

## **SINTESIS SURFAKTAN NATRIUM METIL ESTER SULFONAT (Na-MES) DARI MINYAK KELAPA DENGAN OPTIMASI RASIO MOL DAN WAKTU SULFONASI**

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### **INTISARI**

Sintesis surfaktan Na-MES berbahan dasar minyak kelapa berhasil dilakukan. Penelitian ini bertujuan untuk membuat surfaktan Na-MES dari minyak kelapa, menentukan rasio mol reaktan terbaik, serta waktu sulfonasi optimum. Tahap pertama adalah transesterifikasi. Minyak kelapa direaksikan dengan metanol menggunakan perbandingan rasio mol reaktan 1:8 pada suhu 60 °C selama 90 menit, kemudian metil ester dimurnikan. Metil ester dianalisis menggunakan FTIR dan GC-MS. Tahap kedua, metil ester disulfonasi menggunakan natrium bisulfit ( $\text{NaHSO}_3$ ) pada temperatur 90 °C dengan katalis  $\text{CaO}$  1%. Variasi rasio mol metil ester :  $\text{NaHSO}_3$  dilakukan pada 1:1; 1:1,5; dan 1:2 serta waktu sulfonasi 1, 2, 3, dan 4 jam. Tahap ketiga, pemurnian dengan metanol 40% (v/v) selama 90 menit, penguapan, dan penetralan menggunakan  $\text{NaOH}$  30% (b/v).

Hasil Na-MES yang terbentuk dianalisis FTIR. Uji surfaktan dilakukan dengan uji penentuan nilai HLB, kestabilan emulsi, dan kemampuan menurunkan tegangan permukaan cairan. Hasil penelitian menunjukkan kandungan metil ester tertinggi ialah metil ester laurat sebanyak 52,12%. Konversi metil ester sebesar 98,13%. Surfaktan Na-MES memiliki nilai HLB 14,58. Hasil rasio mol reaktan dan waktu sulfonasi optimum diperoleh pada rasio 1:1,5 dan waktu sulfonasi 3 jam. Surfaktan yang dihasilkan memiliki kestabilan emulsi 90,9% dan mampu menurunkan tegangan permukaan sebesar 33,87 dyne/cm.

Kata kunci: minyak kelapa, Na-MES, sulfonasi, transesterifikasi

## **SYNTHESIS SURFACTANT SODIUM METHYL ESTER SULFONATE (Na-MES) FROM COCONUT OIL WITH OPTIMIZATION OF MOLE RATIO AND SULFONATION TIME**

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### **ABSTRACT**

The synthesis of sodium methyl ester sulfonate (Na-MES) based on coconut oil has been done. The purposes of this research were to synthesize Na-MES surfactants from coconut oil, to determine the best reactant mole ratio, and to optimize the sulfonation time. The first step was transesterification. Coconut oil was reacted with methanol in 1:8 reactant mole ratio at 60 °C for 90 minutes, after that methyl ester was purified. Methyl ester was analyzed using FTIR and GC-MS. The second step, methyl ester product was sulphonated using sodium bisulfite (NaHSO<sub>3</sub>) at 90 °C temperature and the catalyst CaO 1%. Variation of methyl ester : NaHSO<sub>3</sub> mole ratio performed at 1:1; 1:1,5; and 1:2, while sulfonation time varied at 1, 2, 3, and 4 hours. The third step, purification with 40% (v/v) methanol for 90 minutes, evaporation, and neutralization using 30% (b/v) NaOH.

The result of Na-MES formed was analyzed by FTIR. The surfactant also characterized by HLB value, emulsion stability, and surface tension reduction test. The results showed that the highest methyl ester content was methyl ester laurate 52,12%. Percent conversion of methyl ester was 98,13%. The HLB value of surfactant Na-MES was 14,58. Optimum mole ratio of reactant and optimum sulfonation time obtained at 1:1,5 ratio and 3 hours sulfonation. The obtained surfactant has 90,9% emulsion stability and can reduce surface tension as much as 33,87 dyne/cm

Keywords : coconut oil, Na-MES, sulfonation, transesterification