

ABSTRAK

Latar Belakang: Indonesia memiliki paparan sinar matahari tinggi yang dapat berdampak negatif pada kulit. Kombinasi ekstrak daun kelor dan titanium dioksida dalam *tinted sunscreen* belum pernah diteliti sebelumnya. Oleh karena itu, penelitian ini bertujuan untuk mengembangkan *tinted sunscreen* berbasis emulsi ganda guna meningkatkan kestabilan fisik dan efektivitas SPF.

Tujuan: Mengetahui perbedaan sifat dan stabilitas fisik, serta nilai SPF pada berbagai variasi konsentrasi ekstrak daun kelor dan titanium dioksida dalam sediaan *tinted sunscreen*.

Metode: Ekstrak daun kelor diperoleh melalui maserasi dengan pelarut etanol 70%, lalu diformulasikan bersama titanium dioksida menjadi emulsi ganda dengan berbagai variasi konsentrasi. Sediaan diuji meliputi sifat dan kestabilan fisik serta aktivitas sebagai tabir surya.

Hasil: Hasil nilai SPF ekstrak pada konsentrasi 2%, 6%, dan 10% secara berturut-turut adalah 6,97, 31,44, dan 39,42. Sediaan memiliki warna bervariasi dari krem muda hingga coklat tua, berbau khas ekstrak, homogen, serta nilai pH yang sesuai dengan syarat. Daya lekat dan daya sebar seluruh formula memenuhi kriteria, kecuali formula 3 untuk daya lekat, dan formula 4 untuk daya lekat serta sebar. Sediaan tergolong stabil secara fisik, kecuali F2 dan F4 yang menunjukkan ketidakstabilan pada parameter pH. Nilai rata-rata SPF tiap formula adalah: F1 (13,46); F2 (33,32); F3 (40,26); F4 (34,05); dan F5 (6,55).

Kesimpulan: Variasi konsentrasi ekstrak daun kelor dan titanium dioksida dalam sediaan *tinted sunscreen* memberikan perbedaan signifikan terhadap sifat fisik sediaan dan nilai SPF. Ketidakstabilan fisik hanya terjadi pada parameter pH di F2 dan F4.

Kata kunci : *daun kelor, titanium dioksida, emulsi ganda, tabir surya, SPF*

ABSTRACT

Background: Indonesia has high sun exposure which can have negative impacts on the skin. The combination of moringa leaf extract and titanium dioxide in tinted sunscreen has never been studied before. Therefore, this study aims to develop a double emulsion-based tinted sunscreen to increase the physical stability and effectiveness of SPF.

Aim: To determine the differences in characteristics and physical stability, as well as SPF values in various concentrations of moringa leaf extract and titanium dioxide in tinted sunscreen preparations.

Methods: Moringa leaf extract was obtained through maceration with 70% ethanol solvent, then formulated with titanium dioxide into a double emulsion with various concentrations. The preparations were tested including the properties and physical stability and activity as sunscreens.

Results: The results of the SPF values of the extract at concentrations of 2%, 6%, and 10% were 6.97, 31.44, and 39.42, respectively. The preparations have colors ranging from light cream to dark brown, have a distinctive extract odor, are homogeneous, and have pH values that meet the requirements. The adhesive power and spreading power of all formulas met the criteria, except for formula 3 for adhesive power, and formula 4 for adhesive and spreading power. The preparations were classified as physically stable, except for F2 and F4 which showed instability in the pH parameter. The average SPF value of each formula was: F1 (13.46); F2 (33.32); F3 (40.26); F4 (34.05); and F5 (6.55).

Conclusion: Variations in the concentration of moringa leaf extract and titanium dioxide in tinted sunscreen preparations provide significant differences in the physical properties of the preparations and SPF values. Physical instability only occurs in the pH parameters at F2 and F4.

Keywords: *moringa leaves, titanium dioxide, double emulsion, sunscreen, SPF*