INTISARI

Paparan UV berlebih secara kronis menyebabkan masyarakat rentan mengalami penuaan dini, *sun burn*, melasma dan kanker kulit. Penggunaan tabir surya yang mengandung antioksidan memberikan proteksi yang lebih komprehensif. Heksagamavunon-5 (HGV-5) efektif dalam penyerapan sinar UVB dan kafein memiliki aktivitas antioksidan melalui proteksi seluler. Kombinasi ini berpotensi memberikan efek sinergis sebagai tabir surya. Penelitian ini bertujuan untuk menentukan efektivitas, stabilitas, dan indeks iritasi primer krim kombinasi HGV-5 dan kafein. Metode penelitian meliputi uji nilai *Sun Protection Factor* (SPF) HGV-5 secara *in vitro*. Dilanjutkan dengan optimasi basis krim dengan variasi konsentrasi asam stearat, trietanolamin, dan setil alkohol menggunakan *simplex lattice design* (SLD). Basis optimum dipilih berdasarkan respon pH, viskositas, dan daya lekatnya kemudian ditambahkan zat aktif HGV-5 (0,20% b/b) dan kafein (1; 2; 3 % b/b). Ditetapkan nilai SPF, %transmisi eritema (%TE), %transmisi pigmentasi (%TP), stabilitas, dan indeks iritasi primer.

Hasil penelitian menunjukkan bahwa basis krim optimum pada konsentrasi asam stearat (10% b/b), trietanolamin (2% b/b), dan setil alkohol (2% b/b) . Krim tabir surya formula P4 dengan kafein (3% b/b) dan HGV-5 (0,2%) menunjukkan nilai SPF tertinggi yaitu 32,51 dan termasuk kategori perlindungan tabir surya *sunblock*. Formula tabir surya dengan kafein 3%b/b menunjukkan peningkatan IC_{50} yang signifikan dibandingkan formula tanpa kafein. Hasil uji stabilitas menunjukkan formula yang stabil ditinjau dari tidak adanya pemisahan fase pada uji *cycling* selama 3 siklus dan uji mekanis ketahanan terhadap gaya eksternal, serta tidak ada perubahan signifikan pada pH, viskositas, dan daya lekat selama penyimpanan pada suhu ruang. Uji iritasi akut dermal menunjukkan tidak terjadi iritasi pada ketiga kelinci. Tabir surya HGV-5 dan kafein memiliki karakteristik krim yang baik, stabil dalam berbagai kondisi penyimpanan, aman dalam uji iritasi hewan, dan dapat membantu melindungi kulit dari paparan UV berlebih.

Kata Kunci: HGV-5, Kafein, Krim, Efektivitas, Iritasi

ABSTRACT

Chronic excessive UV exposure makes people susceptible to premature aging, sunburn, melasma, and skin cancer. The use of sunscreen containing antioxidants provides more comprehensive protection. Hexagamavunon-5 (HGV-5) is effective in absorbing UVB rays and caffeine has antioxidant activity through cellular protection. This combination has the potential to provide a synergistic effect as a sunscreen. This study aims to determine the effectiveness, stability, and primary irritation index of a combination cream of HGV-5 and caffeine. The research method includes testing the Sun Protection Factor (SPF) value of HGV-5 in vitro. Followed by optimization of the cream base with varying concentrations of stearic acid, triethanolamine, and cetyl alcohol using simplex lattice design (SLD). The optimum base was selected based on its pH response, viscosity, and adhesiveness, then added the active ingredients HGV-5 (0.20% w/w) and caffeine (1; 2; 3% w/w). The SPF, % erythema transmission (%TE), % pigmentation transmission (%TP), stability, and primary irritation index were determined.

The results showed that the optimum cream base was at a concentration of stearic acid (10% w/w), triethanolamine (2% w/w), and cetyl alcohol (2% w/w). The P4 sunscreen cream formula with caffeine (3% w/w) and HGV-5 (0.2%) showed the highest SPF value of 32.51 and was categorized as a sunblock. The sunscreen formula with 3% w/w caffeine showed a significant increase in IC50 compared to the caffeine-free formula. Stability test results indicated the formula was stable, as evidenced by the absence of phase separation in the three-cycle cycling test and mechanical resistance to external forces, as well as no significant changes in pH, viscosity, and adhesion during storage at room temperature. The acute dermal irritation test showed no irritation in the three rabbits. The HGV-5 and caffeine sunscreen has good cream properties, is stable under various storage conditions, is safe in animal irritation tests, and can help protect the skin from excessive UV exposure.

Keywords: HGV-5, Caffeine, Cream, Effectiveness, Irritation