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PENGARUH VARIASI KONSENTRASI EKSTRAK DAUN KELOR (*MORINGA OLEIFERA*) TERHADAP SIFAT FISIK DAN NILAI *SUN PROTECTION FACTOR* (SPF) SEDIAAN KRIM TABIR SURYA SECARA IN VITRO

ABSTRAK

Latar belakang: Paparan radiasi sinar ultraviolet (UV) dapat menyebabkan berbagai gangguan pada kulit, sehingga diperlukan sediaan tabir surya yang efektif dan aman. Ekstrak daun kelor (*Moringa oleifera*) diketahui mengandung senyawa flavonoid dan fenolik yang berpotensi sebagai agen fotoprotektif alami. Penelitian ini bertujuan untuk mengetahui pengaruh variasi konsentrasi ekstrak daun kelor terhadap sifat fisik dan nilai Sun Protection Factor (SPF) sediaan krim tabir surya.
Metode: Penelitian ini merupakan penelitian eksperimental laboratorium dengan variasi konsentrasi ekstrak 1% (F1), 1,5% (F2), dan 2% (F3), serta basis krim sebagai kontrol negatif (F0) dan kontrol positif. Evaluasi sifat fisik meliputi organoleptis, homogenitas, pH, daya lekat, daya sebar, viskositas, dan tipe krim. Penentuan nilai SPF dilakukan secara *in vitro* menggunakan spektrofotometer UV-Vis pada panjang gelombang 290–320 nm. Data dianalisis menggunakan uji *Shapiro–Wilk*, uji homogenitas *Levene*, dan *One Way ANOVA*.
Hasil: Hasil pengujian menunjukkan bahwa seluruh formula memiliki tipe krim minyak dalam air (M/A) dan memenuhi persyaratan sifat fisik sediaan topikal. Nilai rata-rata SPF yang diperoleh yaitu F0 sebesar 0,20; F1 sebesar 3,42; F2 sebesar 3,68; F3 sebesar 4,95; dan kontrol positif sebesar 32,57. Formula F1 dan F2 termasuk kategori proteksi minimal, F3 termasuk kategori sedang, sedangkan kontrol positif termasuk kategori ultra. Hasil uji normalitas menunjukkan seluruh data terdistribusi normal ($p > 0,05$). Uji *One Way ANOVA* menunjukkan terdapat perbedaan yang signifikan antar formula terhadap nilai SPF ($p < 0,001$).
Kesimpulan: Variasi konsentrasi ekstrak etanol daun kelor (*Moringa oleifera*) berpengaruh signifikan terhadap nilai SPF sediaan krim tabir surya. Konsentrasi 2% (F3) memberikan nilai SPF tertinggi di antara formula uji, yaitu 4,95, sehingga menunjukkan efektivitas perlindungan UV yang paling optimal dalam penelitian ini.
Kata kunci: *Moringa oleifera*, krim tabir surya, sifat fisik, *Sun Protection Factor* (SPF).

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THE EFFECT OF VARIATIONS IN MORINGA LEAF EXTRACT (MORINGA OLEIFERA) CONCENTRATION ON THE PHYSICAL PROPERTIES AND SUN PROTECTION FACTOR (SPF) VALUE OF SUNSCREEN CREAM PREPARATIONS IN VITRO

ABSTRACT

Background: *Exposure to ultraviolet (UV) radiation may cause various skin disorders; therefore, effective and safe sunscreen preparations are required. Moringa leaf extract (Moringa oleifera) is known to contain flavonoid and phenolic compounds that have potential as natural photoprotective agents. This study aimed to determine the effect of variations in moringa leaf extract concentration on the physical properties and Sun Protection Factor (SPF) value of sunscreen cream preparations.*

Methods: *This study was a laboratory experimental study using extract concentrations of 1% (F1), 1.5% (F2), and 2% (F3), with cream base as a negative control (F0) and a positive control. Evaluation of physical properties included organoleptic test, homogeneity, pH, adhesion, spreadability, viscosity, and cream type. The SPF value was determined in vitro using a UV-Vis spectrophotometer at wavelengths of 290–320 nm. Data were analyzed using the Shapiro–Wilk test, Levene's homogeneity test, and One Way ANOVA.*

Results: *The results showed that all formulas had an oil-in-water (O/W) cream type and met the physical requirements of topical preparations. The average SPF values obtained were 0.20 for F0, 3.42 for F1, 3.68 for F2, 4.95 for F3, and 32.57 for the positive control. Formulas F1 and F2 were classified as minimal protection, F3 as moderate protection, and the positive control as ultra protection. The normality test indicated that all data were normally distributed ($p > 0.05$). The One Way ANOVA test showed a significant difference among formulas in terms of SPF value ($p < 0.001$).*

Conclusion: *Variations in the concentration of ethanolic moringa leaf extract (Moringa oleifera) significantly affected the SPF value of sunscreen cream preparations. The 2% concentration (F3) produced the highest SPF value (4.95) among the tested formulas, indicating the most optimal UV protection effectiveness in this study.*

Keywords: *Moringa oleifera, sunscreen cream, physical properties, Sun Protection Factor (SPF).*