

PENGARUH FORTIFIKAN BUBUK EKSTRAK ROSELLA TERHADAP AKTIVITAS ANTIOKSIDAN, STABILITAS LIPID, DAN KARAKTER FISIK COKELAT HITAM

INTISARI

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Cokelat hitam merupakan produk pangan berbasis lemak yang rentan mengalami oksidasi lipid selama penyimpanan sehingga dapat menurunkan mutu dan umur simpan produk. Bunga rosella (*Hibiscus sabdariffa L.*) kaya akan senyawa fenolik dan antosianin yang berpotensi sebagai antioksidan alami penangkal radikal bebas. Namun, penelitian sebelumnya umumnya hanya mengevaluasi aktivitas antioksidan awal dan belum mengkaji secara terintegrasi pengaruh penambahan bubuk ekstrak rosella terhadap stabilitas lipid, karakteristik fisik, dan prediksi umur simpan selama penyimpanan. Penelitian ini bertujuan mengevaluasi pengaruh penambahan bubuk ekstrak rosella pada berbagai rasio ekstraksi. Bubuk ekstrak rosella diperoleh melalui ekstraksi UAE dengan rasio 1:50, 2:50, dan 3:50. Sampel cokelat disimpan pada suhu 20 °C, 30 °C, dan 40 °C selama 20 hari. Parameter yang diamati meliputi aktivitas antioksidan (%RSA metode DPPH), angka peroksida (PV), angka anisidin (AV), total oksidasi (TOTOX), warna, kekerasan, morfologi permukaan (SEM), serta titik leleh. Penentuan umur simpan dilakukan menggunakan metode ASLT model Arrhenius.

Penambahan ekstrak rosella tidak memberikan perbedaan signifikan terhadap parameter warna, namun memengaruhi karakteristik tekstur dengan kecenderungan penurunan kekerasan serta terbentuknya permukaan yang lebih granular. Aktivitas antioksidan meningkat selama penyimpanan, sementara nilai PV, AV, dan TOTOX pada cokelat dengan rosella lebih rendah dibandingkan kontrol, menunjukkan peningkatan stabilitas oksidatif. Berdasarkan pendekatan Accelerated Shelf Life Testing (ASLT) model Arrhenius menggunakan parameter TOTOX sebagai indikator kritis, formulasi dengan penambahan ekstrak rosella 3:50

menghasilkan stabilitas terbaik dan umur simpan terpanjang pada suhu penyimpanan 25°C.

Kata Kunci : antioksidan, ASLT, cokelat hitam, oksidasi lipid, rosella.

THE EFFECT OF ROSELLE EXTRACT POWDER FORTIFICATION ON ANTIOXIDANT ACTIVITY, LIPID STABILITY, AND PHYSICAL CHARACTERISTICS OF DARK CHOCOLATE

ABSTRACT

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Dark chocolate is a fat-based food product that is susceptible to lipid oxidation during storage, which may reduce product quality and shelf life. Roselle (*Hibiscus sabdariffa* L.) is rich in phenolic compounds and anthocyanins that have potential as natural antioxidants capable of scavenging free radicals. However, previous studies have generally focused only on initial antioxidant activity and have not comprehensively evaluated the integrated effects of roselle extract powder incorporation on lipid stability, physical characteristics, and shelf-life prediction during storage. This study aimed to evaluate the effect of roselle extract powder addition at various concentrations on dark chocolate quality. Roselle extract powder was produced using UAE with extraction ratios of 1:50, 2:50, and 3:50. Chocolate samples were stored at 20 °C, 30 °C, and 40 °C for 20 days. Observed parameters included antioxidant activity (%RSA using the DPPH method), peroxide value (PV), anisidine value (AV), total oxidation (TOTOX), color, hardness, surface morphology (SEM), and melting properties. Shelf life was determined using the Accelerated Shelf Life Testing (ASLT) method based on the Arrhenius model.

The addition of roselle extract did not significantly affect color parameters but influenced texture characteristics, showing a tendency toward reduced hardness and the formation of a more granular surface morphology. Antioxidant activity increased during storage, while PV, AV, and TOTOX values of roselle-enriched chocolates were lower than those of the control, indicating improved oxidative stability. Based on the ASLT Arrhenius model using TOTOX as the critical quality parameter, chocolate containing 3g roselle extract exhibited the best stability and the longest predicted shelf life at a storage temperature of 25°C.

Keywords: antioxidant, ASLT, dark chocolate, lipid oxidation, roselle.