

INTISARI

Serum wajah merupakan sediaan kosmetik yang banyak diminati karena mampu menghantarkan bahan aktif dalam konsentrasi tinggi dengan tekstur ringan dan mudah diserap kulit. Tetrahidropentagamavunon-5 (THPGV-5) merupakan turunan sintesis kurkumin yang memiliki stabilitas dan aktivitas antioksidan tinggi sehingga berpotensi dikembangkan dalam sediaan serum. Penelitian ini bertujuan untuk mengoptimasi konsentrasi *gelling agent* karbomer dan xanthan gum dalam formula serum THPGV-5 serta mengevaluasi stabilitas fisik sediaan dan aktivitas antioksidannya.

Optimasi formula dilakukan menggunakan metode *Simplex Lattice Design* (SLD) dengan konsentrasi karbomer dan xanthan gum sebagai variabel independen, serta pH, viskositas, dan daya sebar sebagai respon. Analisis optimasi dilakukan menggunakan perangkat lunak Design-Expert versi 13. Evaluasi sediaan meliputi uji organoleptis, homogenitas, pH, viskositas, daya sebar, daya lekat, dan stabilitas fisik menggunakan metode *cycling test*, sedangkan analisis statistik dilakukan menggunakan IBM SPSS *Statistics* 25. Aktivitas antioksidan serum diuji menggunakan metode DPPH dan dinyatakan sebagai nilai IC₅₀.

Hasil penelitian menunjukkan bahwa formula optimum serum THPGV-5 diperoleh dari kombinasi xanthan gum 0,152% dan karbomer 0,148% dengan nilai *desirability* sebesar 0,766, serta menunjukkan kesesuaian antara nilai prediksi dan nilai aktual respon fisik sediaan. Serum yang dihasilkan memiliki pH 5,21, viskositas 1096 cPs, dan daya sebar 38,66 cm². Evaluasi stabilitas fisik menunjukkan bahwa pH relatif stabil dengan kecenderungan penurunan yang tidak drastis, daya sebar dan daya lekat hanya mengalami variasi kecil, serta viskositas mengalami fluktuasi, tetapi secara statistik tidak terdapat perbedaan signifikan antar siklus pengujian. Uji homogenitas menunjukkan bahwa sediaan belum sepenuhnya memenuhi kriteria homogenitas yang diduga berkaitan dengan kelarutan zat aktif yang belum optimal. Sementara itu, uji aktivitas antioksidan dengan metode DPPH menunjukkan bahwa serum THPGV-5 memiliki nilai IC₅₀ sebesar 2,409 ppm (5,791 µM).

Kata Kunci: tetrahidropentagamavunon-5, serum, antioksidan, *gelling agent*

ABSTRACT

Facial serum is a widely used cosmetic preparation because it can deliver active ingredients at high concentrations with a light texture and good skin absorption. Tetrahydropentagamavunon-5 (THPGV-5), a synthetic derivative of curcumin, exhibits high stability and strong antioxidant activity, making it a promising candidate for serum formulation. This study aimed to optimize the concentrations of carbomer and xanthan gum as gelling agents in a THPGV-5 serum formulation and to evaluate the physical stability and antioxidant activity of the product.

Formula optimization was carried out using the Simplex Lattice Design (SLD) method, with carbomer and xanthan gum concentrations as independent variables and pH, viscosity, and spreadability as response parameters. The optimization analysis was performed using Design-Expert software version 13. The formulation was evaluated through organoleptic, homogeneity, pH, viscosity, spreadability, adhesiveness, and physical stability tests using the cycling test method, while statistical analysis was conducted using IBM SPSS Statistics 25. The antioxidant activity of the serum was determined using the DPPH method and expressed as the IC₅₀ value.

The results showed that the optimum THPGV-5 serum formulation was obtained from a combination of 0.152% xanthan gum and 0.148% carbomer, with a desirability value of 0.766, and demonstrated good agreement between the predicted and actual values of the physical responses. The resulting serum had a pH of 5.2075, a viscosity of 1096 cPs, and a spreadability of 7.013 cm. The physical stability evaluation indicated that the pH remained relatively stable with a slight decreasing trend, the spreadability and adhesiveness showed only minor variations, and the viscosity fluctuated; however, no statistically significant differences were observed among the testing cycles. The homogeneity test showed that the formulation did not fully meet the homogeneity criteria, which was presumably related to the suboptimal solubility of the active compound. Meanwhile, the DPPH assay showed that the THPGV-5 serum had an IC₅₀ value of 2.409 ppm (5.791 μ M), indicating strong antioxidant activity.

Keywords: tetrahydropentagamavunon-5, serum, antioxidant, gelling agent