

KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI  
POLITEKNIK NEGERI SRIWIJAYA  
JURUSAN TEKNIK KIMIA



Jalan Srijaya Negara, PALEMBANG 30139

Telp.0711-353414 Fax. 0711-355918. E-mail : kimia@polsri.ac.id.



LEMBAR VALIDASI DATA

Tabel A.1. Data Hasil Penelitian

Run	Junlah Katalis (% b/b minyak)	Suhu Reaksi ( °C)	Yield (%)	Densitas (gr/ml)	Viskositas (cSt)	Bilangan Asam	Kadar Air (%)	Titik Nyala (°C)
1		50	85,9237	0,90446	3,6482	1,40275	0,004956	139
2	3	55	88,85052	0,89026	2,4822	0,84165	0,000772	138
3		60	96,14808	0,89748	2,7875	1,40275	0,024754	143
4		65	83,92508	0,89282	2,6649	1,1222	0,056288	153
5		50	91,7181	0,9081	4,1601	1,96385	0,000592	130
6	4	55	90,43944	0,89544	2,5543	2,2444	0,001838	143
7		60	88,85052	0,89748	2,3439	1,6833	0,043682	138
8		65	92,25092	0,89564	2,5614	1,40275	0,04201	128
9		50	88,3274	0,9013	2,5427	1,40275	0,071964	140
10	5	55	95,2581	0,90722	2,6714	1,96385	0,03977	143
11		60	88,85052	0,89748	2,7561	1,1222	0,04198	138
12		65	89,42	0,8942	2,5667	1,96385	0,014858	144

% ALB Minyak = 0,768%

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Mengetahui,  
PLP Laboratorium Sistem Utilitas

Ahmad Bustomi, S.T  
NIP.196707041994031003

## LAMPIRAN 2

### PERHITUNGAN

#### 1. FFA Minyak Jelantah

- gr NaOH = 2 gram
- ml NaOH titrasi = 0,6 ml
- N NaOH = 0,1 ml
- BM Asam Lemak = 256 gr/mol

Rumus :

$$\text{FFA} = \frac{(\text{ml NaOH} \times \text{N NaOH} \times \text{BM asam lemak})}{\text{gr sampel} \times 1000} \times 100 \%$$

$$\text{FFA} = 0,768 \%$$

#### 2. Biodiesel

##### a. Perbandingan Rasio Molar

Diketahui :

- Bahan Baku Minyak Jelantah = 100 gram
- BM Minyak Jelantah (Trigliserida) = 851, 9923 gr/mol
- BM Asam Lemak = 271,3168 gr/mol
- BM Metanol = 32,04 gr/mol
- $\rho$  Metanol = 0,792 gr/cm<sup>3</sup>

Rasio Molar Minyak : Metanol = 1 : 12

- Mol Minyak Jelantah 100 gram

$$n = \frac{\text{gr}}{\text{BM}} = \frac{100 \text{ gram}}{271,3168 \text{ gr/mol}} = 0,3685 \text{ mol}$$

- Mol Metanol

$$\begin{aligned} n &= \text{Mol} \times \text{Minyak Jelantah} \\ &= 12 \times 0,3685 \text{ mol} \\ &= 4,4229 \text{ mol} \end{aligned}$$

- Massa Metanol

$$\begin{aligned} m &= \text{mol metanol} \times \text{BM metanol} \\ &= 4,4229 \text{ mol} \times 32,04 \text{ gr/mol} \\ &= 141,709 \text{ gram} \end{aligned}$$

- Volume Metanol

$$v = \frac{m}{\rho \text{ metanol}} = \frac{141,709 \text{ gram}}{0,792 \text{ gr/cm}^3} = 178,9253 \text{ ml}$$

- b. Analisis Biodiesel (Katalis 3 %, T = 60°C dan t = 120 menit)

- a. Bilangan Asam

Diketahui :

- N KOH = 0,1 N
- BM KOH = 56,11 gr/mol
- Berat Sampel = 2 gram

$$\text{bilangan asam} = \frac{\text{ml titran KOH} \times \text{N KOH} \times \text{BM KOH}}{\text{gr sampel}}$$

$$\text{Bilangan asam} = \frac{0,3 \text{ ml} \times 0,1 \text{ KOH} \times 56,11 \text{ KOH}}{2 \text{ gram}} = 1,40275\%$$

- b. Uji Kadar Air

$$\text{Kadar Air} = \frac{b - c}{b} \times 100\%$$

Massa cawan + sampel sebelum di oven (b) = 5 gram

Massa cawan + sampel sesudah di oven (c) = 4,9987623 gram

$$\begin{aligned} \text{Kadar Air} &= \frac{b - c}{c} \times 100 \% \\ &= \frac{5 - 4,9987623}{5} \times 100\% \\ &= 0,024754 \% \end{aligned}$$

- c. Massa Jenis

massa = (gr biodiesel + piknometer) – gr pikometer kosong

$$\text{massa} = 29,9323 \text{ gram} - 24,3836 \text{ gram} = 4,4513 \text{ gram}$$

$$\rho \text{ biodiesel} = \frac{m}{v} = \frac{4,4513 \text{ gram}}{5 \text{ ml}} = 0,89282 \text{ gr/ml}$$

d. Viskositas

Diketahui

- $t$  bola jatuh = 11,69 s = 0,1948 menit
- $\rho_2$  ( $\rho$  biodiesel) = 0,89282 gr/ml

$$\begin{aligned}\mu &= 0,3 \text{ mpa} \cdot \text{menit} \cdot \text{ml/gr} \cdot \text{s} \times (8,02 \text{ gr/ml} - 0,89282 \text{ gr/ml}) \times 0,1948 \text{ menit} \\ &= 25,0039 \text{ cP} \times 10^{-3} \\ &= 0,025003 \text{ pa} \cdot \text{s} \times 897 \times 10^5 \\ &= 2,787513 \text{ cSt}\end{aligned}$$

e. % Rendemen

Diketahui :

$$\text{Berat Produk} = 96,14808 \text{ gram}$$

$$\begin{aligned}\% \text{Rendemen} &= \frac{96,14808 \text{ gram}}{100 \text{ gram}} \times 100 \% \\ &= 96,14808 \%\end{aligned}$$

**LAMPIRAN 3**  
**DOKUMENTASI**



Proses Refluk



Proses Dekantasi



Pencucian Biodiesel



Pemanasan Biodiesel



Biodiesel



Analisis Bilangan Asam



Analisis Titik Nyala



Analisis Viskositas



Analisis Densitas



Analisis Kadar Air



Analisis Kadar Abu





















