RINGKASAN

Biodegradable film merupakan salah satu alternatif yang dapat menurunkan ketergantungan terhadap penggunaan plastik konvensional berbahan petroleum yang relatif sulit terdegradasi. *Biodegradable film* mudah rusak dan sobek sehingga dapat menurunkan daya proteksinya sebagai bahan pengemas sehingga dikembangkan *self-healing biodegradable film* yang memiliki kemampuan untuk memperbaiki lapisan yang rusak sehingga tetap memberikan proteksi pada bahan makanan. Penelitian ini bertujuan untuk mengetahui karakteristik fisik dan mekanis *self-healing biodegradable film* yang diproduksi dari beberapa jenis biopolimer, mengetahui kemampuan *self-healing properties biodegradable film,* dan mengetahui pengaruh formula terpilih dari *self-healing biodegradable film* terhadap umur simpan serta karakteristik fisik dan kimia buah anggur selama penyimpanan.

Penelitian ini terdiri atas dua tahap, di mana tahap pertama adalah produksi *biodegradable film* dengan menggunakan Rancangan Acak Lengkap (RAL) dengan dua faktor percobaan yaitu perbedaan jenis biopolimer yang digunakan dan faktor kedua yaitu konsentrasi *plasticizer.* Bahan yang digunakan terdiri dari *chitosan* (P1)*, sodium alginate* (P2)*, sodium alginate* kombinasi pati ganyong (P3) dan *sodium alginate* kombinasi konjak glukomanan (P3) dan penambahan konsentrasi *plasticizer* sorbitol sebesar 1% (S1), sorbitol 2% (S2) dan sorbitol 3% (S3). Parameter yang diujikan meliputi nilai ketebalan, kadar air, *tensile strength* dan *elongation*, warna *biodegradable film,* nilai laju transmisi uap air, dan kemampuan *self-healing.* Penelitian tahap kedua dilakukan dengan mengaplikasikan formulasi perlakuan terpilih pada buah anggur dengan metode *brushing* dan *wrapping* yang disimpan selama 20 hari pada suhu ruang*,* desain pada penelitian tahap kedua dilakukan dengan Rancangan Acak Lengkap (RAL) satu faktorial. Parameter yang diujikan meliputi susut bobot, kekerasan, total padatan terlarut, total asam tertitrasi, kandungan vitamin C dan warna buah anggur.

Hasil penelitian tahap pertama diketahui bahwa rata-rata ketebalan adalah 0,15 – 0,20 mm, nilai rata-rata kadar air berkisar 18% - 30%, nilai *elongation* berkisar 11,75 – 59,94%, nilai *tensile strength* berkisar antara 0,033 – 0,277 MPa dan nilai laju transpirasi uap air berkisar antara 2,65 – 5,91 (g/m2.jam). Kode P4S2 dapat direkomendasikan sebagai *biodegradable film* yang diaplikasikan pada penelitian tahap kedua. Metode *wrapping* dan *brushing* dalam penelitian tahap kedua mampu memperpanjang umur simpan buah sampai hari penyimpanan ke-20, sedangkan buah anggur tanpa perlakuan busuk pada hari ke-8. Berdasarkan hasil penelitian diketahui bahwa metode *wrapping* direkomendasikan karena dapat mempertahankan kualitas buah selama penyimpanan.

SUMMARY

Biodegradable film is an alternative that can reduce the consumption of conventional petroleum-based plastics that are relatively difficult to degrade. Biodegradable film is easily damaged so that it can reduce its protection properties. As a packaging material, a self-healing biodegradable film has been developed to repair damaged layers and protect food. This study aims to determine the physical and mechanical characteristics of self-healing biodegradable films produced from several types of biopolymers, determine the self-healing properties of biodegradable films, and determine the effect of selected formulas of self-healing biodegradable films on the shelf life, physical and chemical characteristics of grapes during storage.

This research consists of two stages. The first stage is biodegradable film production using a completely randomized design (CRD) with two experimental factors. The first factor is the different types of biopolymers used, and the second factor is the plasticizer concentration. The materials used consisted of chitosan (P1), sodium alginate (P2), sodium alginate combined with canna starch (P3), and sodium alginate combined with konjac glucomannan (P3), and the addition of sorbitol plasticizer concentration of sorbitol 1% (S1), sorbitol 2% (S2) and sorbitol 3% (S3). Parameters tested included the thickness, moisture content, tensile strength and elongation, biodegradable film color, water vapor transmission rate, and self-healing ability. In the second stage of the research, the selected treatment formulation was applied to grapes by brushing and wrapping methods which stored for 20 days at room temperature, and the research was carried out with a one-factorial Completely Randomised Design (CRD). The parameters tested included weight loss, hardness, total soluble solids, total titratable acid, vitamin C content, and color of grapes.

The results of the first stage of the study showed that the average thickness was 0.15 - 0.20 mm, the average moisture content value ranged from 18% - 30%, the elongation value ranged from 11.75 - 59.94%, the tensile strength value ranged from 0.033 - 0.277 MPa and the water vapor transpiration rate value ranged from 2.65 - 5.91 (g/m2.h). Code P4S2 can be recommended as a biodegradable film for the second research stage. In the second stage of the study, it was found that the wrapping and brushing methods could extend the fruit's shelf life until the 20th storage day, while the untreated grapes rotted on the eighth day. Based on the results, it is known that the wrapping method is recommended because it can maintain the quality of the fruit during storage.