

OPTIMASI PENGEMBANGAN FORMULA *SELF-FOAMING CLAY SOAP* (SFCS) BENTONIT DENGAN DESAIN *D-OPTIMAL*

Revi Novitasari

Program Studi Farmasi

INTISARI

Dalam terminologi Islam, najis mughallazah adalah najis berat, dimana proses untuk membersihkannya harus menggunakan tanah. Kebutuhan akan formula penyuci najis yang praktis sangat diperlukan dan terus dikembangkan dalam bentuk sabun yang mengandung tanah termasuk *self-foaming clay soap* (SFCS). Penelitian ini memiliki tujuan untuk melakukan optimasi formula sediaan SFCS dengan clay bentonit menggunakan desain D-optimal. Dalam desain ini, variabel independen (x) terdiri dari jumlah clay bentonit (x_1 , 3-5%), Sodium Lauril Sulfat (SLS) (x_2 , 2-7%), potassium cocoate (x_3 , 2-5%) dan cocamidopropyl betaine (x_4 , 1-4%) sedangkan variabel dependen atau respon, yakni zeta potensial (y_1 , mV), viskositas (y_2 , cps) dan daya buih (y_3 , cm). Data eksperimen (x, y) dianalisis dengan ANOVA untuk menghasilkan model regresi polinomial. Dari data eksperimen yang telah analisis, didapatkan model yang signifikan ($p < 0,05$) untuk ketiga respon, yaitu *partial quadratic* untuk respon zeta potensial dan daya buih, serta model *linear mixture* untuk respon viskositas. Hasil verifikasi antara prediksi dan observasi pada formula yang optimal (kadar bentonit 5.000%, SLS 5.936%, potassium cocoate 5.065% dan cocamidopropyl betaine 4.000%), menunjukkan ketiga model yang memuaskan dengan nilai bias kurang dari 10%. Dapat disimpulkan bahwa desain *D-Optimal* dapat digunakan untuk melakukan optimasi sediaan *Self-Foaming Clay Soap* (SFCS) bentonit.

Kata kunci : *Self-Foaming Clay Soap*, bentonit, *D-Optimal*.

OPTIMIZATION OF FORMULA DEVELOPMENT OF SELF-FOAMING CLAY SOAP (SFCS) BENTONITE WITH D-OPTIMAL DESIGN

Revi Novitasari

Department of Pharmacy

ABSTRACT

In Islamic terminology, najis mughallazah is an extreme najis, where the process to clean it must use the soil. The need of a practical najis washing formula is indispensable and continues to be developed in the form of soap that contain soil including self-foaming clay soap (SFCS). This study aims to optimize the SFCS dosage formulas with clay bentonite using a D-Optimal design. In this design, the independent variable (X) consists of the amount of clay bentonite (X_1 , 3-5%), Sodium Lauryl Sulphate (SLS) (X_2 , 2-7%), potassium cocoate (X_3 , 2-5%) and cocamidopropyl betaine (X_4 , 1-4%) while the dependent or response variable (Y) are zeta potential (Y_1 , mV), viscosity (Y_2 , cps) and foamability (Y_3 , cm). Experimental data (X, Y) were analyzed with ANOVA to produce a polynomial regression model. From the experimental data that has been analyzed, it found a significant model ($P < 0.05$) for the three responses, namely partial quadratic for zeta potential and foamability response, and linear mixture model for viscosity response. The results of the verification between prediction and observation on the optimal formula (5.000% of bentonite, 5.936% of SLS, 5.065% of potassium cocoate[®], and 4.000% of cocamidopropyl betaine) show satisfying results of three models with value of % error less than 10%. It can be concluded that the D-Optimal design can be used to optimize the preparation of Self Foaming Clay Soap (SFCS) bentonite.

Keywords: Self Foaming Clay Soap, bentonite, D-Optimal