

FORMULASI DAN EVALUASI KRIM KOMBINASI EKSTRAK DAUN PEGAGAN (*Centella asiatica L*) DAN BEMOTRIZINOL SEBAGAI TABIR SURYA

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ABSTRAK

Indonesia beriklim tropis yang menyebabkan kulit sering terpapar sinar matahari, sehingga berisiko mengalami kerusakan kulit akibat radiasi ultraviolet. Bemotrizinol merupakan agen penyerap UV spektrum luas (280–380 nm), sedangkan ekstrak daun pegagan (*Centella asiatica L*) mengandung flavonoid yang berfungsi sebagai tabir surya alami dan antioksidan. Penelitian ini bertujuan untuk memformulasikan ekstrak daun pegagan dan bemotrizinol dalam bentuk sediaan krim yang memiliki efektivitas proteksi terhadap sinar UV. Optimasi basis krim dilakukan menggunakan perangkat lunak *Design Expert 13*. Formula basis optimal terdiri dari asam stearat 8% dan setil alkohol 2%. Evaluasi stabilitas fisik meliputi uji *Real-Time* dan *cycling test*, pengujiannya mencakup organoleptik, homogenitas, pH, viskositas, daya sebar, dan daya lekat. Penilaian keamanan dilakukan melalui uji iritasi, sedangkan aktivitas tabir surya dianalisis secara *in vitro* dengan metode spektrofotometri UV-Vis untuk menentukan nilai SPF. Hasil uji stabilitas dianalisis menggunakan uji statistik normalitas, homogenitas, *one way ANOVA*, dan uji lanjutan *post hoc*. Meskipun terdapat perbedaan yang signifikan ($p < 0,05$), seluruh sediaan tetap memenuhi kriteria evaluasi yang ditetapkan. Nilai SPF untuk F0 basis adalah $5,62 \pm 0,01$ (proteksi sedang), F1 bemotrizinol $30,97 \pm 0,10$, F2 ekstrak pegagan $28,81 \pm 0,46$, dan F3 kombinasi keduanya $35,16 \pm 0,09$ (seluruhnya proteksi ultra). Berdasarkan uji iritasi, F1 dan F2 tergolong iritan sangat ringan.

Kata kunci: bemotrizinol, ekstrak daun pegagan, krim tabir surya, SPF

**FORMULATION AND EVALUATION OF COMBINATION
CREAM OF GENTA LEAF EXTRACT (*Centella asiatica* L) AND
BEMOTRIZINOL AS A SUNSCREEN**

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ABSTRACT

Indonesia has a tropical climate that causes skin to be frequently exposed to sunlight, thus risking skin damage due to ultraviolet radiation. Bemotrizinol is a broad-spectrum UV absorbing agent (280–380 nm), while Centella asiatica L. leaf extract contains flavonoids that function as antioxidants and natural sunscreens. This study aims to formulate Centella asiatica leaf extract and bemotrizinol in the form of a cream preparation that has effective protection against UV rays. Cream base optimization was carried out using Design Expert 13 software. The optimal base formula consists of 8% stearic acid and 2% cetyl alcohol. Physical stability evaluation includes Real-Time and cycling tests, the tests include organoleptic, homogeneity, pH, viscosity, spreadability, and adhesion. Safety assessment is carried out through irritation tests, while sunscreen activity is analyzed in vitro with the UV-Vis spectrophotometry method to determine the SPF value. The results of the stability test were analyzed using statistical tests of normality, homogeneity, one-way ANOVA, and post hoc follow-up tests. Despite significant differences ($p < 0.05$), all preparations still met the established evaluation criteria. The SPF values for F0 base were 5.62 ± 0.01 (moderate protection), F1 bemotrizinol 30.97 ± 0.10 , F2 pegagan extract 28.81 ± 0.46 , and F3 combination of both 35.16 ± 0.09 (all ultra protection). Based on the irritation test, F1 and F2 was classified as a very mild irritant.

Keywords: bemotrizinol, pegagan leaf extract sunscreen cream, SPF