

LAMPIRAN

1.1 Perhitungan Densitas

Volume piknometer = 25 ml

Piknometer kosong = 16,86 gr

Rumus $\rho = \frac{\text{Piknometer isi} - \text{Piknometer kosong}}{\text{Volume piknometer}}$

1. Variabel 1

$$\begin{aligned}\rho &= \frac{39,71 - 16,86}{25} \\ &= 0,914 \text{ gr/ml}\end{aligned}$$

2. Variabel 2

$$\begin{aligned}\rho &= \frac{39,43 - 16,86}{25} \\ &= 0,903 \text{ gr/ml}\end{aligned}$$

3. Variabel 3

$$\begin{aligned}\rho &= \frac{39,18 - 16,86}{25} \\ &= 0,893 \text{ gr/ml}\end{aligned}$$

4. Variabel 4

$$\begin{aligned}\rho &= \frac{38,82 - 16,86}{25} \\ &= 0,878 \text{ gr/ml}\end{aligned}$$

5. Variabel 5

$$\begin{aligned}\rho &= \frac{38,79 - 16,86}{25} \\ &= 0,877 \text{ gr/ml}\end{aligned}$$

1.2 Perhitungan Viskositas

$\mu_0 = 1,004 \text{ Cp}$ $t_0 = 1 \text{ s}$

$\rho_0 = 1 \text{ gr/ml}$

Rumus: $\mu_x = \frac{t_x \times \rho_x}{t_0 \times \rho_0} \times \mu_0$

1. Variabel 1

$$\begin{aligned}\mu_x &= \frac{4,22 \times 0,914 \times 1,004}{1 \times 1} \\ &= 3,873 \text{ cp}\end{aligned}$$

2. Variabel 2

$$\begin{aligned}\mu_x &= \frac{3,98 \times 0,903 \times 1,004}{1 \times 1} \\ &= 3,608 \text{ cp}\end{aligned}$$

3. Variabel 3

$$\begin{aligned}\mu_x &= \frac{3,70 \times 0,893 \times 1,004}{1 \times 1} \\ &= 3,317 \text{ cp}\end{aligned}$$

4. Variabel 4

$$\begin{aligned}\mu_x &= \frac{3,49 \times 0,878 \times 1,004}{1 \times 1} \\ &= 3,078 \text{ cp}\end{aligned}$$

5. Variabel 2

$$\begin{aligned}\mu_x &= \frac{3,21 \times 0,877 \times 1,004}{1 \times 1} \\ &= 2,827 \text{ cp}\end{aligned}$$

1.3 Perhitungan α , R_m , R_c dan laju alir

1. Variabel 1

Diketahui :

$$\begin{aligned}\text{Konsentrasi} &= 10 \text{ L} : 10 \text{ L (Nira : Air)} \\ &= 15 \text{ kg/10 L} \\ &= 1500 \text{ kg/m}^3\end{aligned}$$

$$a = 39.993 \text{ s/m}^6$$

$$b = 367.806 \text{ s/m}^3$$

$$k_p = 79.986 \text{ s/m}^6$$

$$A = 470 \times 470 \text{ mm}$$

$$= 229.900 \text{ mm}^2$$

$$= 0,221 \text{ m}^2$$

$$-\Delta P = 2 \text{ kg/cm}^2$$

$$= 20.000 \text{ kg/ms}^2$$

$$\mu = 3,873 \text{ cP}$$

$$= 0,003873 \text{ kg/ms}^2$$

$$V = 10 \text{ L}$$

$$= 0,01 \text{ m}^3$$

Jawab:

$$\begin{aligned}\alpha &= \frac{Kp \times A^2 \times (-\Delta P)}{\mu \times Cs} \\ &= \frac{(79.986 \text{ s/m}^6) (0,221 \text{ m}^2)^2 \times (20.000 \text{ kg/cm}^2)}{0,008873 \text{ kg/ms}^2 \times 1.500 \text{ kg/m}^3} \\ &= 1,34 \times 10^7 \text{ m/kg}\end{aligned}$$

Jawab

$$\begin{aligned}Rm &= \frac{B A (-\Delta P)}{\mu} \\ &= \frac{367.806 \text{ s/m}^3 \times (0,221 \text{ m}^2) \times (20.000 \text{ kg/cm}^2)}{0,008873 \text{ kg/ms}^2} \\ &= 4,2 \times 10^{11} \text{ m}^{-1}\end{aligned}$$

Jawab:

$$\begin{aligned}Rc &= \frac{\alpha \times Cs \times v}{A} \\ &= \frac{1,34 \times 10^7 \text{ m/kg} \times 1.500 \text{ kg/m}^3 \times 0,01 \text{ m}^3}{(0,221 \text{ m}^2)} \\ &= 9,13 \times 10^8 \text{ m}^{-1}\end{aligned}$$

Jawab :

$$\begin{aligned}dv/dt &= \frac{A \times (-\Delta P)}{(Rm+Rc) \times \mu} \\ &= \frac{0,221 \text{ m}^2 \times (20.000 \text{ kg/cm}^2)}{(4,2 \times 10^{11} \text{ m}^{-1} + 9,13 \times 10^8 \text{ m}^{-1}) \times 0,008873 \text{ kg/ms}^2} \\ &= 4,07 \times 10^{-11} \text{ m}^3/\text{s}\end{aligned}$$

2. Variabel 2

Diketahui :

$$\text{Konsentrasi} = 10 \text{ L} : 20 \text{ L (Nira : Air)}$$

$$= 15 \text{ kg}/20 \text{ L}$$

$$= 750 \text{ kg/m}^3$$

$$a = 15.507 \text{ s/m}^6$$

$$b = 198.923 \text{ s/m}^3$$

$$k_p = 31.014 \text{ s/m}^6$$

$$A = 470 \times 470 \text{ mm}$$

$$= 229.900 \text{ mm}^2$$

$$= 0,221 \text{ m}^2$$

$$-\Delta P = 2 \text{ kg/cm}^2$$

$$= 20.000 \text{ kg/ms}^2$$

$$\mu = 3,608 \text{ cP}$$

$$= 0,003608 \text{ kg/ms}^2$$

$$V = 20 \text{ L}$$

$$= 0,02 \text{ m}^3$$

Jawab:

$$\alpha = \frac{k_p \times A^2 \times (-\Delta P)}{\mu \times C_s}$$

$$= \frac{31.014 \text{ s/m}^6 \times (0,221 \text{ m}^2)^2 \times 20.000 \text{ kg/ms}^2}{0,003608 \text{ kg/ms}^2 \times 750 \text{ kg/m}^3}$$

$$= 1,19 \times 10^7 \text{ m/kg}$$

Jawab:

$$R_m = \frac{b \times A \times (-\Delta P)}{\mu}$$

$$= \frac{198.923 \text{ s/m}^3 \times 0,221 \text{ m}^2 \times 20.000 \text{ kg/ms}^2}{0,003608 \text{ kg/ms}^2}$$

$$= 2,44 \times 10^{11} \text{ m}^{-1}$$

Jawab :

$$R_c = \frac{\alpha \times C_s \times v}{A}$$

$$A$$

$$= \frac{1,19 \times 10^7 \text{ m/kg} \times 750 \text{ kg/m}^3 \times 0,02 \text{ m}^3}{0,221 \text{ m}^2}$$

$$= 7,60 \times 10^8 \text{ m}^{-1}$$

Jawab :

$$dv/dt = \frac{A \times (-\Delta P)}{(R_m + R_c) \times \mu}$$

$$(R_m + R_c) \times \mu$$

$$\begin{aligned}
&= \underline{0,221 \text{ m}^2 \times 20.000 \text{ kg/ms}^2} \\
&(2,44 \times 10^{11} \text{ m}^{-1} + 7,60 \times 10^8 \text{ m}^{-1}) \times 0,003608 \text{ kg/ms}^2 \\
&= 6,52 \times 10^{-11} \text{ m}^3/\text{s}
\end{aligned}$$

3. Variabel 3

Diketahui :

Konsentrasi = 10 L : 30 L (Nira : Air)

$$= 15 \text{ kg}/30 \text{ L}$$

$$= 500 \text{ kg/m}^3$$

$$a = 7.676 \text{ s/m}^6$$

$$b = 118.673 \text{ s/m}^3$$

$$k_p = 15.352 \text{ s/m}^6$$

$$A = 470 \times 470 \text{ mm}$$

$$= 229.900 \text{ mm}^2$$

$$= 0,221 \text{ m}^2$$

$$-\Delta P = 2 \text{ kg/cm}^2$$

$$= 20.000 \text{ kg/ms}^2$$

$$\mu = 3,317 \text{ cP}$$

$$= 0,003317 \text{ kg/ms}^2$$

$$V = 30 \text{ L}$$

$$= 0,03 \text{ m}^3$$

Jawab:

$$\alpha = \frac{K_p \times A^2 \times (-\Delta P)}{\mu \times C_s}$$

$$= \frac{15.352 \text{ s/m}^6 \times (0,221 \text{ m}^2)^2 \times 0,221 \text{ m}^2}{0,003317 \text{ kg/ms}^2 \times 500 \text{ kg/m}^3}$$

$$= 9,03 \times 10^6 \text{ m/kg}$$

Jawab:

$$R_m = \frac{b A (-\Delta P)}{\mu}$$

$$= \frac{118.673 \text{ s/m}^3 \times 0,221 \text{ m}^2 \times 20.000 \text{ kg/ms}^2}{0,003317 \text{ kg/ms}^2}$$

$$= 1,58 \times 10^{11} \text{ m}^{-1}$$

Jawab :

$$R_c = \frac{\alpha \times C_s \times v}{A}$$

A

$$= \frac{9,03 \times 10^6 \text{ m/kg} \times 500 \text{ kg/m}^3 \times 0,03 \text{ m}^3}{0,221 \text{ m}^2}$$

$$= 6,14 \times 10^8 \text{ m}^{-1}$$

Jawab :

$$dv/dt = \frac{A \times (-\Delta P)}{(R_m + R_c) \times \mu}$$

$$= \frac{0,221 \text{ m}^2 \times 20.000 \text{ kg/ms}^2}{(1,58 \times 10^{11} \text{ m}^{-1} + 6,14 \times 10^8 \text{ m}^{-1}) \times 0,003317 \text{ kg/ms}^2}$$

$$= 9,23 \times 10^{-11} \text{ m}^3/\text{s}$$

4. Variabel 4

Diketahui :

Konsentrasi = 10 L : 40 L (Nira : Air)

$$= 15 \text{ kg}/40 \text{ L}$$

$$= 375 \text{ kg/m}^3$$

$$a = 3.238,5 \text{ s/m}^6$$

$$b = 76.699 \text{ s/m}^3$$

$$k_p = 6.477 \text{ s/m}^6$$

$$A = 470 \times 470 \text{ mm}$$

$$= 229.900 \text{ mm}^2$$

$$= 0,221 \text{ m}^2$$

$$-\Delta P = 2 \text{ kg/cm}^2$$

$$= 20.000 \text{ kg/ms}^2$$

$$\mu = 3,078 \text{ cP}$$

$$= 0,003078 \text{ kg/ms}^2$$

$$V = 40 \text{ L}$$

$$= 0,04 \text{ m}^3$$

Jawab:

$$\alpha = \frac{k_p \times A^2 \times (-\Delta P)}{\mu \times C_s}$$

$$= \frac{6.477 \text{ s/m}^6 \times (0,221 \text{ m}^2)^2 \times 20.000 \text{ kg/ms}^2}{0,003078 \text{ kg/ms}^2 \times 375 \text{ kg/m}^3}$$

$$= 5,48 \times 10^6 \text{ m/kg}$$

Jawab:

$$\begin{aligned} R_m &= \frac{b \times A \times (-\Delta P)}{\mu} \\ &= \frac{76.699 \text{ s/m}^3 \times 0,221 \text{ m}^2 \times 20.000 \text{ kg/ms}^2}{0,003078 \text{ kg/ms}^2} \\ &= 1,10 \times 10^{11} \text{ m}^{-1} \end{aligned}$$

Jawab :

$$\begin{aligned} R_c &= \frac{\alpha \times C_s \times v}{A} \\ &= \frac{5,48 \times 10^6 \text{ m/kg} \times 375 \text{ kg/m}^3 \times 0,04 \text{ m}^3}{0,221 \text{ m}^2} \\ &= 3,72 \times 10^8 \text{ m}^{-1} \end{aligned}$$

Jawab :

$$\begin{aligned} dv/dt &= \frac{A \times (-\Delta P)}{(R_m + R_c) \times \mu} \\ &= \frac{0,221 \text{ m}^2 \times 20.000 \text{ kg/ms}^2}{(1,10 \times 10^{11} \text{ m}^{-1} + 3,72 \times 10^8 \text{ m}^{-1}) \times 0,003078 \text{ kg/ms}^2} \\ &= 1,23 \times 10^{-10} \text{ m}^3/\text{s} \end{aligned}$$

5. Variabel 5

Diketahui :

$$\begin{aligned} \text{Konsentrasi} &= 10 \text{ L} : 50 \text{ L (Nira : Air)} \\ &= 15 \text{ kg/50 L} \\ &= 300 \text{ kg/m}^3 \end{aligned}$$

$$a = 2.276 \text{ s/m}^6$$

$$b = 35.928 \text{ s/m}^3$$

$$k_p = 4.552 \text{ s/m}^6$$

$$A = 470 \times 470 \text{ mm}$$

$$= 229.900 \text{ mm}^2$$

$$= 0,221 \text{ m}^2$$

$$-\Delta P = 2 \text{ kg/cm}^2$$

$$= 20.000 \text{ kg/ms}^2$$

$$\mu = 2,827 \text{ cP}$$

$$= 0,002827 \text{ kg/ms}^2$$

$$V = 50 \text{ L}$$

$$= 0,05 \text{ m}^3$$

Jawab:

$$\alpha = \frac{K_p \times A^2 \times (-\Delta P)}{\mu \times C_s}$$

$$= \frac{4.552 \text{ s/m}^6 \times (0,221 \text{ m}^2)^2 \times 20.000 \text{ kg/ms}^2}{0,002827 \text{ kg/ms}^2 \times 300 \text{ kg/m}^3}$$

$$= 5,24 \times 10^6 \text{ m/kg}$$

Jawab:

$$R_m = \frac{b \times A \times (-\Delta P)}{\mu}$$

$$= \frac{35.928 \text{ s/m}^3 \times 0,221 \text{ m}^2 \times 20.000 \text{ kg/ms}^2}{0,002827 \text{ kg/ms}^2}$$

$$= 5,61 \times 10^{10} \text{ m}^{-1}$$

Jawab :

$$R_c = \frac{\alpha \times C_s \times v}{A}$$

$$= \frac{5,24 \times 10^6 \text{ m/kg} \times 300 \text{ kg/m}^3 \times 0,05 \text{ m}^3}{0,221 \text{ m}^2}$$

$$= 3,56 \times 10^8 \text{ m}^{-1}$$

Jawab :

$$dv/dt = \frac{A \times (-\Delta P)}{(R_m + R_c) \times \mu}$$

$$= \frac{0,221 \text{ m}^2 \times 20.000 \text{ kg/ms}^2}{(5,61 \times 10^{10} \text{ m}^{-1} + 3,56 \times 10^8 \text{ m}^{-1}) \times 0,002827 \text{ kg/ms}^2}$$

$$= 2,21 \times 10^{-10} \text{ m}^3/\text{s}$$

1.4 Perhitungan TSS

TSS

Rumus : $\frac{(A-B) \times 1000}{v}$

v

A = berat cawan kertas saring + residu kering

B = berat cawan + kertas saring

Volume sampel = 25 ml

B = 44,57 gram

1. Variabel 1

$$\begin{aligned} \text{TSS} &= \frac{(45,17 - 44,57) \times 1000}{25} \\ &= 24 \text{ gr/ml} \end{aligned}$$

2. Variabel 2

$$\begin{aligned} \text{TSS} &= \frac{(45,11 - 44,57) \times 1000}{25} \\ &= 21,60 \text{ gr/ml} \end{aligned}$$

3. Variabel 3

$$\begin{aligned} \text{TSS} &= \frac{(45,04 - 44,57) \times 1000}{25} \\ &= 18,80 \text{ gr/ml} \end{aligned}$$

4. Variabel 4

$$\begin{aligned} \text{TSS} &= \frac{(44,88 - 44,57) \times 1000}{25} \\ &= 12,40 \text{ gr/ml} \end{aligned}$$

5. Variabel 5

$$\begin{aligned} \text{TSS} &= \frac{(44,80 - 44,57) \times 1000}{25} \\ &= 9,20 \text{ gr/ml} \end{aligned}$$

1.5 Perhitungan Centrifug

Centrifug = $\frac{\text{tinggi endapan}}{\text{Tinggi keseluruhan}} \times 100\%$

1. Variabel 1

$$\begin{aligned} \text{Centrifug} &= \frac{0,90 \text{ cm}}{18} \times 100 \\ &= 5\% \end{aligned}$$

2. Variabel 2

$$\begin{aligned} \text{Centrifug} &= \frac{0,86 \text{ cm}}{18} \times 100 \\ &= 4,78\% \end{aligned}$$

3. Variabel 3

$$\begin{aligned}\text{Centrifug} &= \frac{0,74 \text{ cm}}{18} \times 100 \\ &= 4,11\%\end{aligned}$$

4. Variabel 4

$$\begin{aligned}\text{Centrifug} &= \frac{0,62 \text{ cm}}{18} \times 100 \\ &= 3,44\%\end{aligned}$$

5. Variabel 5

$$\begin{aligned}\text{Centrifug} &= \frac{0,47 \text{ cm}}{18 \text{ cm}} \times 100 \\ &= 2,61\%\end{aligned}$$

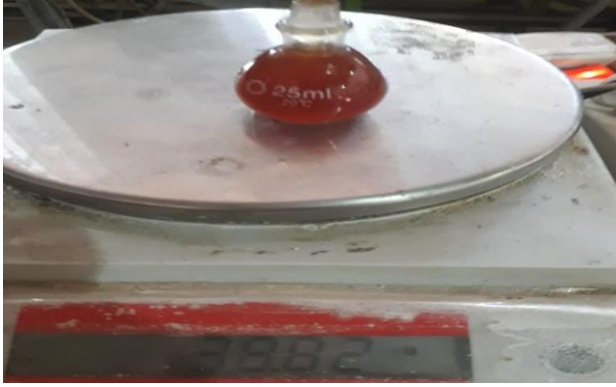
1.6 Foto Praktikum



Serangkaian Alat Filtrasi Plate and Frame



pengadukan nira dengan air



Analisa Densitas



Analisa Viskositas



Analisa Centrifug



Analisa TSS