

INTISARI

Heksagamavunon-5 (HGV-5) merupakan senyawa analog kurkumin yang memiliki aktivitas antioksidan sehingga berpotensi dikembangkan menjadi bahan aktif dalam sediaan tabir surya yang mampu memberikan proteksi pada kulit dari efek radiasi ultraviolet. Salah satu cara untuk meningkatkan efektivitas penggunaan Heksagamavunon-5 pada kulit adalah dengan memformulasikannya menjadi sediaan dalam bentuk gel. Penelitian ini bertujuan untuk mengevaluasi karakteristik dan stabilitas fisik gel Heksagamavunon-5 (HGV-5) yang diformulasikan dari optimasi *gelling agent* karbopol, natrium karboksimetil selulosa (Na-CMC), dan hidroksipropil metil selulosa (HPMC). Formula optimum gel Heksagamavunon-5 yang dihasilkan selanjutnya diuji aktivitas tabir suryanya secara *in vitro*.

Optimasi formula basis gel dilakukan pada kombinasi tiga *gelling agent*, yaitu karbopol, Na-CMC, dan HPMC menggunakan metode *Simplex Lattice Design* dengan *software Design Expert versi 13*. Seluruh formula basis gel yang didapat, dievaluasi karakteristik fisiknya menggunakan uji organoleptik, pH, viskositas, dan uji daya sebar untuk menentukan formula optimum basis gel. Basis gel dan gel HGV-5 yang didapatkan dari formula optimum diuji kembali karakteristik fisiknya menggunakan uji organoleptik, homogenitas, pH, viskositas, daya sebar, dan daya lekatnya. Stabilitas formula optimum diuji dengan metode *cycling test* selama tiga siklus. Aktivitas gel HGV-5 sebagai tabir surya diuji menggunakan metode spektrofotometri UV-Vis dengan menganalisis nilai *Sun Protection Factor* (SPF), persen transmisi eritema (%TE), dan persen transmisi pigmentasi (%TP). Data dianalisis secara statistik menggunakan *software IBM SPSS statistik 25*.

Hasil penelitian menunjukkan formula optimum basis gel terdiri dari kombinasi 0,194% karbopol, 1,100% Na-CMC, dan 0,706% HPMC dengan nilai pH $6,47 \pm 0,01$, viskositas $2950,00 \pm 21,07$ cPois, daya sebar $16,67 \pm 0,27$ cm², dan daya lekat $1,82 \pm 0,03$ detik. Gel HGV-5 menghasilkan nilai SPF sebesar 35,11, %Te sebesar 0,126%, dan %Tp sebesar 0,003%. Hasil uji stabilitas, basis gel dan gel HGV-5 stabil secara organoleptis dan homogenitas. Pada respon pH, viskositas, daya sebar, serta daya lekat, basis gel dan gel HGV-5 tidak stabil selama penyimpanan 3 siklus.

Kata Kunci: heksagamavunon-5, tabir surya, gel, radiasi UV, stabilitas fisik

ABSTRACT

Hexagamavunon-5 (HGV-5) is a curcumin analog compound that has antioxidant activity so that it has the potential to be developed into an active ingredient in sunscreen preparations that can provide protection to the skin from the effects of ultraviolet radiation. One way to increase the effectiveness of the use of Hexagamavunon-5 on the skin is to formulate it into a preparation in the form of a gel. This study aims to evaluate the characteristics and physical stability of Hexagamavunon-5 (HGV-5) gel formulated from the optimization of carbopol gelling agents, sodium carboxymethyl cellulose (Na-CMC), and hydroxypropyl methyl cellulose (HPMC). The optimum formula of the Hexagamavunon-5 gel produced was then tested for its sunscreen activity *in vitro*.

Formula optimization of gel base was performed on a combination of three gelling agents, namely carbopol, Na-CMC, and HPMC using the Simplex Lattice Design method with Design Expert software version 13. All base gel formulas obtained were evaluated for their physical characteristics using organoleptic, pH, viscosity, and spreadability tests to determine the optimum gel base formula. The gel base and HGV-5 gel obtained from the optimum formula were re-tested for their physical characteristics using organoleptic, homogeneity, pH, viscosity, spreadability, and adhesion tests. The stability of the optimum formula was tested using the cycling test method for three cycles. The activity of HGV-5 gel as a sunscreen was tested using the UV-Vis spectrophotometry method by analyzing the Sun Protection Factor (SPF) value, percent erythema transmission (%TE), and percent pigmentation transmission (%TP). The data were analyzed statistically using IBM SPSS statistical software 25.

The results showed that the optimum gel base formula consisted of a combination of 0.194% carbopol, 1.100% Na-CMC, and 0.706% HPMC with a pH value of 6.47 ± 0.01 , viscosity of 2950.00 ± 21.07 cPoises, spreadability of 16.67 ± 0.27 cm², and adhesion of 1.82 ± 0.03 seconds. HGV-5 gel produced an SPF value of 35.11, %Te of 0.126%, and %Tp of 0.003%. The results of the stability test, the gel base and HGV-5 gel were stable in terms of organoleptic and homogeneity. In terms of pH, viscosity, spreadability, and adhesiveness, the gel base and HGV-5 gel were unstable during 3 cycles of storage.

Kata Kunci: heksagamavunon-5, tabir surya, gel, radiasi UV, stabilitas fisik