

ABSTRACT

Meniran (*Phyllanthus niruri* L.) contains flavonoids, alkaloids, coumarins, and polyphenols that can function as an antioxidant. The direct usage of meniran is less practical and effective, thus the lotion is made as the dosage form. Cera alba is used to increase the lotion viscosity while cetyl alcohol is used as an emulsifier. This study aims to determine the effects of cera alba-cetyl alcohol mixture to the physical properties of the meniran extract lotion which can form a lotion preparation with optimum physical properties using the simplex lattice design.

The making of meniran etanol extracts 4.5% lotion formula using the simplex lattice design method was by comparing the proportion of cera alba and cetyl alcohol until 8 formulas were obtained according to software Design Expert® version 7.1.5. Each formula's physical properties, namely viscosity, dispersive power, and adhesion were tested. Predicted results of the optimum formula and the obtained data were verified and analyzed using one sample t-test with a confidence level of 95%. Furthermore, a test for the optimum formula of the antioxidant activity by in vitro was conducted using spectrophotometer UV-Vis free radicals catching method DPPH (2,2-difenyl-1-pikrylhydrazyl) with IC_{50} parameters and lotion stability test using the freeze and thaw cycling test and centrifugation.

The study results based on simplex lattice design method showed the combined mixture of cera alba 8.00% and 4.00% cetyl alcohol as the optimum composition for the lotion preparations. The experimental results did not differ significantly to the response of the predicted results on the confidence level of 95% ($p > 0.05$). This shows that the simplex lattice design method can be used to define the optimum lotion formula. The antioxidant activity of meniran extract lotion preparations from the optimization result produced IC_{50} of 31.24 $\mu\text{g} / \text{mL}$. Stability test showed that the meniran extract lotion has a less stable stability using freeze and thaw cycling test method.

Key word: meniran, lotion, optimization, antioxidants

INTISARI

Meniran (*Phyllanthus niruri* L.) mengandung senyawa flavonoid, alkaloid, kumarin, dan polifenol sehingga dapat berfungsi sebagai antioksidan. Penggunaan meniran secara langsung dinilai kurang praktis dan efektif sehingga dibuat dalam bentuk sediaan *lotion*. *Cera alba* digunakan untuk meningkatkan viskositas *lotion* sedangkan setil alkohol berfungsi sebagai emulgator. Penelitian ini bertujuan untuk mengetahui pengaruh campuran *cera alba*-setil alkohol terhadap sifat fisik *lotion* ekstrak meniran yang dapat membentuk sediaan *lotion* dengan sifat fisik optimum menggunakan metode *simplex lattice design*.

Pembuatan formula *lotion* ekstrak etanol meniran 4,5% dengan metode *simplex lattice design* yaitu membandingkan proporsi *cera alba* dan setil alkohol hingga didapat 8 formula berdasarkan *software Design Expert*® versi 7.1.5. Setiap formula dilakukan uji sifat fisik yaitu viskositas, daya sebar, dan daya lekat. Hasil uji sifat fisik formula hasil percobaan kemudian dibandingkan dengan perhitungan *simplex lattice design* menggunakan uji t satu sampel. Selain itu juga dilakukan uji aktivitas antioksidan formula optimum secara *in vitro* menggunakan spektrofotometer UV-Vis metode penangkapan radikal bebas DPPH (*2,2-difenyl-1-pikrylhydrazyl*) dengan parameter IC₅₀ dan uji stabilitas *lotion* menggunakan metode *freeze and thaw cycling test* dan sentrifugasi

Hasil penelitian berdasarkan metode *simplex lattice design* menunjukkan kombinasi campuran 8,00% *cera alba* dan 4,00% setil alkohol sebagai komposisi optimum sediaan *lotion*. Hasil percobaan tidak berbeda signifikan terhadap respon hasil prediksi ($p > 0,05$). Hal ini menunjukkan bahwa metode *simplex lattice design* dapat digunakan untuk menetapkan formula *lotion* optimum. Aktivitas antioksidan pada sediaan *lotion* ekstrak meniran hasil optimasi menghasilkan IC₅₀ sebesar 31,24 µg/mL. *Lotion* ekstrak meniran formula optimum menunjukkan ketidakstabilan fisik berdasarkan metode *freeze and thaw cycling test*.

Kata kunci : meniran, *lotion*, optimasi, antioksidan