LAMPIRAN B
URAIAN PERHITUNGAN

A. Perkiraan Pembuatan Pati Talas

1 kg umbi talas = 95 gram pati talas

Dalam penelitian ini pembuatan pati talas sebanyak 10 kg umbi talas dengan sampel sebanyak 16 sampel. Dengan demikian, dari 10 kg umbi talas tersebut didapatkan pati talas sebanyak 475 gram pati talas.

B. Pembuatan Larutan

1. Larutan NaOH 0,3 M

   Diketahui : Molar = 0,3 M
   Volume = 100 mL
   Berat Molekul = 40 gr/mol

   Rumus yang digunakan :

   $$\text{gram} = M \times V \times BM$$

   Maka;

   gram $= M \times V \times BM$

   $= 40\ {}^{\text{gr}}/_{\text{mol}} \times 0{,}1\ \text{L} \times 0{,}3\ {}^{\text{mol}}/_{\text{L}}$

   $= 1{,}2$ gram

2. Larutan NaOH 0,1 M

   Diketahui : Molar = 0,1 M
   Volume = 100 mL
   Berat Molekul = 40 gr/mol

   Rumus yang digunakan :

   $$\text{gram} = M \times V \times BM$$

   Maka ;

   gram $= M \times V \times BM$

   $= 40\ {}^{\text{gr}}/_{\text{mol}} \times 0{,}1\ \text{L} \times 0{,}1\ {}^{\text{mol}}/_{\text{L}}$

   $= 0{,}4$ gram

3. Larutan CH_3COOH 6%

Diketahui : Volume = 100 mL
Berat Molekul = 60,05 gr/mol
ρ = 1,05 gr/mL
% = 6%

Rumus yang digunakan :

$$M_1 = \frac{\% \times \rho \times 1000}{BM}$$

$$M_1 \times V_1 = M_2 \times V_2$$

Maka ;

$$M_1 = \frac{100\% \times 1{,}05 \frac{gr}{mL} \times 1000}{60{,}05 \frac{gr}{mol}} \qquad M_2 = \frac{6\% \times 1{,}05 \frac{gr}{mL} \times 1000}{60{,}05 \frac{gr}{mol}}$$

M_1 = 17,485 M $\qquad$ M_2 = 1,0491 M

17,485 M × V_1 = 1,0491 M × 100 mL

$$V_1 = \frac{104{,}912 \text{ mmol}}{17{,}485 \text{ mmol}/\text{mL}}$$

V_1 = 6 mL

4. Larutan HCl 0,1 M

Diketahui : Volume = 500 mL
Berat Molekul = 36,5 gr/mol
ρ = 1,18 gr/mL
% = 37%

Rumus yang digunakan :

$$M_1 = \frac{\% \times \rho \times 1000}{BM}$$

$$M_1 \times V_1 = M_2 \times V_2$$

Maka ;

$$M_1 = \frac{37\% \times 1{,}18 \frac{gr}{mL} \times 1000}{36{,}5 \frac{gr}{mol}} = 11{,}96 \text{ M}$$

$$11{,}96\ \text{M} \times V_1 = 0{,}1\ \text{M} \times 500\ \text{mL}$$

$$V_1 = \frac{50\ \text{mmol}}{11{,}96\ \text{mmol}/\text{mL}}$$

$$V_1 = 4{,}18\ \text{mL}$$

C. *Swelling Power*

a. Pati Alami

Berat sampel kering = 0,1 gr

Berat tabung = 54,31 gr

Berat pasta + tabung = 54,685 gr

Berat pasta = (54,685 – 54,31) gr

= 0,375 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}375\ \text{gr}}{0{,}1\ \text{gr}} = 3{,}75\ \text{g/g}$

b. pH 6

- Pada t = 30 menit

Berat sampel = 0,1 gr

Berat tabung = 54,31 gr

Berat pasta + tabung = 54,9 gr

Berat pasta = (54,9 – 54,31) gr

= 0,59 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}59\ \text{gr}}{0{,}1\ \text{gr}}$

= 5,9 g/g

- Pada t = 60 menit

Berat sampel = 0,1 gr

Berat tabung = 55,09 gr

Berat pasta + tabung = 55,71 gr

Berat pasta = (55,71 – 55,09) gr

= 0,62 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}62 \text{ gr}}{0{,}1 \text{ gr}}$

= 6,2 g/g

- Pada t = 90 menit

Berat sampel = 0,1 gr

Berat tabung = 54,5 gr

Berat pasta + tabung = 55,25 gr

Berat pasta = (55,25 – 54,5) gr

= 0,75 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}75 \text{ gr}}{0{,}1 \text{ gr}}$

= 7,5 g/g

- Pada t = 120 menit

Berat sampel = 0,1 gr

Berat tabung = 54,58 gr

Berat pasta + tabung = 55,32 gr

Berat pasta = (55,32 – 54,58) gr

= 0,74 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}74 \text{ gr}}{0{,}1 \text{ gr}}$ = 7,4 g/g

c. pH 7

- Pada t = 30 menit

Berat sampel = 0,1 gr

Berat tabung = 54,16 gr

Berat pasta + tabung = 55,08 gr

Berat pasta = (55,08 – 54,16) gr

= 0,92 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}92 \text{ gr}}{0{,}1 \text{ gr}}$

= 9,2 g/g

- Pada t = 60 menit

Berat sampel = 0,1 gr

Berat tabung = 54,81 gr

Berat pasta + tabung = 55,64 gr

Berat pasta = (55,64 – 54,81) gr

= 0,83 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}83 \text{ gr}}{0{,}1 \text{ gr}}$

= 8,3 g/g

- Pada t = 90 menit

Berat sampel = 0,1 gr

Berat tabung = 52,67 gr

Berat pasta + tabung = 53,63 gr

Berat pasta = (53,63 – 52,67) gr

= 0,96 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}96 \text{ gr}}{0{,}1 \text{ gr}}$

$= 9{,}6$ g/g

- Pada t = 120 menit

Berat sampel = 0,1 gr

Berat tabung = 54,04 gr

Berat pasta + tabung = 55,09 gr

Berat pasta = (55,09 – 54,04) gr

= 1,05 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{1{,}05 \text{ gr}}{0{,}1 \text{ gr}}$

$= 10{,}5$ g/g

d. pH 8

- Pada t = 30 menit

Berat sampel = 0,1 gr

Berat tabung = 54,55 gr

Berat pasta + tabung = 55,54 gr

Berat pasta = (55,54 – 54,55) gr

= 0,99 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{0{,}99 \text{ gr}}{0{,}1 \text{ gr}}$

$= 9{,}9$ g/g

- Pada t = 60 menit

Berat sampel = 0,1 gr

Berat tabung = 54,31 gr

Berat pasta + tabung = 55,75 gr

Berat pasta = (55,75 – 54,31) gr

= 1,44 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{1{,}44 \text{ gr}}{0{,}1 \text{ gr}}$

= 14,4 g/g

- Pada t = 90 menit

Berat sampel = 0,1 gr

Berat tabung = 54,57 gr

Berat pasta + tabung = 56,22 gr

Berat pasta = (56,22 – 54,57) gr

= 1,65 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{1{,}65 \text{ gr}}{0{,}1 \text{ gr}}$

= 16,5 g/g

- Pada t = 120 menit

Berat sampel = 0,1 gr

Berat tabung = 54,21 gr

Berat pasta + tabung = 55,68 gr

Berat pasta = (55,68 – 54,21) gr

= 1,47 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{1{,}47 \text{ gr}}{0{,}1 \text{ gr}}$

= 14,7 g/g

e. pH 9

- Pada t = 30 menit

Berat sampel = 0,1 gr

Berat tabung = 54,49 gr

Berat pasta + tabung = 55,59 gr

Berat pasta = (55,59– 54,49) gr

= 1,1 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{1{,}1 \text{ gr}}{0{,}1 \text{ gr}}$

= 11 g/g

- Pada t = 60 menit

Berat sampel = 0,1 gr

Berat tabung = 54,04 gr

Berat pasta + tabung = 55,19 gr

Berat pasta = (55,19 – 54,04) gr

= 1,15 gr

Swelling Power $= \frac{\text{Ber at pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{1{,}15 \text{ gr}}{0{,}1 \text{ gr}}$

= 11,5 g/g

- Pada t = 90 menit

Berat sampel = 0,1 gr

Berat tabung = 53,63 gr

Berat pasta + tabung = 54,89 gr

Berat pasta = (54,89 – 53,63) gr

= 1,26 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{1{,}26 \text{ gr}}{0{,}1 \text{ gr}}$

= 12,6 g/g

- Pada t = 120 menit

Berat sampel = 0,1 gr

Berat tabung = 53,62 gr

Berat pasta + tabung = 54,92 gr

Berat pasta = (54,92 – 53,62) gr

= 1,3 gr

Swelling Power $= \frac{\text{Berat pasta (gr)}}{\text{Berat sampel kering (gr)}}$

$= \frac{1{,}3 \text{ gr}}{0{,}1 \text{ gr}}$

= 13 g/g

D. *Solubility*

a. Pati Alami

Volume supernatant = 1,3 mL

Berat endapan kering = 0,1539 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}1539}{1{,}3} \times 100\ \%$

= 11,84 %

b. pH 6

- Pada t = 30 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,2002 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}2002}{1{,}3} \times 100\ \%$

$= 15{,}4\ \%$

- Pada t = 60 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,2404 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}2404}{1{,}3} \times 100\ \%$

$= 18{,}4923\ \%$

- Pada t = 90 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,2303 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}2303}{1{,}3} \times 100\ \%$

$= 17{,}7154\ \%$

- Pada t = 120 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,2603 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}2603}{1{,}3} \times 100\ \% = 20{,}0231\ \%$

c. pH 7

- Pada t = 30 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,2807 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}2807}{1{,}3} \times 100\ \%$

$= 21{,}5923\ \%$

- Pada t = 60 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,3005 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}3005}{1{,}3} \times 100\ \%$

$= 23{,}1154\ \%$

- Pada t = 90 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,3305 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}3305}{1{,}3} \times 100\ \%$

$= 25{,}4231\ \%$

- Pada t = 120 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,3475 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}3475}{1{,}3} \times 100\ \% = 26{,}7308\ \%$

d. pH 8

- Pada t = 30 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,3509 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}3509}{1{,}3} \times 100\ \%$

$= 26{,}9923\ \%$

- Pada t = 60 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,4008 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}4008}{1{,}3} \times 100\ \%$

$= 30{,}8308\ \%$

- Pada t = 90 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,4609 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}4609}{1{,}3} \times 100\ \%$

$= 35{,}4538\ \%$

- Pada t = 120 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,4206 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}4206}{1{,}3} \times 100\ \% = 32{,}3538\ \%$

e. pH 9

- Pada t = 30 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,2902 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}2902}{1{,}3} \times 100\ \%$

= 22,3231 %

- Pada t = 60 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,3205 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}3205}{1{,}3} \times 100\ \%$

= 24,6538 %

- Pada t = 90 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,3825 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}3825}{1{,}3} \times 100\ \%$

= 29,4231 %

- Pada t = 120 menit

Volume supernatant = 1,3 mL

Berat endapan kering = 0,4375 gr

Solubility $= \frac{\text{Berat endapan kering (gr)}}{\text{Volume supernatant (ml)}} \times 100\ \%$

$= \frac{0{,}4375}{1{,}3} \times 100\ \% = 33{,}6538\ \%$

E. Kadar Gugus Karboksil

Rumus yang digunakan :

$$\frac{\text{Vol NaOH (titrasi)} - \text{Vol NaOH } \textit{native starch} \text{ x } 0{,}0045)}{\text{Berat sampel kering}} \text{ x } 100$$

a. pH 6

- Pada t = 30 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,2 mL

$$\text{Gugus Karboksil} = \frac{(0{,}2 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0225\ \%$$

- Pada t = 60 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,25 mL

$$\text{Gugus Karboksil} = \frac{(0{,}25 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}030\ \%$$

- Pada t = 90 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,3 mL

$$\text{Gugus Karboksil} = \frac{(0{,}3 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0375\ \%$$

- Pada t = 120 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,25 mL

$$\text{Gugus Karboksil} = \frac{(0{,}25 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}030\ \%$$

b. pH 7

- Pada t = 30 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,45 mL

$$\text{Gugus Karboksil} = \frac{(0{,}45 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}060\ \%$$

- Pada t = 60 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,5 mL

$$\text{Gugus Karboksil} = \frac{(0{,}5 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0675\ \%$$

- Pada t = 90 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,5 mL

$$\text{Gugus Karboksil} = \frac{(0{,}5 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0675\ \%$$

- Pada t = 60 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,55 mL

$$\text{Gugus Karboksil} = \frac{(0{,}55 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0750\ \%$$

c. pH 8

- Pada T = 30 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,7 mL

$$\text{Gugus Karboksil} = \frac{(0{,}7 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0975\ \%$$

- Pada T = 60 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,75 mL

$$\text{Gugus Karboksil} = \frac{(0{,}75 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}105\ \%$$

- Pada T = 90 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,9 mL

$$\text{Gugus Karboksil} = \frac{(0{,}9 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}1275\ \%$$

- Pada T = 120 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,8 mL

$$\text{Gugus Karboksil} = \frac{(0{,}8 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}1125\ \%$$

d. pH 9

- Pada T = 30 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,55 mL

$$\text{Gugus Karboksil} = \frac{(0{,}55 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0750\ \%$$

- Pada T = 60 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,55 mL

$$\text{Gugus Karboksil} = \frac{(0{,}55 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0750\ \%$$

- Pada T = 90 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,6 mL

$$\text{Gugus Karboksil} = \frac{(0{,}6 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$$

$$= 0{,}0825\ \%$$

- Pada T = 120 menit

Volume NaOH *native acetate* = 0,05 mL

Berat sampel = 3 gram

Volume NaOH (titrasi) = 0,65 mL

Gugus Karboksil $= \frac{(0{,}65 - 0{,}05)\text{mL} \times 0{,}0045 \frac{\text{gr}}{\text{ml}}}{3 \text{ gr}} \times 100\ \%$

$= 0{,}090\ \%$