LAMPIRAN I
DOKUMENTASI PENELITIAN


Pengambilan limbah ikan


Pemotongan pelepah nipah


Proses karbonisasi


Pengeringan pelepah nipah


Hasil karbon

Aktivasi karbon pelepah nipah

LAMPIRAN II
DATA HASIL PERHITUNGAN

1. Pembuatan Larutan Aktivasi

a. Larutan NaOH 5M

$$M = \frac{n}{V}$$

$$M = \frac{m}{BM} \times \frac{1.000}{V_{(ml)}}$$

$$5M = \frac{m}{40\ g/ml} \times \frac{1.000}{500ml}$$

$$m = 100gram$$

Jadi, massa yang dibutuhkan untuk membuat larutan NaOH 5M dalam 500 ml adalah sebanyak 100 gram.

b. Larutan HNO_3 5M

- Menentukan molaritas HNO_3 65%

$$M = \frac{\%\ \times 10 \times\ \rho}{BM}$$

$$M = \frac{65 \times 10 \times 1{,}51}{63}$$

$$M = \frac{981{,}5}{63}$$

$$M = 15{,}57\ M$$

- Pengenceran HNO_3 15,57M menjadi 5M dalam 500 ml pelarut.

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

$$15{,}57M \times V_1 = 5M \times 500\ ml$$

$$V_1 = \frac{5M \times 500\ ml}{15{,}57M}$$

$$V_1 = \frac{2.500\ ml}{15{,}57}$$

$$V_1 = 160{,}56\ ml$$

Jadi, untuk membuat larutan HNO_3 5M dalam 500ml membutuhkan sebanyak 160,56 ml dari larutan HNO_3 65%.

c. Larutan K_2CO_3 5M

$$M = \frac{n}{V}$$

$$M = \frac{m}{BM} \times \frac{1.000}{V_{(ml)}}$$

$$5M = \frac{m}{138\ g/ml} \times \frac{1.000}{500ml}$$

$$m = 345\ gram$$

Jadi, massa yang dibutuhkan untuk membuat larutan K_2CO_3 5M dalam 500 ml adalah sebanyak 345 gram

2. Perhitungan Rendemen Karbon

$$Rendemen = \frac{A}{B} \times 100\%$$

$$Rendemen = \frac{250\ gram}{1000\ gram} \times 100\%$$

$$Rendemen = 25\%$$

Keterangan :

A = massa pelepah nipah ditimbang setelah dipirolisis (gram)

B = massa pelepah nipah ditimbang sebelum dipirolisis (gram)

3. Perhitungan Kadar Air

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

Keterangan :

W_1 : Kehilangan bobot semula (gram)

W_2 : Bobot contoh semula (gram)

a. Karbon aktif sebelum aktivasi

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

= $\frac{0,0576}{1}$ x 100%

= 5,76%

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

= $\frac{0,0543}{1}$ x 100%

= 5,43%

b. Karbon aktif aktivasi NaOH 5M

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

= $\frac{0,0439}{1}$ x 100%

= 4,39%

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

= $\frac{0.0528}{1}$ x 100%

= 5,28%

c. Karbon aktif aktivasi HNO_3 5M

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

= $\frac{0,0352}{1}$ x 100%

= 3,52%

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

= $\frac{0,0312}{1}$ x 100%

= 3,12%

d. Karbon aktif aktivasi K_2CO_3 5M

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

= $\frac{0,0137}{1}$ x 100%

= 1,37%

% Kadar Air = $\frac{W_1}{W_2}$ x 100%

= $\frac{0,0118}{1}$ x 100%

= 1,18%

4. Perhitungan Kadar Abu

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

Keterangan :

W_1 : Berat cawan kosong (gram)

W_2 : Berat cawan + sampel sebelum pemanasan (gram)

W_3 : Berat cawan + sampel setelah pemanasan (gram)

a. Karbon aktif sebelum aktivasi

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

= $\frac{42{,}7809 - 42{,}6753}{44{,}6753 - 42{,}6753}$ x 100%

= $\frac{0{,}1056}{2}$ x 100%

= 5,28%

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

= $\frac{36{,}3491 - 36{,}2287}{38{,}2287 - 36{,}2287}$ x 100%

= $\frac{0{,}1204}{2}$ x 100%

= 6,02%

b. Karbon aktif aktivasi NaOH 5M

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

= $\frac{46{,}3301 - 46{,}2397}{48{,}2397 - 46{,}2397}$ x 100%

= $\frac{0{,}0904}{2}$ x 100%

= 4,52%

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

= $\frac{46{,}0262 - 45{,}9428}{47{,}9428 - 45{,}9428}$ x 100%

= $\frac{0{,}0834}{2}$ x 100%

= 4,17%

c. Karbon aktif aktivasi HNO_3 5M

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

= $\frac{48{,}2800 - 48{,}2350}{50{,}2350 - 48{,}2350}$ x 100%

= $\frac{0{,}045}{2}$ x 100%

= 2,25%

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

= $\frac{45{,}1765 - 45{,}1289}{47{,}1289 - 45{,}1289}$ x 100%

= $\frac{0{,}0476}{2}$ x 100%

= 2,38%

d. Karbon aktif aktivasi K_2CO_3 5M

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

= $\frac{54{,}1148 - 54{,}0860}{56{,}0860 - 54{,}0860}$ x 100%

= $\frac{0{,}0288}{2}$ x 100%

= 1,44%

% Kadar Abu = $\frac{W_3 - W_1}{W_2 - W_1}$ x 100%

= $\frac{50{,}6424 - 50{,}6211}{50{,}6211 - 50{,}6211}$ x 100%

= $\frac{0{,}0213}{2}$ x 100%

= 1,065%

5. Perhitungan Kadar Zat Menguap

% Kadar Zat Menguap = $\frac{(W_1 - W_2)}{W_1} \times 100\%$

Keterangan :

W_1 : Bobot contoh semula (gram)

W_2 : Bobot contoh setelah pemanasan (gram)

a. Karbon aktif sebelum aktivasi

$$\% \text{ Kadar Zat Menguap} = \frac{(W_1 - W_2)}{W_1} \times 100\%$$
$$= \frac{(1-0{,}7713)}{1} \times 100\%$$
$$= 0{,}2287 \times 100\%$$
$$= 22{,}87\%$$
$$\% \text{ Kadar Zat Menguap} = \frac{(W_1 - W_2)}{W_1} \times 100\%$$
$$= \frac{(1-0{,}7105)}{1} \times 100\%$$
$$= 0{,}2287 \times 100\%$$
$$= 28{,}95\%$$

b. Karbon aktif aktivasi NaOH 5M

$$\% \text{ Kadar Zat Menguap} = \frac{(W_1 - W_2)}{W_1} \times 100\%$$
$$= \frac{(1-0{,}8783)}{1} \times 100\%$$
$$= 0{,}1272 \times 100\%$$
$$= 12{,}72\%$$
$$\% \text{ Kadar Zat Menguap} = \frac{(W_1 - W_2)}{W_1} \times 100\%$$
$$= \frac{(1-0{,}8817)}{1} \times 100\%$$
$$= 0{,}1183 \times 100\%$$
$$= 11{,}83\%$$

c. Karbon aktif aktivasi HNO_3 5M

$$\% \text{ Kadar Zat Menguap} = \frac{(W_1 - W_2)}{W_1} \times 100\%$$
$$= \frac{(1-0{,}7982)}{1} \times 100\%$$
$$= 0{,}2018 \times 100\%$$
$$= 20{,}18\%$$
$$\% \text{ Kadar Zat Menguap} = \frac{(W_1 - W_2)}{W_1} \times 100\%$$
$$= \frac{(1-0{,}8022)}{1} \times 100\%$$
$$= 0{,}1978 \times 100\%$$

= 19,78%

d. Karbon aktif aktivasi K_2CO_3 5M

% Kadar Zat Menguap $= \frac{(W_1 - W_2)}{W_1} \times 100\%$

$= \frac{(1-0{,}9514)}{1} \times 100\%$

$= 0{,}0486 \times 100\%$

= 4,86%

% Kadar Zat Menguap $= \frac{(W_1 - W_2)}{W_1} \times 100\%$

$= \frac{(1-0{,}3812)}{1} \times 100\%$

$= 0{,}6188 \times 100\%$

= 6,188%

6. Perhitungan Kadar Karbon Murni

% Karbon aktif murni $= 100 - (A + B)$

Keterangan :

A : Kadar zat menguap (%)

B : Kadar abu (%)

a. Karbon aktif sebelum aktivasi

% Karbon aktif murni $= 100 - (A + B)$

= 100 – (25,91 + 5,65)

= 100 – (31,56)

= 68,44%

% Karbon aktif murni $= 100 - (A + B)$

= 100 – (28,95 + 6,02)

= 100 – (34,97)

= 65,03%

b. Karbon aktif aktivasi NaOH 5M

% Karbon aktif murni $= 100 - (A + B)$

= 100 – (12,72 + 4,52)

= 100 – (17,24)

= 82,76%

% Karbon aktif murni $= 100 - (A + B)$

= 100 – (11,83 + 4,17)

= 100 – (16)

= 84%

c. Karbon aktif aktivasi HNO_3 5M

% Karbon aktif murni $= 100 - (A + B)$

= 100 – (20,18 + 2,25)

= 100 – (34,97)

= 77,57%

% Karbon aktif murni $= 100 - (A + B)$

= 100 – (19,78 + 2,38)

= 100 – (22,16)

= 77,84%

d. Karbon aktif aktivasi K_2CO_3 5M

% Karbon aktif murni $= 100 - (A + B)$

= 100 – (4,86 + 1,44)

= 100 – (6,3)

= 93,7%

% Karbon aktif murni $= 100 - (A + B)$

= 100 – (6,188 + 1,065)

= 100 – (16)

= 92,747%

7. Perhitungan Daya Serap Yodium

Daya Serap Yodium = $\frac{\left(10-\frac{V \times N}{0,1}\right)\times 12,69\times 5}{w}$

Keterangan :

V = Larutan Natrium Tiosulfat yang diperlukan (ml)

N = Normalitas larutan Natrium Tiosulfat (ml)

12,69 = Jumlah yodium sesuai dengan 1 ml larutan Natrium Tiosulfat 0,1N

W = Berat Sampel (gram)

a. Karbon aktif sebelum aktivasi

$$\text{Daya Serap Yodium} = \frac{\left(10 - \frac{V \times N}{0,1}\right) \times 12,69 \times 5}{0,5}$$

$$= \frac{\left(10 - \frac{5,1 \times 0,1}{0,1}\right) \times 12,69 \times 5}{0,5}$$

$$= \frac{2,5 \times 12,69 \times 5}{0,5}$$

$$= \frac{158,625}{0,5}$$

$$= 317 mg/g$$

$$\text{Daya Serap Yodium} = \frac{\left(10 - \frac{V \times N}{0,1}\right) \times 12,69 \times 5}{0,5}$$

$$= \frac{\left(10 - \frac{6,5 \times 0,1}{0,1}\right) \times 12,69 \times 5}{0,5}$$

$$= \frac{3,5 \times 12,69 \times 5}{0,5}$$

$$= \frac{222,075}{0,5}$$

$$= 444,15\ mg/g$$

b. Karbon aktif aktivasi NaOH 5M

$$\text{Daya Serap Yodium} = \frac{\left(10-\frac{V\times N}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{\left(10-\frac{4,7\times 0,1}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{5,3\times 12,69\times 5}{0,5}$$

$$= \frac{336,285}{0,5}$$

$$= 672,57 mg/g$$

$$\text{Daya Serap Yodium} = \frac{\left(10-\frac{V\times N}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{\left(10-\frac{4,6\times 0,1}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{5,4\times 12,69\times 5}{0,5}$$

$$= \frac{342,63}{0,5}$$

$$= 685\ mg/g$$

c. Karbon aktif aktivasi HNO_3 5M

$$\text{Daya Serap Yodium} = \frac{\left(10-\frac{V\times N}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{\left(10-\frac{6,3\times 0,1}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{3,7\times 12,69\times 5}{0,5}$$

$$= \frac{234,765}{0,5}$$

$$= 469,53\ mg/g$$

$$\text{Daya Serap Yodium} = \frac{\left(10-\frac{V\times N}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{\left(10-\frac{6,0\times 0,1}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{4\times 12,69\times 5}{0,5}$$

$$= \frac{253,8}{0,5}$$

$$= 507,6\ mg/g$$

d. Karbon aktif aktivasi K_2CO_3 5M

$$\text{Daya Serap Yodium} = \frac{\left(10-\frac{V\times N}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{\left(10-\frac{3,9\times 0,1}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{6,1\times 12,69\times 5}{0,5}$$

$$= \frac{387,045}{0,5}$$

$$= 774,09\ mg/g$$

$$\text{Daya Serap Yodium} = \frac{\left(10-\frac{V\times N}{0,1}\right)\times 12,69\times 5}{0,5}$$

$$= \frac{\left(10-\frac{3,6\times 0,1}{0,1}\right)\times 12,69\times 5}{0,5}$$

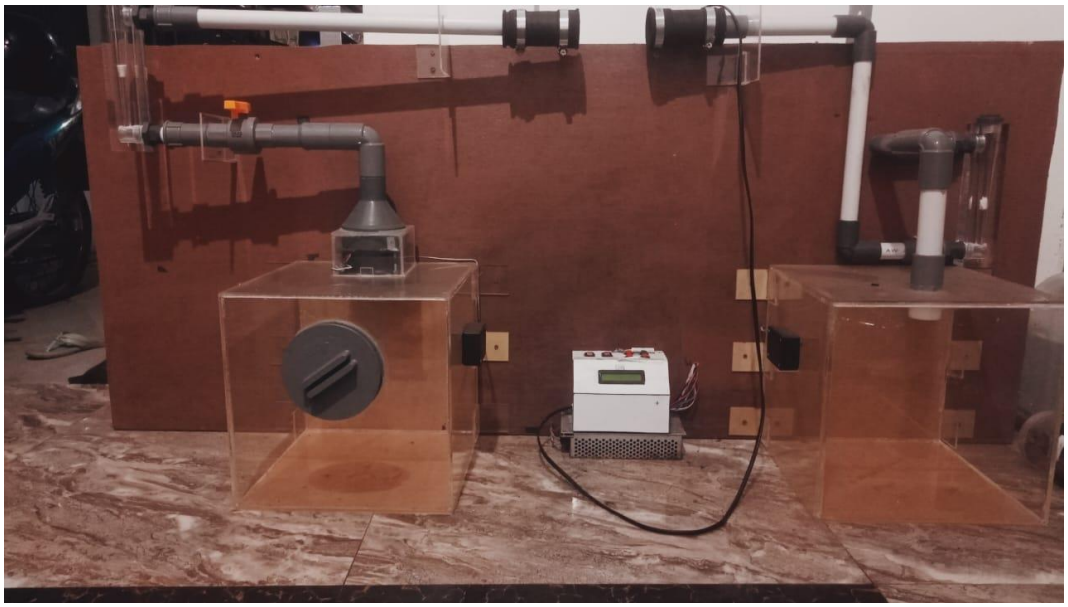
$$= \frac{6,4\times 12,69\times 5}{0,5}$$

$$= \frac{406,08}{0,5}$$

$$= 812,16\ mg/g$$

LAMPIRAN III

GAMBAR ALAT PENJERAPAN GAS H_2S



LAMPIRAN IV

BIODATA PENULIS

A. BIODATA DIRI

Nama /*Name*	:	Windi Navitri
Alamat/*Address*	:	Jalan Rajawali RT. 01 RW. 03, Kelurahan Tegalreja,Kecamatan Cilacap Selatan, Kabupaten Cilacap, Provinsi Jawa Tengah, 53214.
No Telepon/*Phone*	:	083195461051
E-mail	:	windinavitri.stu@pnc.ac.id
Tanggal Lahir/*Date of Birth*	:	10 November 2000
Warga Negara /*Nationality*	:	Indonesia
Agama/*Religion*	:	Islam

B. RIWAYAT PENDIDIKAN

Sekolah/Institusi/Universitas	Jurusan	Periode
SD Negeri Tegalreja 04	-	2007 – 2013
SMP Negeri 6 Cilacap	-	2013 – 2016
SMA Negeri 1 Cilacap	IPA	2016 – 2019
Politeknik Negeri Cilacap	Sarjana Terapan Teknik Pengendalian Pencemaran Lingkungan	2019-2023