

ABSTRAK

PENGEMBANGAN *EDIBLE COATING* PEKTIN-KITOSAN DENGAN
PENAMBAHAN EKSTRAK DAUN ASAM JAWA (*Tamarindus indica* L.) SEBAGAI
SUMBER BELAJAR MATERI MAKROMOLEKUL

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2026

Kerusakan pascapanen pada buah anggur merah (*Vitis vinifera* L.) akibat dari proses respirasi, transpirasi, dan kontaminasi mikroorganisme menyebabkan penurunan kualitas dan umur simpan. Penelitian ini bertujuan untuk (1) Menentukan formulasi optimum *edible coating* berbasis pektin-kitosan yang diperkaya dengan ekstrak daun asam jawa (*Tamarindus indica* L.); (2) Mengevaluasi pengaruhnya terhadap umur simpan buah anggur merah.) Ekstrak daun asam jawa diperoleh dari maserasi menggunakan etanol 70% dan dikarakterisasi menggunakan *fourier transform infrared* (FTIR) dan *gas chromatography-mass spectrometry* (GC-MS). Optimasi formulasi dilakukan dengan melakukan variasi konsentrasi pektin, kitosan, dan ekstrak daun asam jawa. Formulasi terbaik kemudian dikarakterisasi menggunakan FTIR dan dievaluasi berdasarkan parameter susut bobot, *persentase* buah layak konsumsi, total asam yang dapat dititrasi, dan sudut kontak. (1) Formulasi terbaik diperoleh pada konsentrasi pektin 1,5%, kitosan 1,5%, dan ekstrak daun asam jawa 2%. (2) Formulasi tersebut menurunkan susut bobot sebesar 7,3% setelah lima hari penyimpanan, dibandingkan dengan kontrol tanpa *coating* sebesar 14,5%. (3) Pada formulasi optimum rasio buah layak konsumsi pada lima hari penyimpanan adalah sebesar 100%, nilai total asam yang dapat dititrasi sebesar 2,4% lebih tinggi dibandingkan kontrol dan sifat hidrofobik permukaan *edible coating* meningkat. Peningkatan kinerja *edible coating* dikaitkan dengan terbentuknya matriks polielektrolit pektin-kitosan yang lebih rapat dan diperkuat senyawa bioaktif ekstrak daun asam jawa sehingga efektif menghambat perpindahan uap air dan gas pada buah. Hasil menunjukkan bahwa *edible coating* yang dikembangkan berpotensi digunakan sebagai kemasan hayati ramah lingkungan untuk mempertahankan kualitas dan memperpanjang umur simpan buah penyimpanan

Kata kunci: Anggur merah, *Edible coating*, Ekstrak daun asam jawa, Kitosan, Pektin, Umur simpan

ABSTRACT

**THE DEVELOPMENT OF PECTIN-CHITOSAN EDIBLE COATING ENRICHED
WITH TAMARIND LEAF EXTRACT (*Tamarindus Indica L.*) FOR
MACROMOLECULAR LEARNING MATERIAL**

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Postharvest deterioration of red grapes (*Vitis vinifera L.*) is one of the major causes of yield loss due to respiration, transpiration, and microbial contamination during storage, resulting in reduced fruit quality and shelf life. One promising strategy to minimize these losses is the application of a biopolymer-based edible coating enriched with natural bioactive compounds. This study aims to (1) Determine the optimal formulation of a pectin-chitosan-based edible coating enriched with tamarind (*Tamarindus indica L.*) leaf extract (2) Evaluate its effect on the shelf life of red grapes. Tamarind leaf extract was prepared by maceration using 70% ethanol, and subsequently characterized using Fourier transform infrared (FTIR) and gas chromatography-mass spectrometry (GC-MS). The edible coating formulation was optimized by varying the concentrations of pectin, chitosan, and tamarind leaf extract. The best formulation was then characterized using FTIR and evaluated based on the parameters of weight loss, percentage of edible fruit, total titratable acidity, and contact angle measurement. The result showed that the best formulation consisted of 1.5% pectin, 1.5% chitosan, and 2% tamarind leaf extract. (1) This formulation reduced weight loss to 7.3% after five days of storage, compared with 14.5% in the uncoated control. (2) Furthermore, the coated red grapes with the optimal formulation was able to maintain a 100% marketable fruit after five days of storage, (3) Retained a higher total titratable acidity (2.4%) than the control, and exhibited improved surface hydrophobicity. These improvement are attribute to the formation of a denser pectin-chitosan polyelectrolyte network reinforced by bioactive compound present in tamarind leaf extract, which effectively reduced the transfer of water vapor and gases. The results demonstrate that the developed edible coating has the potential to be used as an environmentally friendly bio-packaging material for preserving the quality and extending the shelf life of red grapes during storage.

Keywords: Edible coating, Pectin, Chitosan, Tamarind leaf extract, Red grapes, Shelf life.