ABSTRAK

Imelda Angie Jesica (01038210032)

OPTIMASI FORMULA KRIM *NANOSTRUCTURED LIPID CARRIERS* EKSTRAK RIMPANG KUNYIT (*Curcuma longa* L.) DENGAN VARIASI KONSENTRASI *THICKENING AGENT* SERTA UJI AKTIVITAS ANTIOKSIDAN

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(XX + 160 halaman; 35 tabel; 39 gambar, 14 lampiran)

Perawatan kulit penting untuk melindungi dari polusi, sinar matahari, dan radikal bebas. Antioksidan diperlukan untuk menetralkan radikal bebas yang dapat merusak kulit. Rimpang kunyit mengandung kurkumin dengan aktivitas antioksidan tinggi. Penelitian ini menggunakan teknologi *Nanostructured Lipid Carriers* (NLC) untuk meningkatkan enkapsulasi dan penetrasi zat aktif ke kulit. Proses penelitian meliputi ekstraksi, uji kadar flavonoid total, formulasi NLC, optimasi formula krim, evaluasi fisik, serta uji antioksidan menggunakan metode DPPH. Rendemen ekstrak kunyit sebesar 26,293% dengan kadar flavonoid 127,807 ± 3,69 mgQE/g. Formula NLC terdiri dari 5% ekstrak kunyit, 3% *cetyl alcohol*, 7% *isopropyl myristate*, 35% tween 80, 7% propilen glikol, dan air. NLC yang dihasilkan memiliki ukuran partikel 215,7 ± 48,93 nm, PI 0,8953 ± 0,089, dan zeta potensial -32,133 ± 0,351 mV. Formula krim optimum mengandung 7,2% asam stearat dan 4,8% *cetyl alcohol*. Krim berwarna kuning cerah, bertekstur lembut, beraroma mangga, dengan pH 4,95 ± 0,030, daya sebar 6,025 ± 0,108 cm, daya lekat 5,54 ± 0,151 detik, dan tipe emulsi M/A. Nilai IC_{50} ekstrak kunyit 93,718 ppm, krim NLC 15309,17 ± 52,66 ppm, dan krim ekstrak 13989,37 ± 88,08 ppm. Akan tetapi, hasil aktivitas pada sediaan menunjukkan aktivitas antioksidan sangat rendah, sehingga diperlukan optimasi metode pengujian.

Kata Kunci: (Ekstrak rimpang kunyit, *Nanostructured Lipid Carriers* (NLC), Krim, Antioksidan)

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ABSTRACT

Imelda Angie Jesica (01038210032)

OPTIMIZATION OF NANOSTRUCTURED LIPID CARRIERS CREAM FORMULA CONTAINING TURMERIC RHIZOME EXTRACT (Curcuma longa L.) WITH VARIATION IN THICKENING AGENT CONCENTRATION AND ANTIOXIDANT ACTIVITY TEST

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(XX + 160 *pages;* 35 *tables;* 39 *pictures,14 appendices)*

Skin care is essential to protect the skin from pollution, sunlight, and free radicals. Antioxidants are required to neutralize free radicals that can damage skin cells. Turmeric rhizome contains curcumin with strong antioxidant activity. This study utilized Nanostructured Lipid Carrier (NLC) technology to improve the encapsulation and skin penetration of the active compounds. The research process included extraction, total flavonoid content measurement, NLC formulation, cream optimization, physical evaluation, and antioxidant testing by the DPPH method. Turmeric extract yielded 26.293% with a total flavonoid content of 127.807 ± 3.69 mgQE/g. The NLC formula consisted of 5% turmeric extract, 3% cetyl alcohol, 7% isopropyl myristate, 35% tween 80, 7% propylene glycol, and water. The NLC had a particle size of 215.7 ± 48.93 nm, polydispersity index 0.8953 ± 0.089, and zeta potential -32.133 ± 0.351 mV. The optimal cream contained 7.2% stearic acid and 4.8% cetyl alcohol. The cream was bright yellow, soft, mango-scented, with pH 4.95 ± 0.030, spreadability 6.025 ± 0.108 cm, adhesion 5.54 ± 0.151 seconds, and water-in-oil type emulsion. IC_{50} values were 93.718 ppm (extract), 15,309.17 ppm (NLC cream), and 13,989.37 ppm (extract cream). Antioxidant activity in cream was low, requiring testing optimization.

Keywords: (Turmeric rhizome extract, Nanostructured Lipid Carriers (NLC)*, Cream, Antioxidant)*

References: 162 (2004 – 2025)