* (HMT). Variasi perlakuan dalam penelitian ini adalah pati ubi jalar (alami, HMT 1 jam, HMT 2 jam, dan HMT 3 jam) dan konsentrasi pati (1 %, 1,25 %, dan 1,5 %). Analisis *edible film* meliputi ketebalan, kuat tarik, elongasi, WVP (*water vapor permeability*), kelarutan, dan warna. Penentuan *edible film* terbaik menggunakan uji indeks efektifitas kemudian dianalisis sifat morfologi, termal, dan kristalinitas. *Edible film* terbaik diaplikasikan sebagai pengemas dodol nanas dan dianalisis mutunya selama penyimpanan meliputi kadar FFA, kadar air, warna, tekstur, susut bobot, dan total mikrobia (TPC). Hasil penelitian menunjukkan modifikasi HMT menurunkan kadar air, kelarutan, dan *swelling volume* pati ubi jalar. Pola amilografi pati ubi jalar HMT menunjukkan suhu pasting tinggi, *peak viscosity* dan *breakdown viscosity* rendah, *setback viscosity* dan *final viscosity* tinggi sehingga pati ubi jalar HMT termasuk tipe C. Semakin lama pemanasan HMT menurunkan kadar air, kelarutan, dan *swelling volume* secara signifikan. Mikrostruktur pati ubi jalar HMT menunjukkan bentuk bulat, poligonal, lebih banyak agregat granula dan rongga di permukaan. Modifikasi HMT meningkatkan kristalinitas dan sifat termal pati ubi jalar. *Edible film* pati ubi jalar HMT memiliki ketebalan lebih tinggi, kuat tarik dan elongasi lebih tinggi, WVP lebih rendah, kelarutan dan warna lebih rendah dibandingkan *edible film* pati ubi jalar alami. Sifat fisik *edible film* pati ubi jalar HMT 1 jam, HMT 2 jam dan HMT 3 jam tidak berbeda signifikan. Konsentrasi pati ubi jalar 1,5 % dapat menurunkan kuat tarik, elongasi, dan kelarutan serta meningkatkan ketebalan dan WVP *edible film*. Berdasarkan uji indeks efektivitas diperoleh *edible film* terbaik yaitu *edible film* pati ubi jalar HMT 1 jam konsentrasi 1 % dengan karakteristik fisik yaitu ketebalan 0,056 mm; kuat tarik 6,88 MPa; elongasi 20 %; WVP 0,554 g.mm/m2.KPa.hari, dan kelarutan 42,65 %. Mikrostruktur *edible film* pati ubi jalar HMT halus, homogen dan lebih kompak. Kristalinitas dan stabilitas termal *edible film* pati ubi jalar HMT lebih tinggi dibandingkan *edible film* pati ubi jalar alami. Mutu dodol nanas di akhir penyimpanan minggu ke-5 yaitu kadar air 9,83 %; kadar asam lemak bebas 0,084 %; dan total mikrobia (TPC) 1500 koloni/g (masih di bawah ambang batas SNI dodol nanas).

Kata Kunci: *edible film*, pati ubi jalar, *heat moisture treatment*, dodol nanas

Preparation and Characterization of Heat Moisture Treated Sweet Potato Starch Edible film and Its Application as Pineapple Dodol Packaging

By:

Novita Indrianti
15/389504/PTP/01420

ABSTRACT

Starch edible films had good oxygen barrier but they exhibited poor mechanical properties and highly water vapor permeability. These shortcomings can be improved with Heat Moisture Treatement (HMT) modified starch. The treatments in this research were types of sweet potato starch (native, HMT 1 hour, HMT 2 hour, and HMT 3 hour) and starch concentrations (1 %, 1.25 %, and 1.5 %). Edible films were analyzed for thickness, tensile strength, elongation, WVP, solubility, and color. The best edible film was chosen using the effectiveness index method and analyzed for morphological, thermal, and crystallinity properties. Then it was applied as pineapple dodol packing and analyzed their quality during storage (FFA content, moisture content, color, texture, weight loss, and TPC). The results showed that HMT reduced the moisture content, the solubility and the swelling volume of sweet potato starch. HMT sweet potato starch showed high pasting temperature, low peak viscosity, low breakdown viscosity, high setback and high final viscosity. It indicated that HMT sweet potato starches are categorized as C type pasting profile. The microstructure of HMT sweet potato starch showed oval, polygonal, more aggregated and hollow surfaces structure. HMT enhanced the crystallinity and the thermal properties of sweet potato starch. The thickness, the tensile strength, and the elongation of modified sweet potato starch films higher than those of native films. On the other hand, the solubility, the WVP and the color of modified sweet potato starch films lower than those of native films. Longer durations of HMT had no effects on the characteristics of films. The increase of sweet potato starch concentrations (1.5 %) enhanced the moisture content, the thickness, and the WVP but decreased the tensile strength, the elongation, and the solubility of films. The modified sweet potato starch films had a smooth, homogeneous, compact, and dense film surfaces. The crystallinity and the thermal properties of the modified sweet potato starch films showed more increased than those of the native film. The treatment of 1 h HMT and 1 % of sweet potato starch produced a good film with the characteristics i.e. 0.056 mm thickness; 6.88 MPa tensile strength; 20 % elongation; 0.554 g.mm/m2.KPa.day WVP, and 42.65 % solubility.The quality of pineapple dodol showed that during 5 weeks storage, the moisture content was 9.83 %; the FFA content was 0.84 %; and the TPC was 1500 colony/g (below the threshold of SNI pineapple dodol).

Key words: edible film, sweet potato starch, heat moisture treatment, pineapple dodol