

ABSTRACT

OPTIMIZATION AND FORMULATION OF A PEEL-OFF GEL MASK CONTAINING TAPAK LIMAN LEAF EXTRACT (*Elephantopus Scaber* L.) USING A COMBINATION OF PVA AND HPMC BASES WITH THE SIMPLEX LATTICE DESIGN (SLD) METHOD

By

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Background : Skincare products such as peel-off gel masks are widely used due to their ability to cleanse the skin and remove dead skin cells. The use of natural ingredients offers a safer alternative, including tapak liman (*Elephantopus scaber* L.), which contains bioactive compounds beneficial for skin health. This study aims to determine the optimal formulation for a peel-off gel mask using a combination of Polyvinyl Alcohol (PVA) and Hydroxypropyl Methyl Cellulose (HPMC).

Methods : This study was an experimental study involving formulation optimization using the *Simplex Lattice Design* (SLD) method with *Design Expert* software. The formulations were evaluated for pH, viscosity, spreadability, and drying time as optimization responses, as well as organoleptic properties, homogeneity, adhesion, stability, and hedonic tests. The evaluation data were analyzed using *Design Expert* to determine the optimal formulation based on desirability values, and statistical analysis was performed in SPSS using a one-sample t-test.

Results : Increasing the concentrations of PVA and HPMC increased spreadability, pH, viscosity, and drying time, with PVA exerting a stronger effect. The optimal formulation was obtained at 8% PVA and 4% HPMC, with a desirability value of 0.701. The predicted optimal formulation did not differ significantly from the experimental results ($p > 0.05$).

Conclusion : The formulation of a peel-off gel mask containing tapak liman leaf extract using the *Simplex Lattice Design* (SLD) method resulted in an optimal formula with physical characteristics that meet the required standards and shows potential as a natural skincare product.

Keywords : HPMC, peel-off gel mask, PVA, *simplex lattice design* (SLD), tapak liman leaf (*Elephantopus Scaber* L.).

ABSTRAK

OPTIMASI DAN FORMULASI SEDIAAN MASKER GEL *PEEL-OFF* EKSTRAK DAUN TAPAK LIMAN (*Elephantopus Scaber L.*) DENGAN KOMBINASI BASIS PVA DAN HPMC MENGGUNAKAN METODE *SIMPLEX LATTICE DESIGN* (SLD)

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Latar belakang : Produk perawatan kulit seperti masker gel *peel-off* banyak digunakan karena mampu membersihkan kulit dan mengangkat sel kulit mati. Pemanfaatan bahan alam menjadi alternatif yang lebih aman, salah satunya yaitu daun tapak liman (*Elephantopus scaber L.*) yang mengandung senyawa bioaktif bermanfaat bagi kesehatan kulit. Penelitian ini bertujuan untuk menentukan formula optimal masker gel *peel-off* dengan kombinasi *Polyvinyl Alcohol* (PVA) dan *Hydroxypropyl Methylcellulose* (HPMC).

Metode : Penelitian ini merupakan penelitian eksperimental dengan optimasi formulasi menggunakan metode *Simplex Lattice Design* (SLD) melalui *software Design Expert*. Evaluasi sediaan meliputi uji pH, viskositas, daya sebar, dan waktu kering sebagai respon optimasi, serta uji organoleptik, homogenitas, daya lekat, stabilitas, dan hedonik. Data hasil evaluasi dianalisis menggunakan *Design Expert* untuk menentukan formula optimal berdasarkan nilai *desirability*, serta dilakukan analisis statistik menggunakan SPSS dengan metode *one sample t-test*.

Hasil : Peningkatan konsentrasi PVA dan HPMC meningkatkan nilai daya sebar, pH, viskositas, dan waktu kering, dengan PVA lebih dominan. Formula optimal diperoleh pada konsentrasi PVA 8% dan HPMC 4% dengan nilai *desirability* 0,701. Hasil prediksi formula optimal tidak berbeda signifikan dengan hasil percobaan ($p > 0,05$).

Kesimpulan : Formulasi masker gel *peel-off* ekstrak daun tapak liman menggunakan metode *Simplex Lattice Design* (SLD) menghasilkan formula optimal dengan karakteristik fisik yang memenuhi persyaratan dan berpotensi digunakan sebagai produk perawatan kulit berbahan alam.

Kata kunci : daun tapak liman (*Elephantopus Scaber L.*), HPMC, masker gel *peel-off*, PVA, *simplex lattice design* (SLD).