

## LAMPIRAN 1 DATA PERHITUNGAN

### 1. Perhitungan Densitas Alga oil

$$\begin{aligned} \text{S4T5} \\ \rho &= \frac{m}{v} \\ \rho &= \frac{71,3280 \text{ g} - 31,2439 \text{ g}}{43 \text{ ml}} \\ \rho &= 0,9321 \text{ g/ml} \\ \rho &= 932 \text{ kg/m}^3 \end{aligned}$$

$$\begin{aligned} \text{S4T10} \\ \rho &= \frac{m}{v} \\ \rho &= \frac{51,1783 \text{ g} - 28,6867 \text{ g}}{22,5 \text{ ml}} \\ \rho &= 0,999 \text{ g/ml} \\ \rho &= 999 \text{ kg/m}^3 \end{aligned}$$

$$\begin{aligned} \text{S5T5} \\ \rho &= \frac{m}{v} \\ \rho &= \frac{81,2601 \text{ g} - 41,2833 \text{ g}}{41 \text{ ml}} \\ \rho &= 0,970 \text{ g/ml} \\ \rho &= 970 \text{ kg/m}^3 \end{aligned}$$

$$\begin{aligned} \text{S5T10} \\ \rho &= \frac{m}{v} \\ \rho &= \frac{84,8228 \text{ g} - 41,2452 \text{ g}}{50 \text{ ml}} \\ \rho &= 0,871 \text{ g/ml} \\ \rho &= 871 \text{ kg/m}^3 \end{aligned}$$

### 2. Perhitungan Viskositas Alga oil

$$\begin{aligned} \text{S4T5} \\ v &= \frac{C}{t} \\ v &= \frac{2.218}{932} \\ v &= 2,38 \text{ cSt} \end{aligned}$$

$$\begin{aligned} \text{S4T10} \\ v &= \frac{C}{t} \\ v &= \frac{2.417}{999} \\ v &= 2,41 \text{ cSt} \end{aligned}$$

$$\begin{aligned} \text{S5T5} \\ v &= \frac{C}{t} \\ v &= \frac{2.211}{970} \\ v &= 2,28 \end{aligned}$$

$$\begin{aligned} \text{S5T10} \\ v &= \frac{C}{t} \\ v &= \frac{2.78}{870} \\ v &= 3,20 \end{aligned}$$

### 3. Perhitungan %FFA Alga oil

$$\begin{aligned} \text{S4T5} \qquad \qquad \qquad \text{S4T10} \\ \%FFA &= \frac{(V \text{ titrasi} \times N \text{ NaOH} \times Mr \text{ NaOH})}{(m \text{ sampel} \times 1000)} \times 100 = \frac{(V \text{ titrasi} \times N \text{ NaOH} \times Mr \text{ NaOH})}{(m \text{ sampel} \times 1000)} \times 100 \\ \%FFA &= \frac{(1 \text{ ml} \times 0,1 \text{ N} \times 40 \text{ g/mol})}{(2 \text{ ml} \times 1000)} \times 100 \qquad \%FFA = \frac{(4 \text{ ml} \times 0,1 \text{ N} \times 40 \text{ g/mol})}{(2 \text{ ml} \times 1000)} \times 100 \\ \%FFA &= 2\% \qquad \qquad \qquad \%FFA = 8\% \end{aligned}$$

<p><b>S5T5</b></p> $\%FFA = \frac{(V \text{ titrasi} \times N \text{ NaOH} \times Mr \text{ NaOH})}{(m \text{ sampel} \times 1000)} \times 100$ $\%FFA = \frac{(1,5 \text{ ml} \times 0,1 \text{ N} \times 40 \text{ g/mol})}{(2 \text{ ml} \times 1000)} \times 100$ <p style="text-align: center;"><math>\%FFA = 3\%</math></p>	<p><b>S5T10</b></p> $\%FFA = \frac{(V \text{ titrasi} \times N \text{ NaOH} \times Mr \text{ NaOH})}{(m \text{ sampel} \times 1000)} \times 100$ $\%FFA = \frac{(1 \text{ ml} \times 0,1 \text{ N} \times 40 \text{ g/mol})}{(2 \text{ ml} \times 1000)} \times 100$ <p style="text-align: center;"><math>\%FFA = 2\%</math></p>
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#### 4. Perhitungan Kadar Air Alga oil

**S4T5**

$W_0 = 73,822 \text{ g}$   
 $W_1 = 74,770 \text{ g}$   
 $W_2 = 73,903 \text{ g}$   
 $\%Ka = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$   
 $\%Ka = \frac{74,770 \text{ g} - 73,903 \text{ g}}{74,770 \text{ g} - 73,822 \text{ g}} \times 100\%$   
 $\%Ka = 0,91\%$

**S4T10**

$W_0 = 83,190 \text{ g}$   
 $W_1 = 84,207 \text{ g}$   
 $W_2 = 83,327 \text{ g}$   
 $\%Ka = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$   
 $\%Ka = \frac{84,207 \text{ g} - 83,327 \text{ g}}{84,207 \text{ g} - 83,190 \text{ g}} \times 100\%$   
 $\%Ka = 0,865\%$

**S5T5**

$W_0 = 74,799 \text{ g}$   
 $W_1 = 75,820 \text{ g}$   
 $W_2 = 74,933 \text{ g}$   
 $\%Ka = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$   
 $\%Ka = \frac{75,820 \text{ g} - 74,933 \text{ g}}{75,820 \text{ g} - 74,799 \text{ g}} \times 100\%$   
 $\%Ka = 0,86\%$

**S5T10**

$W_0 = 85,725 \text{ g}$   
 $W_1 = 86,587 \text{ g}$   
 $W_2 = 85,767 \text{ g}$   
 $\%Ka = \frac{W_1 - W_2}{W_1 - W_0} \times 100\%$   
 $\%Ka = \frac{86,587 \text{ g} - 85,767 \text{ g}}{86,587 \text{ g} - 85,725 \text{ g}} \times 100\%$   
 $\%Ka = 0,95\%$

#### 5. Perhitungan Konsentrasi H<sub>2</sub>SO<sub>4</sub> dan KOH untuk biodiesel

**S5E0,5T0,5**

$\text{Konsentrasi } H_2SO_4 \text{ } 0,5\% = \frac{0,5}{100} \times 60 \text{ ml} = 0,3 \text{ ml}$   
 $\text{Konsentrasi } KOH \text{ } 0,5\% = \frac{0,5}{100} \times 40 \text{ ml} = 0,2 \text{ ml}$   
 $\text{Konsentrasi etanol : volume oil} = 1:2$   
 $\text{Konsentrasi etanol} = \frac{40}{2} = 20 \text{ ml}$

**S5E0,5T1**

$$\text{Konsentrasi } H_2SO_4 \text{ 0,5\%} = \frac{0,5}{100} \times 60 \text{ ml} = 0,3 \text{ ml}$$

$$\text{Konsentrasi KOH 1\%} = \frac{1}{100} \times 33 \text{ ml} = 0,3$$

$$\text{Konsentrasi etanol : volume oil} = 1:2$$

$$\text{Konsentrasi etanol} = \frac{33}{2} = 15,5 \text{ ml}$$

**S5E1T0,5**

$$\text{Konsentrasi } H_2SO_4 \text{ 1\%} = \frac{1}{100} \times 60 \text{ ml} = 0,6 \text{ ml}$$

$$\text{Konsentrasi KOH 0,5\%} = \frac{0,5}{100} \times 48 \text{ ml} = 0,24$$

$$\text{Konsentrasi etanol : volume oil} = 1:2$$

$$\text{Konsentrasi etanol} = \frac{48}{2} = 24 \text{ ml}$$

**S5E1T1**

$$\text{Konsentrasi } H_2SO_4 \text{ 1\%} = \frac{1}{100} \times 60 \text{ ml} = 0,6 \text{ ml}$$

$$\text{Konsentrasi KOH 1\%} = \frac{1}{100} \times 29 \text{ ml} = 0,29$$

$$\text{Konsentrasi etanol : volume oil} = 1:2$$

$$\text{Konsentrasi etanol} = \frac{29}{2} = 14,5 \text{ ml}$$

**S7,5E0,5T0,5**

$$\text{Konsentrasi } H_2SO_4 \text{ 0,5\%} = \frac{0,5}{100} \times 85 \text{ ml} = 0,425 \text{ ml}$$

$$\text{Konsentrasi KOH 0,5\%} = \frac{0,5}{100} \times 50 \text{ ml} = 0,25$$

$$\text{Konsentrasi etanol : volume oil} = 1:2$$

$$\text{Konsentrasi etanol} = \frac{50}{2} = 25 \text{ ml}$$

**S7,5E0,5T1**

$$\text{Konsentrasi } H_2SO_4 \text{ 0,5\%} = \frac{0,5}{100} \times 85 \text{ ml} = 0,425 \text{ ml}$$

$$\text{Konsentrasi KOH 1\%} = \frac{1}{100} \times 65 \text{ ml} = 0,65$$

$$\text{Konsentrasi etanol : volume oil} = 1:2$$

$$\text{Konsentrasi etanol} = \frac{65}{2} = 32,5 \text{ ml}$$

**S7,5E1T0,5**

$$\text{Konsentrasi } H_2SO_4 \text{ 1\%} = \frac{1}{100} \times 85 \text{ ml} = 0,85 \text{ ml}$$

$$\text{Konsentrasi KOH 0,5\%} = \frac{0,5}{100} \times 55 \text{ ml} = 0,275 \text{ ml}$$

$$\text{Konsentrasi etanol : volume oil} = 1:2$$

$$\text{Konsentrasi etanol} = \frac{55}{2} = 27,5 \text{ ml}$$

**S7,5E1T1**

$$\text{Konsentrasi } H_2SO_4 \text{ 1\%} = \frac{1}{100} \times 85 \text{ ml} = 0,85 \text{ ml}$$

$$\text{Konsentrasi KOH 1\%} = \frac{1}{100} \times 60 \text{ ml} = 0,6 \text{ ml}$$

$$\text{Konsentrasi etanol : volume oil} = 1:2$$

$$\text{Konsentrasi etanol} = \frac{60}{2} = 30 \text{ ml}$$

**6. Perhitungan Densitas Biodiesel****S5E0,5T0,5**

$$\rho = \frac{m}{v}$$

$$\rho = \frac{19,5336 \text{ g} - 15,3716 \text{ g}}{5 \text{ ml}}$$

$$\rho = 832 \text{ kg/m}^3$$

**S5E0,5T1**

$$\rho = \frac{m}{v}$$

$$\rho = \frac{19,6721 \text{ g} - 15,2743 \text{ g}}{5 \text{ ml}}$$

$$\rho = 879 \text{ kg/m}^3$$

**S5E1T0,5**

$$\rho = \frac{m}{v}$$

$$\rho = \frac{19,9365 - 15,3735 \text{ g}}{5 \text{ ml}}$$

$$\rho = 912 \text{ kg/m}^3$$

**S5E1T1**

$$\rho = \frac{m}{v}$$

$$\rho = \frac{219,5727 \text{ g} - 15,2732 \text{ g}}{5 \text{ ml}}$$

$$\rho = 859 \text{ kg/m}^3$$

**S7,5E0,5T0,5**

$$\rho = \frac{m}{v}$$

$$\rho = \frac{20,1381 \text{ g} - 15,2791 \text{ g}}{5 \text{ ml}}$$

$$\rho = 971 \text{ kg/m}^3$$

**S7,5E0,5T1**

$$\rho = \frac{m}{v}$$

$$\rho = \frac{19,5897 \text{ g} - 15,3743 \text{ g}}{5 \text{ ml}}$$

$$\rho = 843 \text{ kg/m}^3$$

$$\begin{aligned} & \mathbf{S7,5E1T0,5} \\ & \rho = \frac{m}{v} \\ & \rho = \frac{19,5324 \text{ g} - 5,3718 \text{ g}}{5 \text{ ml}} \\ & \rho = 831 \text{ kg/m}^3 \end{aligned}$$

$$\begin{aligned} & \mathbf{S7,5E1T1} \\ & \rho = \frac{m}{v} \\ & \rho = \frac{19,5258 \text{ g} - 15,724 \text{ g}}{5 \text{ ml}} \\ & \rho = 850 \text{ kg/m}^3 \end{aligned}$$

## 7. Perhitungan Viskositas Biodiesel

$$\begin{aligned} & \mathbf{S5E0,5T0,5} \\ & v = \frac{C}{t} \\ & v = \frac{1.84}{833} \\ & v = 2,22 \text{ cSt} \end{aligned}$$

$$\begin{aligned} & \mathbf{S5E0,5T1} \\ & v = \frac{C}{t} \\ & v = \frac{2.061,9}{870} \\ & v = 2,37 \text{ cSt} \end{aligned}$$

$$\begin{aligned} & \mathbf{S5E1T0,5} \\ & v = \frac{C}{t} \\ & v = \frac{2.124}{912} \\ & v = 2,33 \text{ cSt} \end{aligned}$$

$$\begin{aligned} & \mathbf{S5E1T1} \\ & v = \frac{C}{t} \\ & v = \frac{2.018}{859} \\ & v = 2,35 \text{ cSt} \end{aligned}$$

$$\begin{aligned} & \mathbf{S7,5E0,5T0,5} \\ & v = \frac{C}{t} \\ & v = \frac{2.349}{971} \\ & v = 2,42 \text{ cSt} \end{aligned}$$

$$\begin{aligned} & \mathbf{S7,5E0,5T1} \\ & v = \frac{C}{t} \\ & v = \frac{2.065}{843} \\ & v = 2,45 \text{ cSt} \end{aligned}$$

$$\begin{aligned} & \mathbf{S7,5E1T0,5} \\ & v = \frac{C}{t} \\ & v = \frac{2.318}{831} \\ & v = 2,79 \text{ cSt} \end{aligned}$$

$$\begin{aligned} & \mathbf{S7,5E1T1} \\ & v = \frac{C}{t} \\ & v = \frac{2.592}{850} \\ & v = 3,05 \text{ cSt} \end{aligned}$$

## 8. Perhitungan Angka Asam Biodiesel

$$\begin{aligned} & \mathbf{S5E0,5T0,5} \\ & \text{Angka Asam} \\ & = \frac{(A - B) \times N \times 5,61}{W} \end{aligned}$$

$$\begin{aligned} & \mathbf{S5E0,5T1} \\ & \text{Angka Asam} \\ & = \frac{(A - B) \times N \times 5,61}{W} \end{aligned}$$

$$\begin{aligned} & \text{Angka Asam} \\ &= \frac{1,7 \text{ ml} \times 0,1 \text{ N} \times 5,61}{1,6 \text{ g}} \\ \text{Angka Asam} &= 0,59 \text{ mgNaOH/g} \end{aligned}$$

$$\begin{aligned} & \text{Angka Asam} \\ &= \frac{1,5 \text{ ml} \times 0,1 \text{ N} \times 5,61}{1,6 \text{ g}} \\ \text{Angka Asam} &= 0,52 \text{ mgNaOH} \\ & \text{/g} \end{aligned}$$

#### S5E1T0,5

$$\begin{aligned} & \text{Angka Asam} \\ &= \frac{(A - B) \times N \times 5,61}{W} \\ \text{Angka Asam} &= \frac{1,2 \text{ ml} \times 0,1 \text{ N} \times 5,61}{1,6 \text{ g}} \\ \text{Angka Asam} &= 0,42 \text{ mgNaOH/g} \end{aligned}$$

#### S5E1T1

$$\begin{aligned} & \text{Angka Asam} \\ &= \frac{(A - B) \times N \times 5,61}{W} \\ \text{Angka Asam} &= \frac{1,4 \text{ ml} \times 0,1 \text{ N} \times 5,61}{1,6 \text{ g}} \\ \text{Angka Asam} &= 0,49 \text{ mgNaOH} \\ & \text{/g} \end{aligned}$$

#### S7,5E0,5T0,5

$$\begin{aligned} & \text{Angka Asam} \\ &= \frac{(A - B) \times N \times 5,61}{W} \\ \text{Angka Asam} &= \frac{1,5 \text{ ml} \times 0,1 \text{ N} \times 5,61}{1,6 \text{ g}} \\ \text{Angka Asam} &= 0,52 \text{ mgNaOH/g} \end{aligned}$$

#### S7,5E0,5T1

$$\begin{aligned} & \text{Angka Asam} \\ &= \frac{(A - B) \times N \times 5,61}{W} \\ \text{Angka Asam} &= \frac{1,8 \text{ ml} \times 0,1 \text{ N} \times 5,61}{1,6 \text{ g}} \\ \text{Angka Asam} &= 0,63 \text{ mgNaOH} \\ & \text{/g} \end{aligned}$$

#### S7,5E1T0,5

$$\begin{aligned} & \text{Angka Asam} \\ &= \frac{(A - B) \times N \times 5,61}{W} \\ \text{Angka Asam} &= \frac{1,6 \text{ ml} \times 0,1 \text{ N} \times 5,61}{1,6 \text{ g}} \\ \text{Angka Asam} &= 0,56 \text{ mgNaOH/g} \end{aligned}$$

#### S7,5E1T1

$$\begin{aligned} & \text{Angka Asam} \\ &= \frac{(A - B) \times N \times 5,61}{W} \\ \text{Angka Asam} &= \frac{1,3 \text{ ml} \times 0,1 \text{ N} \times 5,61}{1,6 \text{ g}} \\ \text{Angka Asam} &= 0,45 \text{ mgNaOH} \\ & \text{/g} \end{aligned}$$

### 9. Perhitungan penurunan lempeng tembaga Biodiesel selama tujuh hari

$$\begin{aligned} & \text{A5M1E0,5T0,5} \\ \% &= \frac{W_o - W_f}{W_o} \times 100\% \\ &= \frac{0,002}{4,13} \times 100\% \\ &= 0,05\% \end{aligned}$$

$$\begin{aligned} & \text{A5M1E0,5T1} \\ \% &= \frac{W_o - W_f}{W_o} \times 100\% \\ &= \frac{0,12}{3,99} \times 100\% \\ &= 0,030\% \end{aligned}$$

$\begin{aligned} & \mathbf{A5M1E1T0,5} \\ \% &= \frac{W_o - W_f}{W_o} \times 100\% \\ &= \frac{0,03}{4,082} \times 100\% \\ &= 0,07\% \end{aligned}$	$\begin{aligned} & \mathbf{A5M1E1T1} \\ \% &= \frac{W_o - W_f}{W_o} \times 100\% \\ &= \frac{0,002}{4,152} \times 100\% \\ &= 0,05\% \end{aligned}$
$\begin{aligned} & \mathbf{A7,5M1E0,5T0,5} \\ \% &= \frac{W_o - W_f}{W_o} \times 100\% \\ &= \frac{0,03}{4,164} \times 100\% \\ &= 0,07\% \end{aligned}$	$\begin{aligned} & \mathbf{A7,5M1E0,5T1} \\ \% &= \frac{W_o - W_f}{W_o} \times 100\% \\ &= \frac{0,019}{3,97} \times 100\% \\ &= 0,48\% \end{aligned}$
$\begin{aligned} & \mathbf{A7,5M1E1T0,5} \\ \% &= \frac{W_o - W_f}{W_o} \times 100\% \\ &= \frac{0,002}{4,115} \times 100\% \\ &= 0,05\% \end{aligned}$	$\begin{aligned} & \mathbf{A7,5M1E1T1} \\ \% &= \frac{W_o - W_f}{W_o} \times 100\% \\ &= \frac{0,003}{3,879} \times 100\% \\ &= 0,08\% \end{aligned}$

## 10. Perhitungan Laju Korosi Biodiesel

$$\begin{aligned} & \mathbf{A5M1E0,5T0,5} \\ \text{Laju Korosi} &= \frac{W_o - W_f}{A \times t} \times 100\% \\ &= \frac{0,002}{4,5} \times 100\% \\ \text{Laju Korosi} &= 0,0004 \text{ g/cm}^2 \cdot \text{hari} \end{aligned}$$

$$\begin{aligned} & \mathbf{A5M1E0,5T1} \\ \text{Laju Korosi} &= \frac{W_o - W_f}{A \times t} \times 100\% \\ &= \frac{0,012}{4,5} \times 100\% \\ \text{Laju Korosi} &= 0,0027 \text{ g/cm}^2 \cdot \text{hari} \end{aligned}$$

$$\begin{aligned} & \mathbf{A5M1E1T0,5} \\ \text{Laju Korosi} &= \frac{W_o - W_f}{A \times t} \times 100\% \\ &= \frac{0,003}{4,5} \times 100\% \\ \text{Laju Korosi} &= 0,0007 \text{ g/cm}^2 \cdot \text{hari} \end{aligned}$$

**A5M1E1T1**

$$\begin{aligned} \text{Laju Korosi} &= \frac{W_o - W_f}{A \times t} \times 100\% \\ \text{Laju Korosi} &= \frac{0,002}{4,5} \times 100\% \\ \text{Laju Korosi} &= 0,004 \text{ g/cm}^2 \cdot \text{hari} \end{aligned}$$

**A7,5M1E0,5T0,5**

$$\begin{aligned} \text{Laju Korosi} &= \frac{W_o - W_f}{A \times t} \times 100\% \\ \text{Laju Korosi} &= \frac{0,003}{4,5} \times 100\% \\ \text{Laju Korosi} &= 0,0007 \text{ g/cm}^2 \cdot \text{hari} \end{aligned}$$

**A7,5M1E0,5T1**

$$\begin{aligned} \text{Laju Korosi} &= \frac{W_o - W_f}{A \times t} \times 100\% \\ \text{Laju Korosi} &= \frac{0,019}{4,5} \times 100\% \\ \text{Laju Korosi} &= 0,0042 \text{ g/cm}^2 \cdot \text{hari} \end{aligned}$$

**A7,5M1E1T0,5**

$$\begin{aligned} \text{Laju Korosi} &= \frac{W_o - W_f}{A \times t} \times 100\% \\ \text{Laju Korosi} &= \frac{0,002}{4,5} \times 100\% \\ \text{Laju Korosi} &= 0,0004 \text{ g/cm}^2 \cdot \text{hari} \end{aligned}$$






**A7,5M1E1T1**

$$\begin{aligned} \text{Laju Korosi} &= \frac{W_o - W_f}{A \times t} \times 100\% \\ \text{Laju Korosi} &= \frac{0,003}{4,5} \times 100\% \\ \text{Laju Korosi} &= 0,0007 \text{ g/cm}^2 \cdot \text{hari} \end{aligned}$$



## LAMPIRAN 2 DOKUMENTASI PENELITIAN

### 1. Proses Pembuatan Alga Oil dan Biodiesel

Proses Ekstraksi	
	
Bahan Baku Alga Bubuk 100 mesh	Menimbang 100 gram bahan baku
	
Maserasi alga bubuk dengan etanol selama 2 hari	Ekstraksi dengan ultrasonik
	
Menyaring hasil ekstraksi bertingkat	Melakukan proses destilasi

### Proses Esterifikasi



Menuangkan alga oil



Menambahkan etanol



Menuangkan katalis  $H_2SO_4$



Hasil proses esterifikasi

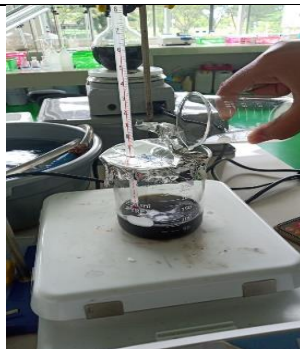
### Proses Transesterifikasi



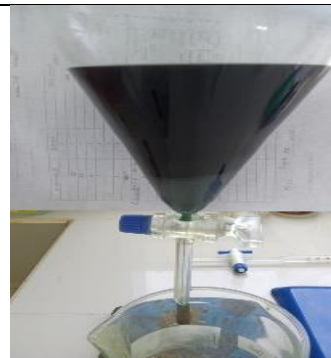
Menuangkan hasil esterifikasi



Menambahkan pelarut etanol



Menambahkan katalis KOH



Hasil proses transesterifikasi

### Proses Pencucian



Memanaskan aquades



Hasil proses pencucian

## 2. Proses Analisis Alga Oil dan Biodiesel

### Analisis Densitas



Menimbang piknometer kosong



Menimbang piknometer isi

### Analisis Viskositas

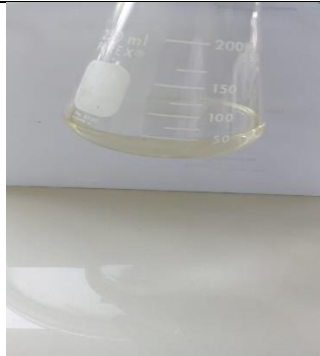


Menuangkan sampel ke *Viscometer Ostwald*



Menuangkan sampel ke beaker glass

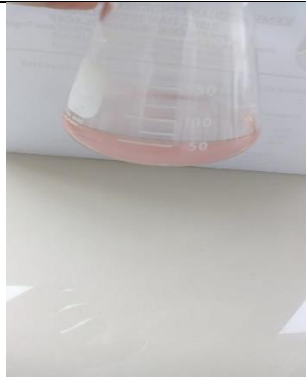
## Analisis Angka Asam



Sampel sebelum dilakukan titrasi



Melakukan titrasi



Hasil setelah di titrasi

## Analisis Kadar Air



Menimbang cawan kosong



Menimbang cawan isi



Memasukkan cawan isi kedalam oven

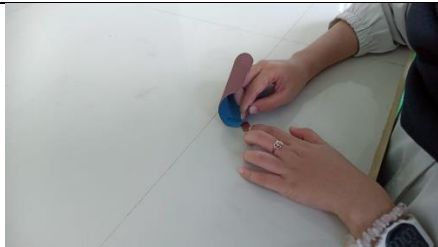


Memasukkan cawan isi setelah dioven kedalam desikator

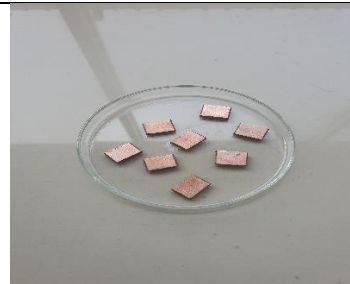


Hasil sampel setelah dioven

### Analisis Laju Korosi Lempeng Tembaga



Menghaluskan lempeng tembaga

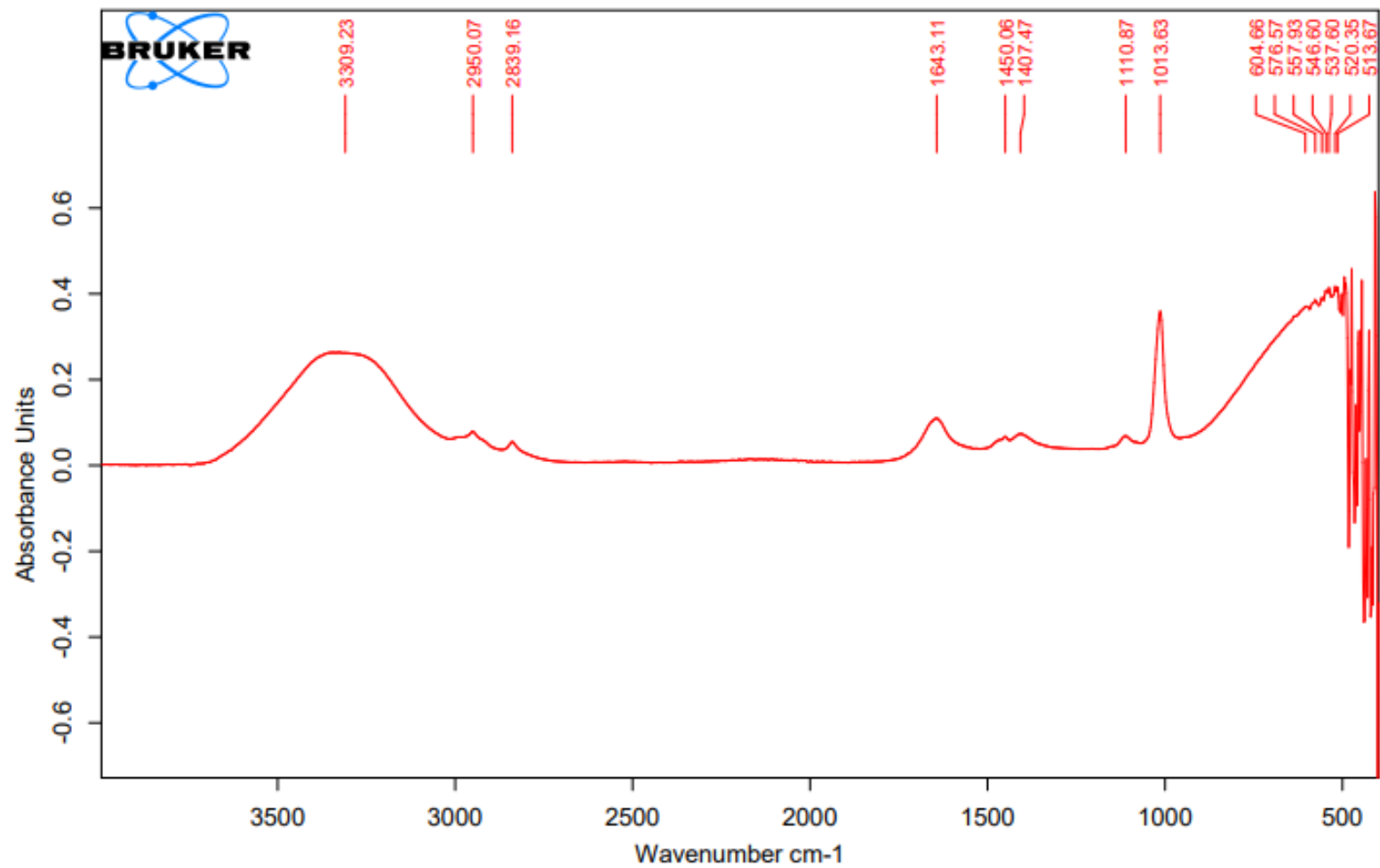


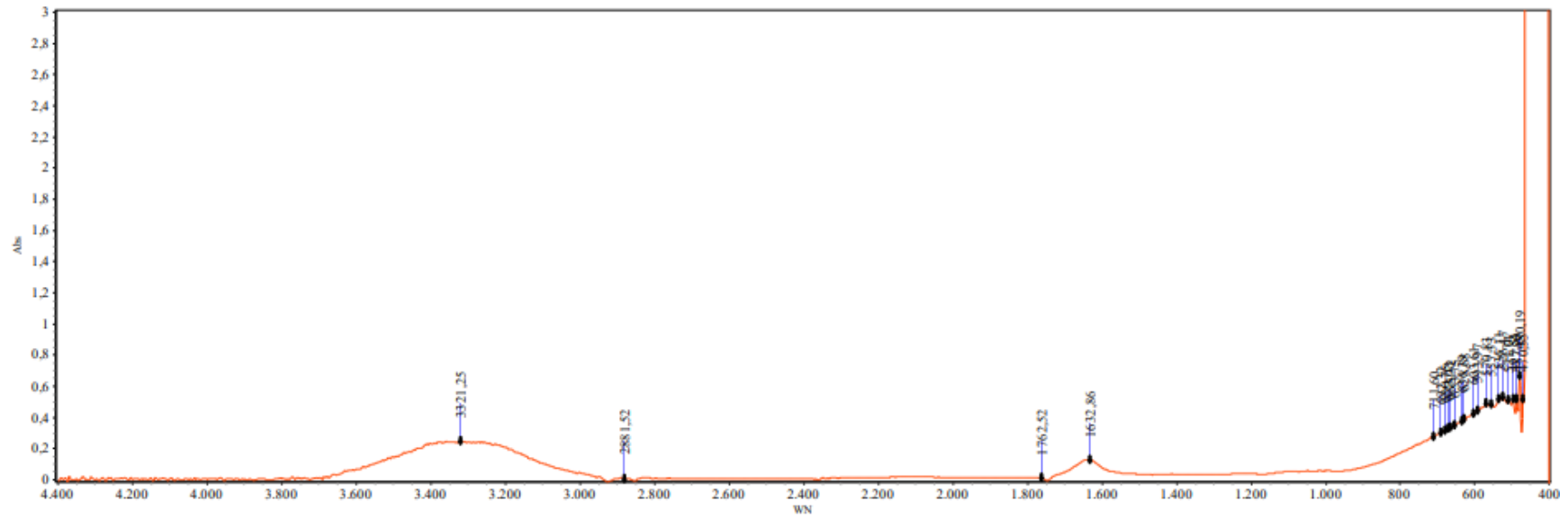
Lempeng tembaga sebelum perendaman



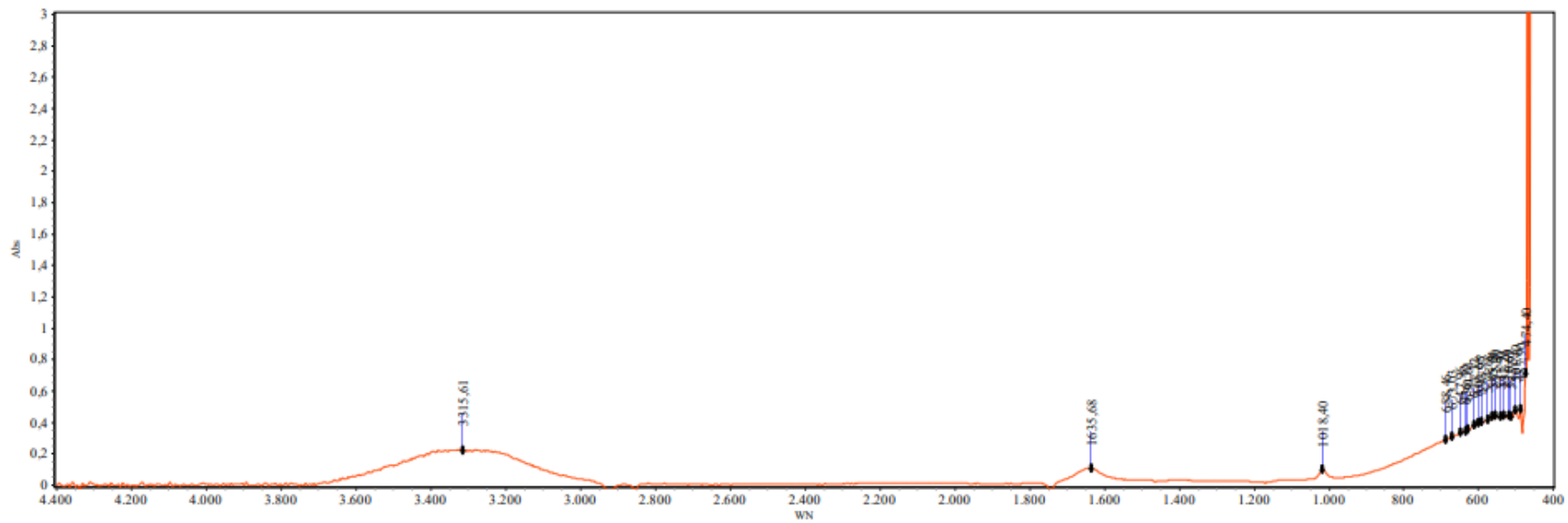
Menimbang lempeng tembaga

### LAMPIRAN 3 HASIL ANALISIS GUGUS FUNGSI









## LAMPIRAN 4 LABEL DAN DATA PRODUK

### 1. Label dan Foto Produk



NAMA SAMPEL : S5E0,5T0,5

KARAKTERISTIK	NILAI
densitas	832,4 kg/m <sup>3</sup>
viskositas	2,2 cst
angka asam	0,59 mgNaOH/g



### 2. Sampel S5E0,5T0,5

KARAKTERISTIK	NILAI
densitas	832,4 kg/m <sup>3</sup>
viskositas	2,2 cst
angka asam	0,59 mgNaOH/g

### 3. Sampel S5E0,5T1

KARAKTERISTIK	NILAI
densitas	879 kg/m <sup>3</sup>
viskositas	2,37 cst
angka asam	0,52 mgNaOH/g

### 4. Sampel S5E1T0,5

KARAKTERISTIK	NILAI
densitas	912 kg/m <sup>3</sup>
viskositas	2,33 cst
angka asam	0,42 mgNaOH/g

5. Sampel S5E1T1

<b>KARAKTERISTIK</b>	<b>NILAI</b>
densitas	859 kg/m <sup>3</sup>
viskositas	2,35 cst
angka asam	0,49 mgNaOH/g
gugus fungsi	O - H, C - H, C = O, C = C

6. Sampel S7,5E0,5T0,5

<b>KARAKTERISTIK</b>	<b>NILAI</b>
densitas	971,8 kg/m <sup>3</sup>
viskositas	2,42 cst
angka asam	0,52 mgNaOH/g

7. Sampel S7,5E0,5T1

<b>KARAKTERISTIK</b>	<b>NILAI</b>
densitas	843 kg/m <sup>3</sup>
viskositas	2,45 cst
angka asam	0,63 mgNaOH/g

8. Sampel S7,5E1T0,5

<b>KARAKTERISTIK</b>	<b>NILAI</b>
densitas	831 kg/m <sup>3</sup>
viskositas	2,79 cst
angka asam	0,56 mgNaOH/g

9. Sampel S7,5E1T1

<b>KARAKTERISTIK</b>	<b>NILAI</b>
densitas	850 kg/m <sup>3</sup>
viskositas	3,05 cst
angka asam	0,45 mgNaOH/g
gugus fungsi	O - H, C = C, C - O

## DAFTAR RIWAYAT HIDUP



Nama : Firda Febriyani  
Tempat/Tanggal Lahir : Cilacap, 11 Februari 2003  
Alamat : Jalan Gunung Batu Rt 02 / Rw 21, Sidanegara,  
Cilacap Tengah, Cilacap  
Telepon : 085875315152  
Motto : Take the moment and taste it, you've got no  
reason to be afraid

### Riwayat Pendidikan

- SD Negeri Sidanegara 01 Tahun 2009 - 2014
- SMP Negeri 6 Cilacap Tahun 2014 - 2017
- SMA Negeri 2 Cilacap Tahun 2017 - 2020
- Politeknik Negeri Cilacap Tahun 2020 - 2024