

**SINTESIS DAN KARAKTERISASI ASAM DODESIL LIGNOSULFONAT DARI LIMBAH AMPAS TEBU SEBAGAI SURFAKTAN UNTUK BAHAN INJEKSI PADA ENHANCED OIL RECOVERY (EOR)**

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**INTISARI**

Telah dilakukan sintesis asam dodesil lignosulfonat dari limbah ampas tebu. Penelitian ini bertujuan untuk mengisolasi lignin dari limbah ampas tebu, mensintesis asam dodesil lignosulfonat dari lignin melalui reaksi alkilasi dan sulfonasi, serta uji kinerja senyawa tersebut sebagai surfaktan yang digunakan untuk bahan injeksi kimia pada proses *Enhanced Oil Recovery* (EOR).

Metode yang digunakan untuk mengisolasi lignin adalah metode soda-etanol. Sintesis asam dodesil lignosulfonat dilakukan melalui reaksi alkilasi dengan dodesil klorida dan dilanjutkan dengan sulfonasi menggunakan reagen  $\text{Na}_2\text{SO}_3$ . Senyawa yang diperoleh dikarakterisasi dengan alat spektrofotometer FTIR dan SEM-EDX, kemudian dilakukan uji kompatibilitas, nilai konsentrasi kritis misel (kkm), uji kelakuan fasa, dan uji penentuan nilai *Interfacial Tension* (IFT).

Hasil isolasi lignin ampas tebu yang diperoleh berwarna coklat tua dengan rendemen sebesar 22,9%. Dodesil lignin hasil alkilasi berwarna coklat sebesar 71,35% dan asam dodesil lignosulfonat yang dihasilkan dari sulfonasi dodesil lignin berwarna coklat dengan rendemen sebesar 82%. Asam dodesil lignosulfonat yang dihasilkan bersifat kompatibel dalam air formasi, dapat membentuk emulsi fasa tengah (III), memiliki nilai kkm 1,5 g/L, dan nilai IFT sebesar  $5 \times 10^{-1}$  dyne/cm.

*Kata kunci : Asam dodesil lignosulfonat, Enhanced Oil Recovery (EOR), surfaktan.*

**SYNTHESIS AND CHARACTERIZATION OF DODECYL  
LIGNOSULFONIC ACID FROM SUGARCANE BAGASSE  
AS A SURFACTANT FOR INJECTION AGENT  
IN ENHANCED OIL RECOVERY (EOR)**

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**ABSTRACT**

Synthesis of dodecyl lignosulfonic acid from sugarcane bagasse waste has been done. The aims of this experiment were to isolate lignin from sugarcane bagasse waste, synthesize dodecyl lignosulfonic acid, and characterize dodecyl lignosulfonic acid as a surfactant that will be used in Enhanced Oil Recovery (EOR) process.

Isolation of lignin was done by soda-ethanol method. Synthesis of dodecyl lignosulfonic acid was done by alkylation using dodecyl chloride and sulfonation reaction using sodium sulfite ( $\text{Na}_2\text{SO}_3$ ). All the compound that has been synthesized were characterized using FTIR spectrophotometer and SEM-EDX. The synthesized dodecyl lignosulfonic acid was tested for their performance as injection agent through several tests, such as compatibility test, phase behavior test, critical micelle concentration (cmc) determination and Interfacial Tension (IFT) test.

The result showed that lignin was successfully isolated from sugarcane bagasse in yield 22.9%. Alkylation and sulfonation of lignin afforded rendement of 71.35 and 82% respectively. Dodecyl lignosulfonic acid was compatible enough in the formation solution, could make a middle phase emulsion, the cmc value was 1.5 g/L, and the IFT value was  $5 \times 10^{-1}$  dyne/cm.

*Keywords : Dodecyl lignosulfonic acid, Enhanced Oil Recovery (EOR), surfactant*