LAMPIRAN

1.1 Perhitungan Densitas

Volume piknometer = 25 ml

Piknometer kosong = 16,86 gr

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

1. Variabel 1

$\rho = \frac{39,91 - 16,86}{25}$

= 0,922 gr/ml

2. Variabel 2

$\rho = \frac{39,59 - 16,86}{25}$

= 0,909 gr/ml

3. Variabel 3

$\rho = \frac{39,21 - 16,86}{25}$

= 0,894 gr/ml

4. Variabel 4

$\rho = \frac{38,77 - 16,86}{25}$

= 0,876 gr/ml

5. Variabel 5

$\rho = \frac{38,42 - 16,86}{25}$

= 0,862 gr/ml

1.2 Perhitungan Viskositas

μ_0 = 1,004 Cp t_0 = 1 s ρ_0 = 1 gr/ml

Rumus: $\mu_x = \frac{tx \times \rho x}{t0 \times \rho 0} \times \mu$

1. Variabel 1

$\mu_x = \frac{4,15 \times 0,922 \times 1,004}{1 \times 1}$

$= 3,842$ cp

2. Variabel 2

$\mu_x = \frac{3,88 \times 0,909 \times 1,004}{1 \times 1}$

$= 3,542$ cp

3. Variabel 3

$\mu_x = \frac{3,65 \times 0,894 \times 1,004}{1 \times 1}$

$= 3,276$ cp

4. Variabel 4

$\mu_x = \frac{3,49 \times 0,876 \times 1,004}{1 \times 1}$

$= 3,071$ cp

5. Variabel 2

$\mu_x = \frac{3,21 \times 0,862 \times 1,004}{1 \times 1}$

$= 2,779$ cp

1.3 Perhitungan α, Rm, Rc dan laju alir

1. Variabel 1

Diketahui :

Konsentrasi = 10kg : 10 L (Ampas tahu : Air)

= 10 kg/10 L

= 1000 kg/m^3

a = 46.913 s/m^6

b = 351.292 s/m^3

kp = 93.826 s/m^6

A = 470 x 470 mm

= 229.900 mm^2

= 0,221 m^2

$-\Delta P = 2\ kg/cm^2$

$= 20.000\ kg/ms^2$

$\mu = 3{,}842\ cP$

$= 0{,}003842\ kg/ms^2$

$V = 10\ L$

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

Jawab:

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

$$= \frac{(93.826\ s/m^6\ (0{,}221\ m^2)^2 \times (20.000\ kg/cm^2)}{0{,}003842\ kg/ms^2 \times 1.000\ kg/m^3}$$

$= 2{,}38 \times 10^7\ m/kg$

Jawab

$$Rm = \frac{B\ A(-\Delta P)}{\mu}$$

$$= \frac{351.282\ s/m^3 \times (0{,}221\ m^2) \times (20.000\ kg/cm^2)}{0{,}003842\ kg/ms^2}$$

$= 4{,}04 \times 10^{11}\ m^{-1}$

Jawab:

$$Rc = \frac{\alpha \times Cs \times v}{A}$$

$$= \frac{2{,}38 \times 10^7\ m/kg \times 1.000\ kg/m^3 \times 0{,}01\ m^3}{(0{,}221\ m^2)}$$

$= 1{,}08 \times 10^9\ m^{-1}$

Jawab :

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

$$= \frac{0{,}221\ m^2 \times (20.000\ kg/cm^2)}{(4{,}04 \times 10^{11}\ m^{-1} + 1{,}08 \times 10^9\ m^{-1}) \times 0{,}003842\ kg/ms^2)}$$

$= 4{,}19 \times 10^{-11}\ m^3/s$

2. Variabel 2

Diketahui :

Konsentrasi = 10 kg : 20 L (Ampas tahu : Air)

= 10 kg/20 L

$= 500\ kg/m^3$

$a = 19.637\ s/m^6$

$b = 191.220\ s/m^3$

$kp = 39.274\ s/m^6$

A = 470 x 470 mm

$= 229.900\ mm^2$

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

$-\Delta P = 2\ kg/cm^2$

$= 20.000\ kg/ms^2$

$\mu = 3{,}842\ cP$

$= 0{,}003842\ kg/ms^2$

V = 20 L

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

Jawab:

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

$$= \frac{39.274\ s/m^6 \times (0{,}221\ m^2)^2 \times 20.000\ kg/ms^2}{0{,}003608\ kg/ms^2 \times 500\ kg/m^3}$$

$= 2{,}16 \times 10^7\ m/kg$

Jawab:

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

$$= \frac{191.220\ s/m^3 \times 0{,}221\ m^2 \times 20.000\ kg/ms^2}{0{,}003608\ kg/ms^2}$$

$$= 2{,}39 \times 10^{11}\ m^{-1}$$

Jawab :

$$Rc = \frac{\alpha \times Cs \times v}{A}$$

$$= \frac{2{,}16 \times 10^7\ m/kg \times 500\ kg/m^3 \times 0{,}02\ m^3}{0{,}221\ m^2}$$

$$= 9{,}80 \times 10^8\ m^{-1}$$

Jawab :

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

$$= \frac{0{,}221\ m^2 \times 20.000\ kg/ms^2}{(2{,}39 \times 10^{11}\ m^{-1} + 9{,}80 \times 10^8\ m^{-1}) \times 0{,}003608\ kg/ms^2}$$

$$= 6{,}53 \times 10^{-11}\ m^3/s$$

3. Variabel 3

Diketahui :

Konsentrasi = 10 kg : 30 L (Ampas Tahu : Air)

= 10 kg/30 L

= 333,34 kg/m^3

$a = 5.781{,}5\ s/m^6$

$b = 125.821\ s/m^3$

$kp = 11.563\ s/m^6$

A = 470 x 470 mm

= 229.900 mm^2

= 0,221 m^2

$-\Delta P = 2\ kg/cm^2$

$= 20.000\ kg/ms^2$

$\mu = 3{,}276\ cP$

$= 0{,}003276\ kg/ms^2$

$V = 30\ L$

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

Jawab:

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

$$= \frac{11.563\ s/m^6 \times (0{,}221\ m^2)^2 \times 0{,}221\ m^2}{0{,}003276\ kg/ms^2 \times 333{,}34\ kg/m^3}$$

$= 1{,}03 \times 10^6\ m/kg$

Jawab:

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

$$= \frac{125.821\ s/m^3 \times 0{,}221\ m^2 \times 20.000\ kg/ms^2}{0{,}003276\ kg/ms^2}$$

$= 1{,}70 \times 10^{11}\ m^{-1}$

Jawab :

$$Rc = \frac{\alpha \times Cs \times v}{A}$$

$$= \frac{1{,}03 \times 10^6\ m/kg \times 333{,}34\ kg/m^3 \times 0{,}03\ m^3}{0{,}221\ m^2}$$

$= 4{,}68 \times 10^8\ m^{-1}$

Jawab :

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

$$= \frac{0{,}221\ m^2 \times 20.000\ kg/ms^2}{}$$

$(1{,}70 \times 10^{11}\ m^{-1} + 4{,}68 \times 10^{8}\ m^{-1}) \times 0{,}003276\ kg/ms^2$

$= 8{,}51 \times 10^{-11}\ m^3/s$

4. Variabel 4

Diketahui :

Konsentrasi = 10 L : 40 L (Ampas Tahu : Air)

= 10 kg/40 L

$= 250\ kg/m^3$

$a = 2.796\ s/m^6$

$b = 34.695\ s/m^3$

$kp = 5.592\ s/m^6$

A = 470 x 470 mm

$= 229.900\ mm^2$

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

$-\Delta P = 2\ kg/cm^2$

$= 20.000\ kg/ms^2$

$\mu = 3{,}071$ cP

$= 0{,}003071\ kg/ms^2$

V = 40 L

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

Jawab:

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

$$= \frac{5.592\ s/m^6 \times (0{,}221\ m^2)^2 \times 20.000\ kg/ms^2}{0{,}003071\ kg/ms^2 \times 250\ kg/m^3}$$

$= 7{,}10 \times 10^{6}\ m/kg$

Jawab:

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

$$= \frac{34.695\ s/m^3 \times 0{,}221\ m^2 \times 20.000\ kg/ms^2}$$

$0{,}003071\ kg/ms^2$

$= 4{,}99 \times 10^{11}\ m^{-1}$

Jawab :

$$Rc = \frac{\alpha \times Cs \times v}{A}$$

$$= \frac{7{,}10 \times 10^6\ m/kg \times 250\ kg/m^3 \times 0{,}04\ m^3}{0{,}221\ m^2}$$

$= 3{,}22 \times 10^8\ m^{-1}$

Jawab :

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

$$= \frac{0{,}221\ m^2 \times 20.000\ kg/ms^2}{(4{,}99 \times 10^{11}\ m^{-1} + 3{,}22 \times 10^8\ m^{-1}) \times 0{,}003071\ kg/ms^2}$$

$= 2{,}72 \times 10^{-10}\ m^3/s$

5. Variabel 5

Diketahui :

Konsentrasi = 10 L : 50 L (Ampas Tahu : Air)

= 10 kg/50 L

$= 200\ kg/m^3$

$a = 3.238\ s/m^6$
$b = 76.699\ s/m^3$
$kp = 6.477\ s/m^6$

A = 470 x 470 mm

$= 229.900\ mm^2$

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

$-\Delta P = 2\ kg/cm^2$

$= 20.000\ kg/ms^2$

$\mu = 2{,}779\ cP$

$= 0{,}002779\ kg/ms^2$

V = 50 L

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

Jawab:

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

$$= \frac{6.477\ s/m^6 \times (0{,}221\ m^2)^2 \times 20.000\ kg/ms^2}{0{,}002779\ kg/ms^2 \times 200\ kg/m^3}$$

$= 1{,}14 \times 10^6\ m/kg$

Jawab:

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

$$= \frac{76.699\ s/m^3 \times 0{,}221\ m^2 \times 20.000\ kg/ms^2}{0{,}002779\ kg/ms^2}$$

$= 1{,}22 \times 10^{10}\ m^{-1}$

Jawab :

$$Rc = \frac{\alpha \times Cs \times v}{A}$$

$$= \frac{1{,}14 \times 10^6\ m/kg \times 200\ kg/m^3 \times 0{,}05\ m^3}{0{,}221\ m^2}$$

$= 5{,}15 \times 10^8\ m^{-1}$

Jawab :

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

$$= \frac{0{,}221\ m^2 \times 20.000\ kg/ms^2}{(1{,}22 \times 10^{10}\ m^{-1} + 5{,}15 \times 10^8\ m^{-1}) \times 0{,}002779\ kg/ms^2}$$

$= 1{,}00 \times 10^{-10}\ m^3/s$

1.4 Perhitungan TSS

TSS

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

A = berat cawan kertas saring + residu kering

B = berat cawan + kertas saring

Volume sampel = 25 ml

B = 44,57 gram

1. Variabel 1

$$TSS = \frac{(45{,}19 - 44{,}57) \times 1000}{25}$$

$$= 24{,}80 \text{ mg/L}$$

2. Variabel 2

$$TSS = \frac{(45{,}10 - 44{,}57) \times 1000}{25}$$

$$= 21{,}20 \text{ mg/L}$$

3. Variabel 3

$$TSS = \frac{(45{,}03 - 44{,}57) \times 1000}{25}$$

$$= 18{,}40 \text{ mg/L}$$

4. Variabel 4

$$TSS = \frac{(44{,}85 - 44{,}57) \times 1000}{25}$$

$$= 11{,}20 \text{ mg/L}$$

5. Variabel 5

$$TSS = \frac{(44{,}78 - 44{,}57) \times 1000}{25}$$

$$= 8{,}40 \text{ mg/L}$$

1.5 Perhitungan Centrifug

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

1. Variabel 1

   Centrifug = $\frac{0{,}91\ cm}{18} \times 100$

   = 5,06%

2. Variabel 2

   Centrifug = $\frac{0{,}85\ cm}{18} \times 100$

   = 4,72%

3. Variabel 3

   Centrifug = $\frac{0{,}75\ cm}{18} \times 100$

   = 4,17%

4. Variabel 4

   Centrifug = $\frac{0{,}65\ cm}{18} \times 100$

   = 3,61%

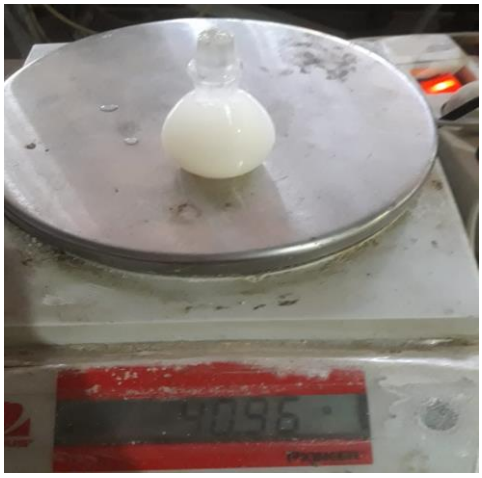
5. Variabel 5

   Centrifug = $\frac{0{,}42\ cm}{18\ cm} \times 100$

   = 2,33%

1.6 Foto Praktikum

Serangkaian Alat Filtrasi Plate and Frame



Analisa Densitas

Analisa Viskositas

Analisa Centrifug

Analisa TSS