

POTENSI FOTOPROTEKSI KRIM MENGANDUNG NANOEMULSI MINYAK ATSIRI BUNGA KENANGA (*Cananga odorata*) SEBAGAI SEDIAAN TABIR SURYA

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INTISARI

Paparan sinar UV yang tinggi di Indonesia mendorong pengembangan tabir surya alami yang aman dan ramah lingkungan. Minyak atsiri bunga kenanga (MABK) berdasarkan hasil analisis menggunakan GC-MS (QP2010 Shimadzu) mengandung linalool sebesar 3,19% yang memiliki potensi agen fotoproteksi. Penelitian ini bertujuan untuk mengembangkan sediaan krim mengandung nanoemulsi MABK sebagai alternatif sediaan tabir surya. MABK dibuat nanoemulsi dengan metode emulsifikasi spontan dalam 10 formula dengan rasio MABK sebagai minyak, cremophor RH40 sebagai surfaktan, dan PEG 400 sebagai kosurfaktan yang berbeda. Formula F1, F5, dan F9 terpilih sebagai formulasi nanoemulsi MABK optimum, dengan rasio MABK : cremophor RH40 : PEG 400 masing-masing 1:8:1, 2:7:1, dan 3:5:2. Ukuran partikel terkecil diperoleh pada F1 ($15,63 \pm 0,06$ nm; PDI $0,11 \pm 0,02$), diikuti F5 ($20,80 \pm 0,17$ nm; PDI $0,38 \pm 0,50$) dan F9 ($25,30 \pm 0,10$ nm; PDI $0,07 \pm 0,03$), menegaskan stabilitas dan keseragaman dispersi seiring peningkatan rasio minyak. Formula optimum nanoemulsi diinkorporasikan dalam basis krim yang menghasilkan krim nanoemulsi putih tipe O/W (*Oil in Water*) dengan karakteristik: ukuran partikel $546,5 \pm 27,4$ nm, PDI $0,44 \pm 0,16$, zeta potensial $-48,3 \pm 0,6$ mV, pH 6,15, viskositas 5.410 ± 15 cps, daya sebar $6,90 \pm 0,05$ cm, daya lekat $4,32 \pm 0,23$ s, tanpa pemisahan fase atau gumpalan pasca sentrifugasi. Penentuan nilai SPF krim nanoemulsi MABK menggunakan spektrofotometri Uv-Vis V-760 menunjukkan nilai SPF 0,18, akan tetapi dalam bentuk nanoemulsi MABK diperoleh SPF 40. Dengan demikian, meskipun krim nanoemulsi MABK telah memenuhi parameter fisika kimia, akan tetapi belum menunjukkan potensi fotoproteksi yang signifikan sehingga perlu optimasi dalam formulasi.

Kata kunci : Krim, linalool, minyak atsiri bunga kenanga, nanoemulsi, tabir surya.

PHOTOPROTECTIVE POTENTIAL OF A CREAM CONTAINING NANOEMULSION OF KENANGA (*Cananga odorata*) ESSENTIAL OIL AS A SUNSCREEN FORMULATION

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ABSTRACT

High UV exposure in Indonesia encourages the development of natural sunscreens that are safe and environmentally friendly. The essential oil of *Cananga odorata* flowers (MABK) based on analysis using GC-MS (QP2010 Shimadzu), contains 3.19% linalool, which has potential as a photoprotective agent. This study aimed to develop a cream formulation incorporating a nanoemulsion of MABK as an alternative sunscreen preparation. MABK nanoemulsions were prepared by the spontaneous emulsification method in ten different formulations, using MABK as the oil phase, Cremophor RH40 as the surfactant, and PEG 400 as the co-surfactant. Formulations F1, F5, and F9 were identified as the optimum nanoemulsions, with essential oil : Cremophor RH40 : PEG 400 ratios of 1 : 8 : 1, 2 : 7 : 1, and 3 : 5 : 2, respectively. The smallest particle size was observed in F1 (15.63 ± 0.06 nm; PDI 0.11 ± 0.02), followed by F5 (20.80 ± 0.17 nm; PDI 0.38 ± 0.50) and F9 (25.30 ± 0.10 nm; PDI 0.07 ± 0.03), confirming dispersion stability and uniformity even as the oil ratio increased. The optimum nanoemulsion was incorporated into a cream base, resulting in a white O/W (Oil in Water) nanoemulsion cream with the following characteristics: particle size 546.5 ± 27.4 nm, PDI 0.44 ± 0.16 , zeta potential -48.3 ± 0.6 mV, pH 6.15, viscosity $5,410 \pm 15$ cps, spreadability $6,90 \pm 0,05$ cm, adhesion time 4.32 ± 0.23 s, and no phase separation or aggregation occurred after centrifugation. Determination of the SPF value of MABK nanoemulsion cream using spectrophotometry Uv-Vis V-760 showed an SPF value of 0.18, but in the form of MABK nanoemulsion, an SPF of 40 was obtained. Although MABK nanoemulsion cream required the physicochemical parameters, it has not shown significant photoprotection potential so it needs optimization in the formulation.

Keywords : Cream, linalool, *Cananga odorata* flower essential oil, nanoemulsion, sunscreen.