

LAMPIRAN I
Data Pengamatan dan Data Hasil

Tabel 7. Data Hasil Perhitungan Derajat Substitusi

Perbandingan metanol-propanol	Konsentras i NaOH	Volume NaOH	A	Derajat Substitusi
1:7	25 %	32,4	2,74	0,528
	30 %	30,0	2,50	0,474
	35 %	24,0	1,90	0,346
1:8	25 %	42,3	3,37	0,771
	30 %	28,6	2,36	0,443
	35 %	26,7	2,17	0,402
1:9	25 %	39,0	3,40	0,686
	30 %	37,6	3,26	0,651
	35 %	25,0	2,00	0,366

Tabel 8. Data Perhitungan Kadar NaCl dan Kemurnian

Perbandingan metanol-propanol	Konsentras i NaOH	Volume AgNO ₃	% Kadar NaCl	% kemurnian
1:7	25 %	1,44	33,67	66,33
	30 %	1,50	35,07	64,93
	35 %	1,67	39,04	60,95
1:8	25 %	1,00	23,38	76,62
	30 %	1,48	34,60	65,39
	35 %	1,63	38,11	61,89
1:9	25 %	1,32	30,86	69,14
	30 %	1,38	32,26	67,74
	35 %	1,50	35,07	64,93

LAMPIRAN II
PERHITUNGAN

2.1. Perhitungan Analisa Metanol - Propanol (1 : 7) , NaOH : 25%

1. Derajat Subtitusi

$$A = \frac{BC - DE}{F}$$

$$= \frac{32,4 \text{ ml} \times 0,1 \text{ N} - 5 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}}$$

$$= 2,74$$

$$DS = \frac{0,162 \times A}{1 - (0,058 \times A)}$$

$$= \frac{0,162 \times 2,5}{1 - (0,058 \times 2,5)}$$

$$= 0,528$$

2. Kadar NaCl

$$\% \text{ NaCl} = \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel}(\text{gram})} \times 100 \%$$

$$= \frac{0,5845 \times \frac{100}{25} \times 1,44 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}} \times 100 \%$$

$$= 33,667 \%$$

3. Kemurnian

$$\% \text{ Kemurnian} = 100 \% - \% \text{ NaCl}$$

$$= 100 \% - 33,667 \%$$

$$= 66,3328 \%$$

2.2. Perhitungan Analisa Metanol - Propanol (1 : 7) , NaOH : 30%

1. Derajat Subtitusi

$$A = \frac{BC - DE}{F}$$

$$= \frac{30 \text{ ml} \times 0,1 \text{ N} - 5 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}}$$

$$= 2,5$$

$$DS = \frac{0,162 \times A}{1 - (0,058 \times A)}$$

$$= \frac{0,162 \times 2,74}{1 - (0,058 \times 2,74)}$$

$$= 0,4737$$

2. Kadar NaCl

$$\begin{aligned}\% \text{ NaCl} &= \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel}(\text{gram})} \times 100 \% \\ &= \frac{0,5845 \times \frac{100}{25} \times 1,5 \text{ ml} \times 0,1 N}{1 \text{ gram}} \times 100 \% \\ &= 35,07 \%\end{aligned}$$

3. Kemurnian

$$\begin{aligned}\% \text{ Kemurnian} &= 100 \% - \% \text{ NaCl} \\ &= 100 \% - 35,07 \% \\ &= 64,93 \%\end{aligned}$$

2.3. Perhitungan Analisa Metanol - Propanol (1 : 7) , NaOH : 35%

1. Derajat Subtitusi

$$\begin{aligned}A &= \frac{BC - DE}{F} \\ &= \frac{24 \text{ ml} \times 0,1 N - 5 \text{ ml} \times 0,1 N}{1 \text{ gram}} \\ &= 1,9\end{aligned}$$

$$\begin{aligned}DS &= \frac{0,162 \times A}{1 - (0,058 \times A)} \\ &= \frac{0,162 \times 1,9}{1 - (0,058 \times 1,9)} \\ &= 0,3459\end{aligned}$$

2. Kadar NaCl

$$\begin{aligned}\% \text{ NaCl} &= \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel}(\text{gram})} \times 100 \% \\ &= \frac{0,5845 \times \frac{100}{25} \times 1,67 \text{ ml} \times 0,1 N}{1 \text{ gram}} \times 100 \% \\ &= 39,0446 \%\end{aligned}$$

3. Kemurnian

$$\begin{aligned}\% \text{ Kemurnian} &= 100 \% - \% \text{ NaCl} \\ &= 100 \% - 39,0446 \% \\ &= 60,9554 \%\end{aligned}$$

2.4. Perhitungan Analisa Metanol - Propanol (1 : 8) , NaOH : 25%

1. Derajat Subtitusi

$$A = \frac{BC - DE}{F}$$

$$= \frac{42,3 \text{ ml} \times 0,1 \text{ N} - 5 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}}$$

$$= 3,73$$

$$DS = \frac{0,162 \times A}{1 - (0,058 \times A)}$$

$$= \frac{0,162 \times 3,73}{1 - (0,058 \times 3,73)}$$

$$= 0,7711$$

2. Kadar NaCl

$$\% \text{ NaCl} = \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel (gram)}} \times 100 \%$$

$$= \frac{0,5845 \times \frac{100}{25} \times 1 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}} \times 100 \%$$

$$= 23,38 \%$$

3. Kemurnian

$$\% \text{ Kemurnian} = 100 \% - \% \text{ NaCl}$$

$$= 100 \% - 23,38 \%$$

$$= 76,62 \%$$

2.5. Perhitungan Analisa Metanol - Propanol (1 : 8), NaOH : 30%

1. Derajat Subtitusi

$$A = \frac{BC - DE}{F}$$

$$= \frac{28,6 \text{ ml} \times 0,1 \text{ N} - 5 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}}$$

$$= 2,36$$

$$DS = \frac{0,162 \times A}{1 - (0,058 \times A)}$$

$$= \frac{0,162 \times 2,36}{1 - (0,058 \times 2,36)}$$

$$= 0,4429$$

2. Kadar NaCl

$$\begin{aligned} \% \text{ NaCl} &= \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel}(\text{gram})} \times 100 \% \\ &= \frac{0,5845 \times \frac{100}{25} \times 1,48 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}} \times 100 \% \\ &= 34,6024 \% \end{aligned}$$

$$\begin{aligned} 3. \text{ Kemurnian} \\ \% \text{ Kemurnian} &= 100 \% - \% \text{ NaCl} \\ &= 100 \% - 34,6024 \% \\ &= 65,3976 \% \end{aligned}$$

2.6. Perhitungan Analisa Metanol - Propanol (1 : 8), NaOH : 35%

1. Derajat Substitusi

$$\begin{aligned} A &= \frac{BC - DE}{F} \\ &= \frac{26,7 \text{ ml} \times 0,1 \text{ N} - 5 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}} \\ &= 2,17 \end{aligned}$$

$$\begin{aligned} \text{DS} &= \frac{0,162 \times A}{1 - (0,058 \times A)} \\ &= \frac{0,162 \times 2,17}{1 - (0,058 \times 2,17)} \\ &= 0,4022 \end{aligned}$$

2. Kadar NaCl

$$\begin{aligned} \% \text{ NaCl} &= \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel}(\text{gram})} \times 100 \% \\ &= \frac{0,5845 \times \frac{100}{25} \times 1,63 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}} \times 100 \% \\ &= 38,1094 \% \end{aligned}$$

$$\begin{aligned} 3. \text{ Kemurnian} \\ \% \text{ Kemurnian} &= 100 \% - \% \text{ NaCl} \\ &= 100 \% - 38,1094 \% \\ &= 61,8906 \% \end{aligned}$$

2.7. Perhitungan Analisa Metanol – Propanol (1:9), NaOH : 25 %

1. Derajat Substitusi

$$A = \frac{BC - DE}{F}$$

$$= \frac{39 \text{ ml} \times 0,1 \text{ N} - 5 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}}$$

$$= 3,4$$

$$DS = \frac{0,162 \times A}{1 - (0,058 \times A)}$$

$$= \frac{0,162 \times 2,17}{1 - (0,058 \times 2,17)}$$

$$= 0,686$$

2. Kadar NaCl

$$\% \text{ NaCl} = \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel (gram)}} \times 100 \%$$

$$= \frac{0,5845 \times \frac{100}{25} \times 1,32 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}} \times 100 \%$$

$$= 30,8616 \%$$

3. Kemurnian

$$\% \text{ Kemurnian} = 100 \% - \% \text{ NaCl}$$

$$= 100 \% - 30,8616 \%$$

$$= 69,1384 \%$$

2.8. Perhitungan Analisa Metanol – Propanol (1:9), NaOH : 30 %

1. Derajat Substitusi

$$A = \frac{BC - DE}{F}$$

$$= \frac{37,6 \text{ ml} \times 0,1 \text{ N} - 5 \text{ ml} \times 0,1 \text{ N}}{1 \text{ gram}}$$

$$= 3,26$$

$$DS = \frac{0,162 \times A}{1 - (0,058 \times A)}$$

$$= \frac{0,162 \times 2,17}{1 - (0,058 \times 2,17)}$$

$$= 0,6513$$

2. Kadar NaCl

$$\begin{aligned} \% \text{ NaCl} &= \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel}(\text{gram})} \times 100 \% \\ &= \frac{0,5845 \times \frac{100}{25} \times 1,38 \text{ ml} \times 0,1 N}{1 \text{ gram}} \times 100 \% \\ &= 32,2644 \% \end{aligned}$$

$$\begin{aligned} 3. \text{ Kemurnian} \\ \% \text{ Kemurnian} &= 100 \% - \% \text{ NaCl} \\ &= 100 \% - 32,2644 \% \\ &= 67,7356 \% \end{aligned}$$

2.9. Perhitungan Analisa Metanol – Propanol (1:9), NaOH : 35 %

1. Derajat Substitusi

$$\begin{aligned} A &= \frac{BC - DE}{F} \\ &= \frac{25 \text{ ml} \times 0,1 N - 5 \text{ ml} \times 0,1 N}{1 \text{ gram}} \\ &= 2 \end{aligned}$$

$$\begin{aligned} \text{DS} &= \frac{0,162 \times A}{1 - (0,058 \times A)} \\ &= \frac{0,162 \times 2,17}{1 - (0,058 \times 2,17)} \\ &= 0,3665 \end{aligned}$$

2. Kadar NaCl

$$\begin{aligned} \% \text{ NaCl} &= \frac{0,5845 \times f \times \text{vol Ag NO}_3 \times N \text{ Ag NO}_3}{\text{berat sampel}(\text{gram})} \times 100 \% \\ &= \frac{0,5845 \times \frac{100}{25} \times 1,5 \text{ ml} \times 0,1 N}{1 \text{ gram}} \times 100 \% \\ &= 35,07 \% \end{aligned}$$

3. Kemurnian % Kemurnian

$$\begin{aligned} &= 100 \% - \% \text{ NaCl} \\ &= 100 \% - 35,07 \% \\ &= 64,93 \% \end{aligned}$$

**LAMPIRAN III
GAMBAR**



Gambar 12. Proses Penjemuran Eceng Gondok



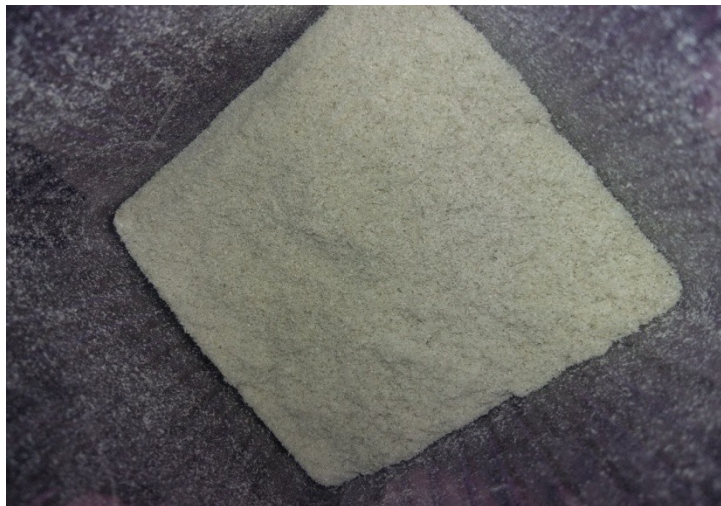
Gambar 13. Eceng Gondok yang telah Kering



Gambar 14. Proses Penggilingan Eceng Gondok



Gambar 15. Proses Pengayakan



Gambar 16. Serbuk Eceng Gondok



Gambar 17. Proses Sokhletasi



Gambar 18. Proses Dehemiselulosa



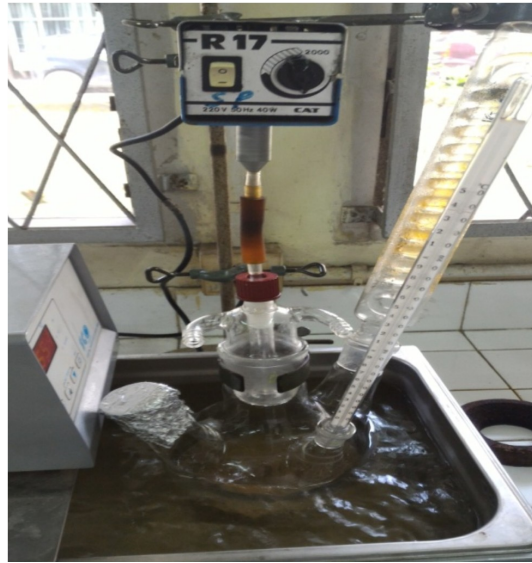
Gambar 19. Proses Delignin dan *Bleaching*



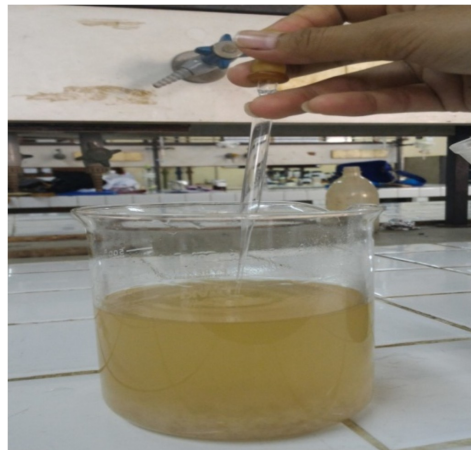
Gambar 20. Hasil Selulosa Eceng Gondok



Gambar 21. Serbuk Selulosa Eceng Gondok



Gambar 22. Proses Pembuatan CMC



Gambar 23. Proses Penambahan Asam Asetat (Netralisasi)



Gambar 24. Proses Pencucian dengan Etanol



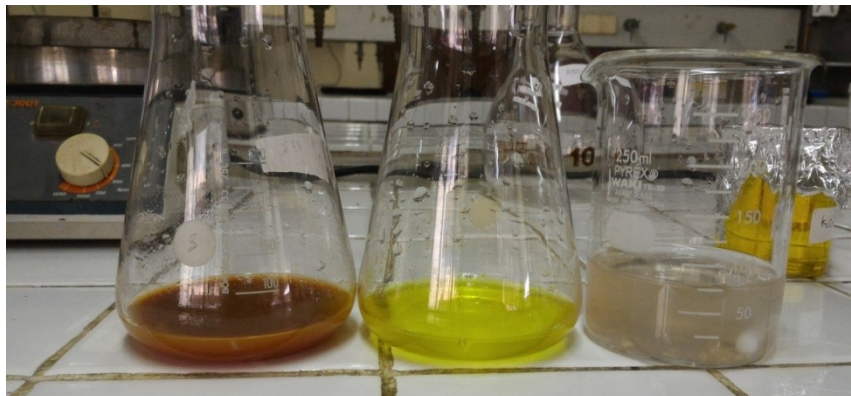
Gambar 25. Proses Penyaringan Hasil CMC



Gambar 26. Hasil CMC



Gambar 27. Pengujian Viskositas



Gambar 28. Pengujian Kadar NaCl



Gambar 29. Pengujian Derajat Sustitusi