

# OPTIMASI PENGEMBANGAN FORMULA GEL EKSTRAK RAMBUT JAGUNG SEBAGAI ANTIOKSIDAN MENGGUNAKAN *GELLING AGENT* NATRIUM CARBOXYMETHYL CELLULOSE (NA CMC)

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## INTISARI

Ekstrak rambut jagung mengandung senyawa flavonoid. Flavonoid memiliki efek sebagai anti-virus, anti-inflamasi, anti-diabetes, anti-kanker, anti-penuaan, serta antioksidan. Tujuan penelitian ini untuk mengoptimasi formula gel ekstrak rambut jagung sebagai antioksidan dengan *gelling agent* Na CMC menggunakan *optimal mixture design*. Metode ekstraksi rambut jagung menggunakan maserasi *ultrasonic* dengan pelarut etanol 70%. Hasil rendemen ekstrak yang didapatkan 2,6%, pada uji KLT antara ekstrak dengan standar *quersetin*, dengan hasil positif mengandung *quersetin*. Pada uji aktivitas antioksidan ekstrak rambut jagung memiliki nilai IC<sub>50</sub> 5738 ppm dan nilai IAA 0,00871 ppm. Data eksperimen variabel independen (X) yaitu Na CMC (X<sub>1</sub>;0,5-2%), gliserin (X<sub>2</sub>;8,5-10%), dan propilenglikol (X<sub>3</sub>;18,5-20%), sedangkan variabel dependen (Y) yaitu nilai viskositas (Y<sub>1</sub>;cP), nilai daya sebar (Y<sub>2</sub>;cm), dan nilai *extrudability* (Y<sub>3</sub>;gram/kg). Dianalisis menggunakan ANOVA untuk menghasilkan model regresi polynomial dan didapatkan model *linear* untuk respon viskositas, serta model *quadratic* untuk respon daya sebar dan *extrudability*. Hasil formula yang optimal didapatkan kadar Na CMC 1,682 %, gliserin 9,818 %, propilenglikol 18,500 %. Verifikasi dari perbandingan respon prediksi dengan respon observasi menghasilkan persen bias <10%. Karakterisasi formula optimal yang didapatkan pada viskositas 4231±2,65 cP, daya sebar 5,2±0,1 cm, *extrudability* 1,97±0,06 g/kg dan pH 7,35±0,01. Pada uji organoleptis didapatkan konsistensi gel yang halus, berbau khas ekstrak rambut jagung dan berwarna coklat kekuningan. Disimpulkan bahwa *optimal mixture design* dapat digunakan untuk mengoptimasi sediaan gel ekstrak rambut jagung dan aktivitas antioksidan mengalami peningkatan yang signifikan ketika diformulasikan ke dalam sediaan gel ekstrak rambut jagung dibanding ekstrak.

**Kata kunci :** Antioksidan, Rambut Jagung, Gel, Na CMC, *optimal mixture design*

**OPTIMIZATION AND DEVELOPMENT FORMULA GEL OF CORN  
SILK EXTRACT AS ANTIOXIDANT USING GELLING AGENT  
NATRIUM CARBOXYMETHYL CELLULOSE (NA CMC)**

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**ABSTRACT**

Corn silk extract contains flavonoid compounds. Flavonoids have an effect as anti-viral, anti-inflammatory, anti-diabetic, anti-cancer, anti-aging, and antioxidants. The purpose of this research is to preparation the formulation gel of corn silk extract as an antioxidant with gelling agent Na CMC using optimal mixture design. The method of corn silk extraction using ultrasonic maceration with 70% ethanol solvent. The yield of extract obtained 2,6%, in TLC test between extract with quercetin standard, with positive result containing quercetin. In the antioxidant activity test of corn silk extract has a value of IC<sub>50</sub> 5738 ppm and AAI value 0,00871 ppm. The experimental data of independent variables (X) are NaCMC (X<sub>1</sub>, 0.5-2%), glycerin (X<sub>2</sub>; 8.5-10%), and propylene glycol (X<sub>3</sub>; 18,5-20%), while the dependent variable (Y) viscosity (Y<sub>1</sub>; cP), spreadability (Y<sub>2</sub>; cm), and the extrudability (Y<sub>3</sub>; gram/kg). Experimental data (X,Y) were analyzed using ANOVA to produce a polynomial regression model and obtained a linear model for viscosity response, and a quadratic model for spreadability and extrudability response. The optimal formula Na CMC content of 1,682%, glycerin 9,818%, propylene glycol 18,500%. Verification of the comparison of predictive responses with observational responses obtained %error <10%. Characterization of the optimal formula obtained at the viscosity  $4231 \pm 2.65$  cP, spreadability  $5.2 \pm 0.1$  cm, extrudability  $1.97 \pm 0.06$  g / kg and pH  $7.35 \pm 0.01$ . In the organoleptic test found the consistency of a smooth gel, distinctive smell of corn silk extract and yellowish brown. It was concluded that optimal mixture design can be used to preparation the formula gel of corn silk extract and antioxidant activity has increased significantly when it is formulated into gel of corn silk than extract.

**Keywords:** Antioxidant, Corn Silk, Gel, Na CMC, optimal mixture design