

INTISARI

Paparan sinar UV yang berlebihan dapat memberikan efek jangka panjang berupa penuaan kulit. *Avobenzone* sebagai filter UVA, dapat memproteksi kulit secara maksimal dari kerusakan akibat radiasi UV. *Hyaluronic acid* yang umumnya dikombinasikan dengan bahan aktif lain, juga mampu mengurangi tanda-tanda penuaan dengan mekanisme peningkatan hidrasi kulit. Penelitian ini bertujuan untuk mengoptimasikan gliserin sebagai humektan dan *tween* 80 sebagai emulsifier supaya menghasilkan karakterisasi fisik dan stabilitas optimum serum tabir surya kombinasi *avobenzone* dan *hyaluronic acid*, serta menguji aktivitasnya secara *in vitro*.

Optimasi formula dilakukan dengan metode *Simplex Lattice Design* (SLD) menggunakan *software Design Expert* versi 13. Evaluasi formula optimum meliputi parameter organoleptik, homogenitas, pH, daya sebar, daya lekat, viskositas, SPF, %TE, %TP, dan stabilitas penyimpanan. Data dianalisis secara statistik menggunakan *paired t-test*, *one-sample t-test*, uji ANOVA dengan taraf kepercayaan 95%, dan uji *post hoc Tukey*.

Hasil penelitian menunjukkan formula optimum serum *avobenzone* terdiri atas kombinasi 20% gliserin dan 2% *tween* 80 yang memiliki daya sebar 37,379 cm², daya lekat 1,008 detik, viskositas 579,944 cPs, dan pH 5,508. Hasil analisis *post hoc Tukey* menunjukkan tidak terdapat perbedaan yang signifikan (*sig.* >0,05) pada setiap parameter selama proses uji stabilitas penyimpanan 3 siklus. Serum *avobenzone* memiliki nilai SPF sebesar 20,003 (proteksi ultra); %Te sebesar 0,307; dan %Tp sebesar 0,013 (*sunblock*).

Kata Kunci: Tabir Surya, *Avobenzone*, HA, Serum.

ABSTRACT

Excessive exposure to UV radiation can have long-term effects, such as skin aging. Avobenzone, as a UVA filter, provides maximum protection against UV-induced skin damage. Hyaluronic acid, which is commonly combined with other active ingredients, also helps reduce signs of aging through a mechanism that enhances skin hydration. This study aims to optimize glycerin as a humectant and tween 80 as an emulsifier to achieve optimal physical characterization and stability of a sunscreen serum combining avobenzone and hyaluronic acid, and test its activity in vitro.

Formula optimization was conducted using the Simplex Lattice Design (SLD) method with Design Expert software version 13. The evaluation of the optimal formula included organoleptic parameters, homogeneity, pH, spreadability, adhesion, viscosity, SPF, %TE, %TP, and storage stability. The data were statistically analyzed using the paired t-test, one-sample t-test, ANOVA test with a 95% confidence level, and post hoc Tukey test.

The results indicated that the optimal avobenzone serum formula consists of a combination of 20% glycerin and 2% tween 80, with a spreadability of 37.379 cm², adhesion time of 1.008 seconds, viscosity of 579.944 cPs, and pH of 5.508. The post hoc Tukey analysis showed no significant differences (p -value > 0.05) during the three-cycle storage stability test. The avobenzone serum has an SPF value of 20.003 (ultra protection), %TE of 0.307, and %TP of 0.013 (sunblock classification).

Keywords: Sunscreen, Avobenzone, HA, Serum.