

## INTISARI

Penuaan dini pada kulit menjadi salah satu permasalahan yang banyak ditemui, sehingga penggunaan produk perawatan kulit dengan kandungan antioksidan dapat dijadikan sebagai alternatif solusi. Senyawa tetrahidropentagamavunon-0 (THPGV-0) diketahui memiliki aktivitas antioksidan yang tinggi, sehingga sangat berpotensi digunakan sebagai zat aktif dalam sediaan serum. Agar sediaan serum memiliki viskositas yang tepat, dibuat optimasi kombinasi *gelling agent Hydroxy Propyl Methyl Cellulose* (HPMC) dan *xanthan gum*. Penelitian ini bertujuan untuk mengetahui pengaruh variasi HPMC dan *xanthan gum* terhadap stabilitas dan sifat fisik serum serta mengukur aktivitas antioksidan THPGV-0.

Penelitian ini merupakan penelitian eksperimental dengan metode *Simplex Lattice Design* (SLD). Penelitian diawali dengan pembuatan formula serum dengan memvariasikan HPMC dan *xanthan gum* kemudian diuji parameter pH, diameter sebar dan viskositas. Hasil uji dianalisis untuk mendapatkan formula optimum dengan bantuan *software design expert* versi 13. Serum THPGV-0 nantinya akan diuji sifat fisik (*organoleptis*, homogenitas, pH, viskositas, daya lekat, dan diameter sebar) dan stabilitas (*cycling test*). Diuji juga aktivitas antioksidannya dengan DPPH secara spektrofotometri UV-Vis. Dilakukan analisis data formula optimum menggunakan *software SPSS* versi 29.

Hasil penelitian menunjukkan bahwa formula basis optimum berada pada kombinasi 0,1% *xanthan gum* dan 0,65% HPMC, dengan viskositas 353,75 cPs; pH 5,76; dan diameter sebar 8,84 cm. Serum yang dihasilkan berwarna putih keruh, bertekstur lembut, cair sedikit kental, dan homogen. Uji stabilitas menunjukkan penurunan pada viskositas, peningkatan diameter sebar, penurunan daya lekat, sedangkan pH tetap stabil secara statistik. Hasil analisis SPSS menunjukkan tidak ada signifikansi pada viskositas, pH, diameter sebar, dan daya lekat selama uji stabilitas. Senyawa THPGV-0 memiliki nilai  $IC_{50}$  sebesar 22,031  $\mu$ M menunjukkan aktivitas antioksidan yang tinggi. Sedangkan serum THPGV-0 memiliki nilai  $IC_{50}$  sebesar 22,978  $\mu$ M. Berdasarkan hasil evaluasi sifat fisik, stabilitas, dan pengujian aktivitas antioksidan, serum THPGV-0 menunjukkan potensi yang signifikan untuk dikembangkan sebagai sediaan perawatan kulit yang efektif.

**Kata kunci:** antioksidan; HPMC; serum; THPGV-0; *xanthan gum*

## ABSTRACT

Premature skin aging is one of the most common skin problems; therefore, the use of skincare products containing antioxidants can be considered an alternative solution. The compound tetrahydropentagamavunon-0 (THPGV-0) is known to possess high antioxidant activity, making it highly potential to be used as an active ingredient in serum formulations. To obtain a serum with appropriate viscosity, an optimization of the combination of Hydroxy Propyl Methyl Cellulose (HPMC) and xanthan gum as gelling agents was carried out. This study aimed to determine the effect of variations in HPMC and xanthan gum concentrations on the stability and physical properties of the serum, as well as to evaluate the antioxidant activity of THPGV-0.

This study was an experimental research using the Simplex Lattice Design (SLD) method. The study began with the preparation of serum formulations by varying the concentrations of HPMC and xanthan gum, followed by testing several parameters including pH, spreadability, and viscosity. The test results were analyzed to obtain the optimum formula using Design Expert software version 13. The THPGV-0 serum was then evaluated for its physical properties (organoleptic characteristics, homogeneity, pH, viscosity, adhesiveness, and spreadability) and stability (cycling test). Antioxidant activity was also evaluated using the DPPH method through UV-Vis spectrophotometry. Data analysis of the optimum formula was performed using SPSS software version 29.

The results showed that the optimum base formula was obtained at a combination of 0.1% xanthan gum and 0.65% HPMC, with viscosity of 353.75 cPs, pH of 5.76, and spreadability of 8.84 cm. The resulting serum was milky white in color, had a smooth texture, slightly viscous liquid consistency, and was homogeneous. Stability testing showed a decrease in viscosity, an increase in spreadability, and a decrease in adhesiveness, while pH remained statistically stable. SPSS analysis indicated no significant differences in viscosity, pH, spreadability, and adhesiveness during the stability test. THPGV-0 compound showed an  $IC_{50}$  value of 22.031  $\mu$ M, indicating high antioxidant activity, while THPGV-0 serum showed an  $IC_{50}$  value of 22.978  $\mu$ M. Based on the evaluation of physical properties, stability, and antioxidant activity testing, THPGV-0 serum demonstrates significant potential to be developed as an effective skincare formulation.

**Keywords:** antioxidant; HPMC; serum; THPGV-0; xanthan gum