ABSTRAK

Kurkumin dan zinc merupakan senyawa yang memiliki aktivitas imunomodulator, namun pemanfaatan kurkumin secara oral masih terbatas akibat bioavailabilitasnya yang rendah. Teknologi liposomal dapat digunakan untuk meningkatkan stabilitas dan ketersediaan hayati kurkumin melalui proses enkapsulasi dalam vesikel fosfolipid. Selain itu, *gummy candy* dipilih sebagai bentuk sediaan karena praktis, menarik, dan memiliki penerimaan yang baik oleh konsumen. Penelitian ini bertujuan untuk menentukan formulasi *gummy candy* kombinasi kurkumin liposomal dan *zinc gluconate* yang memiliki karakteristik fisik dan stabilitas yang baik.

Kurkumin liposomal dibuat menggunakan metode hidrasi lapis tipis (*thin film hydration method*) dengan variasi rasio kurkumin dan lesitin 1:1, 2:1, dan 3:1. Karakterisasi liposom meliputi efisiensi penjerapan, pH, viskositas, ukuran partikel, dan indeks polidispersitas (PDI). Formula terbaik kemudian diformulasikan menjadi *gummy candy* dengan variasi konsentrasi gelatin F1 (15%), F2 (12,5%), F3 (10%), F4 (7,5%), dan F5 (5%). Sediaan *gummy candy* dievaluasi meliputi organoleptik, keseragaman bobot, waktu hancur, *moisture content*, pH, *dan color measurement.*

Hasil penelitian menunjukkan bahwa kurkumin liposomal menghasilkan efisiensi penjerapan pada rasio 1:1, 2:1, dan 3:1 sebesar 99,62%, 99,64%, dan 99,96%. Karakterisasi formula terbaik menunjukkan nilai pH 5,63 ± 0,09, viskositas 0,779 ± 0,016 cPs, ukuran partikel 228,95 ± 3,25 nm, dan PDI 0,423 ± 0,024. Hasil evaluasi *gummy candy* menunjukkan seluruh formula memiliki warna oranye, aroma khas jeruk, dan rasa manis. Formula 1 dengan gelatin 15% merupakan formula terbaik dengan keseragaman bobot 3,6301 ± 0,0549 g, waktu hancur 3 menit 49 detik, moisture content 7,2891 ± 0,4688%, pH 5,06 ± 0,0000, dan nilai ΔE 0,00 ± 1,0614. Uji hedonik menunjukkan F1 memperoleh skor tertinggi sebesar 161. Pada uji stabilitas penyimpanan, F1 mampu mempertahankan karakteristik organoleptik dan keseragaman bobot, meskipun terjadi peningkatan *moisture content* pada hari ke-30.

Berdasarkan hasil penelitian, Formula 1 dengan konsentrasi gelatin 15% merupakan formula terbaik *gummy candy* kombinasi kurkumin liposomal dan *zinc gluconate.*

Kata kunci: *gummy candy*, kurkumin liposomal, *zinc gluconate*, gelatin, stabilitas fisik.

ABSTRACT

Curcumin and zinc are compounds known to have immunomodulatory activity; however, the oral utilization of curcumin is limited due to its low bioavailability. Liposomal technology can be used as a delivery system to improve curcumin stability and bioavailability through encapsulation within phospholipid vesicles. In addition, gummy candy was selected as a dosage form because it is practical, attractive, and has good consumer acceptance. This study aimed to determine the formulation of gummy candy containing liposomal curcumin and zinc gluconate with good physical characteristics and stability.

Liposomal curcumin was prepared using the thin film hydration method with variations in curcumin and lecithin ratios of 1:1, 2:1, and 3:1. Liposome characterization was performed by evaluating entrapment efficiency, pH, viscosity, particle size, and polydispersity index (PDI). The best liposomal formula was then incorporated into gummy candy formulations with different gelatin concentrations: F1 (15%), F2 (12.5%), F3 (10%), F4 (7.5%), and F5 (5%). The gummy candy formulations were evaluated for organoleptic properties, weight uniformity, disintegration time, moisture content, pH, and color measurement.

The results showed that liposomal curcumin produced entrapment efficiency values of 99.62%, 99.64%, and 99.96% for the 1:1, 2:1, and 3:1 ratios, respectively. The characterization of the best liposomal formula showed a pH value of 5.63 ± 0.09, viscosity of 0.70 ± 0.01 cP, particle size of 228,95 ± 3,25 nm, and PDI value of 0,423 ± 0,024. Evaluation of gummy candy showed that all formulations produced an orange color, citrus aroma, and sweet taste. Formula 1 with 15% gelatin was selected as the best formula, with weight uniformity of 3.6301 ± 0.0549 g, disintegration time of 3 minutes 49 seconds, moisture content of 7.2891 ± 0.4688%, pH of 5.06 ± 0.0000, and ΔE value of 0.00 ± 1.0614. The hedonic test showed that Formula 1 obtained the highest score of 161 compared with other formulas. During accelerated stability testing, F1 maintained organoleptic characteristics and weight uniformity, although moisture content increased on day 30.

Based on the results, Formula 1 with 15% gelatin was the best gummy candy formulation containing liposomal curcumin and zinc gluconate.

Keywords: *gummy candy, liposomal curcumin, zinc gluconate, gelatin, physical stability.*