

INTI SARI

Penuaan kulit akibat stres oksidatif merupakan dampak dari paparan radikal bebas terhadap jaringan biologis. Senyawa antioksidan seperti Pentagamavunon-5 (PGV-5) berperan penting dalam eradikasi radikal dan proteksi sel terhadap kerusakan oksidatif. Sediaan serum dengan karakteristik fisik optimal mampu mengoptimalkan penetrasi zat aktif secara efisien ke dalam jaringan kulit. Penelitian ini bertujuan menghasilkan formula serum PGV-5 melalui optimasi *thickening agent* kombinasi HPMC dan CMC-Na untuk memperoleh sediaan dengan sifat fisik dan stabilitas yang baik.

Penelitian diawali dengan uji aktivitas antioksidan senyawa PGV-5 menggunakan reagen DPPH untuk memperoleh nilai IC_{50} . Optimasi sediaan serum menggunakan metode *simplex lattice design* dengan variasi konsentrasi HPMC dan CMC-Na. Formula optimum dievaluasi sifat fisik, aktivitas antioksidan, dan stabilitasnya. Data dianalisis menggunakan IBM SPSS *Statistics* 26 dengan taraf kepercayaan 95%.

Hasil penelitian menunjukkan serum PGV-5 memiliki aktivitas antioksidan sangat kuat dengan nilai IC_{50} sebesar 7,62 mikromol. Formula optimum terdiri dari HPMC:CMC-Na (0,45%:0,55%) menghasilkan pH $4,78 \pm 0,205$, viskositas $390,86 \pm 63,76$ cPoise, dan diameter sebar $7,93 \pm 0,065$ cm. Sediaan menunjukkan organoleptis, homogenitas, dan daya lekat yang stabil, sementara pH dan diameter sebar mengalami peningkatan disertai penurunan viskositas selama 3 siklus penyimpanan. Serum PGV-5 mampu mempertahankan aktivitas antioksidan meskipun terjadi perubahan parameter sifat fisik sehingga berpotensi sebagai sediaan topikal antioksidan.

Kata kunci: Serum, PGV-5, sifat fisik, stabilitas, antioksidan

ABSTRACT

Skin aging due to oxidative stress results from free radical attacks on biological tissues. Antioxidant compounds such as Pentagamavunon-5 (PGV-5) play an important role in radical eradication and cell protection against oxidative damage. Serum formulations with optimal physical characteristics can efficiently optimize active substance penetration into skin tissues. This research aimed to develop a PGV-5 serum formula through optimization of HPMC and CMC-Na *thickening agent* combinations to obtain a formulation with good physical properties and stability.

The research began with testing the antioxidant activity of PGV-5 compound using DPPH reagent to obtain IC_{50} values. Serum formulation optimization employed the *simplex lattice design* method with varying concentrations of HPMC and CMC-Na. The optimum formula was evaluated for physical properties, antioxidant activity, and stability. Data were analyzed using IBM SPSS *Statistics* 26 with a 95% confidence level.

The results showed that PGV-5 serum exhibited very strong antioxidant activity with an IC_{50} value of 7.62 microM. The optimum formula consisted of HPMC:CMC-Na (0.45%:0.55%) producing pH 4.78 ± 0.205 , viscosity 390.86 ± 63.76 cPoise, and spreading diameter 7.93 ± 0.065 cm. The formulation demonstrated stable organoleptic properties, homogeneity, and adhesion characteristics, while pH and spreading diameter increased accompanied by decreased viscosity during 3 storage cycles. PGV-5 serum maintained its antioxidant activity despite changes in physical parameters, showing potential as a topical antioxidant formulation.

Keywords: Serum, PGV-5, physical properties, stability, antioxidant