LAMPIRAN

Lampiran 1 Perhitungan Pembuatan Larutan

1.1 Pembuatan Larutan HCl dari Larutan Induk 96%

1. **Pembuatan Larutan Induk H_2SO_4 15%**

   M1V1 = M2V2

   96% mol/L . V1 = 15% mol/L . 100 mL

   $V1 = \frac{15\ \text{mol/L} \cdot 150\ \text{mL}}{96\ \text{mol/L}}$

   V1 = 23,4 mL

2. **Pembuatan Larutan H_2SO_4 1%**

   M1V1 = M2V2

   15% mol/L . V1 = 1% mol/L . 50 mL

   $V1 = \frac{1\ \text{mol/L} \cdot 50\ \text{mL}}{15\ \text{mol/L}}$

   V1 = 3,3 mL

3. **Pembuatan Larutan H_2SO_4 3%**

   M1V1 = M2V2

   15% mol/L . V1 = 3% mol/L . 50 mL

   $V1 = \frac{3\ \text{mol/L} \cdot 50\ \text{mL}}{15\ \text{mol/L}}$

   V1 = 10 mL

4. **Pembuatan Larutan H_2SO_4 5%**

   M1V1 = M2V2

   15% mol/L . V1 = 5% mol/L . 50 mL

   $V1 = \frac{5\ \text{mol/L} \cdot 100\ \text{mL}}{15\ \text{mol/L}}$

   V1 = 16,6 mL

5. **Pembuatan Larutan H_2SO_4 7%**

   M1V1 = M2V2

   15% mol/L . V1 = 7% mol/L . 50 mL

   $V1 = \frac{7\ \text{mol/L} \cdot 50\ \text{mL}}{15\ \text{mol/L}}$

   V1 = 23,3 mL

1.2 Pembuatan Larutan HCl dari Larutan Induk 37%

1. **Pembuatan Larutan Induk HCl 10%**

   M1V1 = M2V2

   37% mol/L . V_1 = 10% mol/L . 100 mL

   $V_1 = \frac{10\%\ mol/L.\ 100\ mL}{37\%\ mol/L}$

   V1 = 27 mL

2. **Pembuatan Larutan HCl 1%**

   M1V1 = M2V2

   10% mol/L . V_1 = 1% mol/L . 50 mL

   $V_1 = \frac{1\%\ mol/L.\ 50\ mL}{10\%\ mol/L}$

   V1 = 5 mL

3. **Pembuatan Larutan HCl 3%**

   M1V1 = M2V2

   10% mol/L . V_1 = 3% mol/L . 50 mL

   $V_1 = \frac{3\%\ mol/L.\ 50\ mL}{10\%\ mol/L}$

   V1 = 15 mL

4. **Pembuatan Larutan HCl 5%**

   M1V1 = M2V2

   10% mol/L . V_1 = 5% mol/L . 50 mL

   $V_1 = \frac{5\%\ mol/L.\ 50\ mL}{10\%\ mol/L}$

   V1 = 25 mL

5. **Pembuatan Larutan HCl 7%**

   M1V1 = M2V2

   10% mol/L . V_1 = 7% mol/L . 50 mL

   $V_1 = \frac{7\%\ mol/L.\ 50\ mL}{10\%\ mol/L}$

   V1 = 35 mL

1.3 Pembuatan Larutan HNO_3 dari Larutan Induk 65%

1. **Pembuatan Larutan Induk HNO_3 10%**

   M1V1 = M2V2

   65% mol/L . V_1 = 10% mol/L . 100 mL

   $V_1 = \frac{10\%\ mol/L.\ 100\ mL}{65\%\ mol/L}$

   V1 = 15,4 mL

2. **Pembuatan Larutan HNO_3 1%**

   M1V1 = M2V2

   10% mol/L . V_1 = 1% mol/L . 50 mL

   $V_1 = \frac{1\%\ mol/L.\ 50\ mL}{}$

10% mol/L
V1 = 5 mL

3. **Pembuatan Larutan HNO_3 3%**

M1V1 = M2V2
10% mol/L . V1 = 3% mol/L . 50 mL
V1 = $\frac{3\% \text{ mol/L} \cdot 50 \text{ mL}}{10\% \text{ mol/L}}$
V1 = 15 mL

4. **Pembuatan Larutan HNO_3 5%**

M1V1 = M2V2
10% mol/L . V1 = 5% mol/L . 50 mL
V1 = $\frac{5\% \text{ mol/L} \cdot 50 \text{ mL}}{10\% \text{ mol/L}}$
V1 = 25 mL

5. **Pembuatan Larutan HNO_3 7%**

M1V1 = M2V2
10% mol/L . V1 = 7% mol/L . 50 mL
V1 = $\frac{7\% \text{ mol/L} \cdot 50 \text{ mL}}{10\% \text{ mol/L}}$
V1 = 35 mL

1.4 Pembuatan Larutan NaOH 2%

Larutan NaOH 2 % artinya dalam 100 mL larutan mengandung 2 gram NaOH. Jadi untuk membuat larutan NaOH 2 % ditimbang 2 gram dan dilarutkan dalam 100 mL aquades.

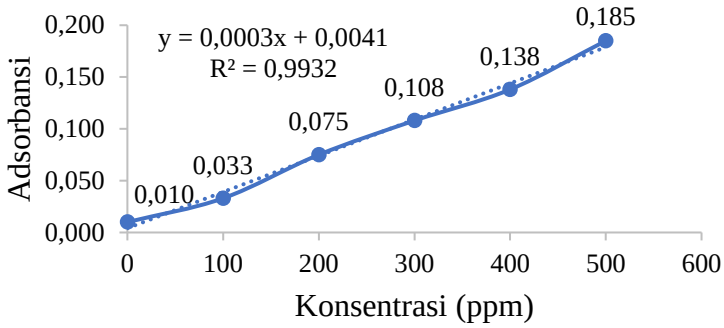
1.5 Pembuatan Larutan $K_2Cr_2O_7$

Larutan $K_2Cr_2O_7$ 2 % artinya dalam 100 mL larutan mengandung 2 gram $K_2Cr_2O_7$. Jadi untuk membuat larutan $K_2Cr_2O_7$ 2% ditimbang 2 gram dan dilarutkan dalam 100 mL aquades.

Lampiran 2 Tabel Kadar Gula Pereduksi

2.1 Pembuatan Glukosa Standar

Glukosa Standar (ppm)	Absorbansi
0	0,054
500	0,268
1000	0,469
1500	0,778
2000	1,073
2500	1,310



1.2 Kadar Gula Pereduksi Pada Variasi Konsentrasi Katalis HCl (%)

Konsentrasi Katalis HCl (%)	Absorbansi	Rata-rata Absorbansi	Konsentrasi Gula (g/L)
1	0,447	0,473	46,40
	0,499		
3	0,583	0,567	56,40
	0,550		
5	0,692	0,685	68,25
	0,678		
7	0,834	1,699	**84,70**
	0,865		

1.3 Kadar Gula Pereduksi Pada Variasi Konsentrasi Katalis H_2SO_4 (%)

Konsentrasi Katalis HCl (%)	Absorbansi	Rata-rata Absorbansi	Konsentrasi Gula (g/L)
1	0,023	0,023	63,00
	0,023		
3	0,023	0,0235	**64,67**
	0,024		
5	0,023	0,023	61,33
	0,022		
7	0,022	1,022	59,67
	0,022		

1.4 Gula Pereduksi Pada Variasi Konsentrasi Katalis HNO_3 (%)

Konsentrasi Katalis HNO_3 (%)	Absorbansi	Rata-rata Absorbansi	Konsentrasi Gula (g/L)
1	0,024	0,025	24,53
	0,025		
	0,025		
3	0,031	0,033	41,87
	0,036		
	0,033		
5	0,038	0,041	57,87

	0,046		
	0,040		
7	0,048	0,049	**72,53**
	0,054		
	0,044		

Contoh Perhitungan Konsentrasi Gula Pereduksi

Konsentrasi katalis Asam Klorida 7%

Persamaan regresi y = 0,0003x + 0,0041

x = Konsentrasi Gula

y = Absorbansi

$$x = \frac{y - b}{a} = \frac{0{,}0235 - 0{,}0041}{0{,}0003} = 64{,}67 \text{ ppm} = 6459.62 \text{ mg/L}$$

Faktor Pengenceran (FP) 10 maka

Konsentrasi gula pereduksi (g/L) = 6459,62 mg/L x10

= 64,59 g/L

Lampiran 3 Dokumentasi Kegiatan Penelitian

1. Preparasi Sampel

a. Pengambilan Sampel

Kelimpahan *Ulva reticulata*

Proses Pengambilan *Ulva reticulata*

Proses Pengambilan *Ulva reticulata*

b. Pembersihan dan Proses Penjemuran

Pencucian Sampel

Pemisahan Zat Pengotor

Zat Pengotor

Penjemuran *Ulva reticulata*

c. Proses Pengecilan Ukuran dan Penyamaan Ukuran

Ulva reticulata

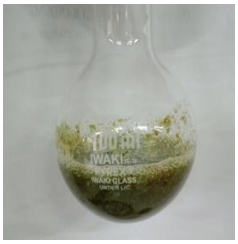
Diblender

Diayak (Ayakan 35 *Mesh*)

Bubuk *Ulva reticulata*

2. Proses Hidrolisis

Ditimbang (2 gr)



Disuspensi

Dihidrolisis

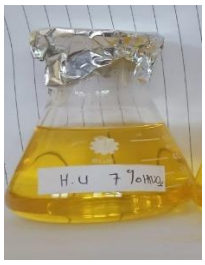
Setelah Hidrolisis


Disaring


Hidrolisat


Residu

3. Fermentasi


Hidrolisat

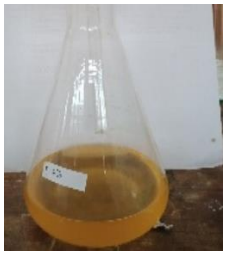

Diatur pH


Disterilisasi

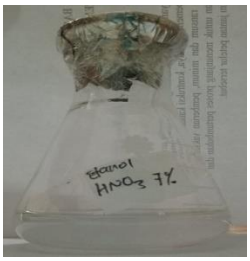

Diinkubasi

4. Distilasi


Hasil Fermentasi Disaring


Hasil Penyaringan

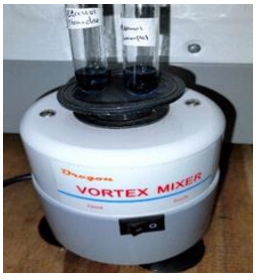

Distilasi



Bioetanol

5. Analisis Kualitatif Etanol

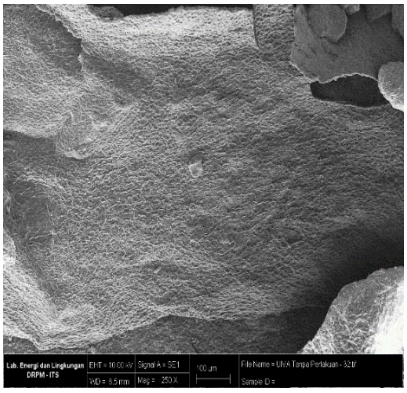
$K_2Cr_7O_7$



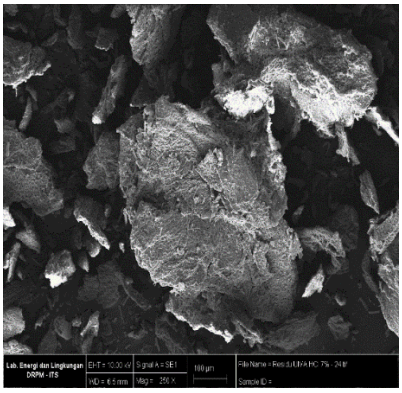
Dhomogenkan

Hasil Analisis Kualitatif

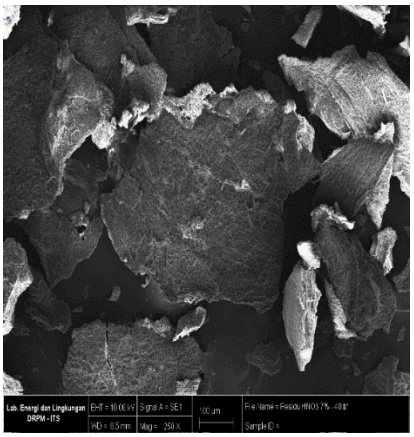
Lampiran 4 Hasil Analisis Permukaan Menggunakan SEM



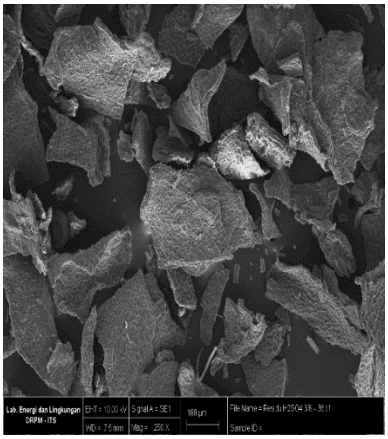
Sebelum Hidrolisis



Setelah Hidrolisis dengan HCl



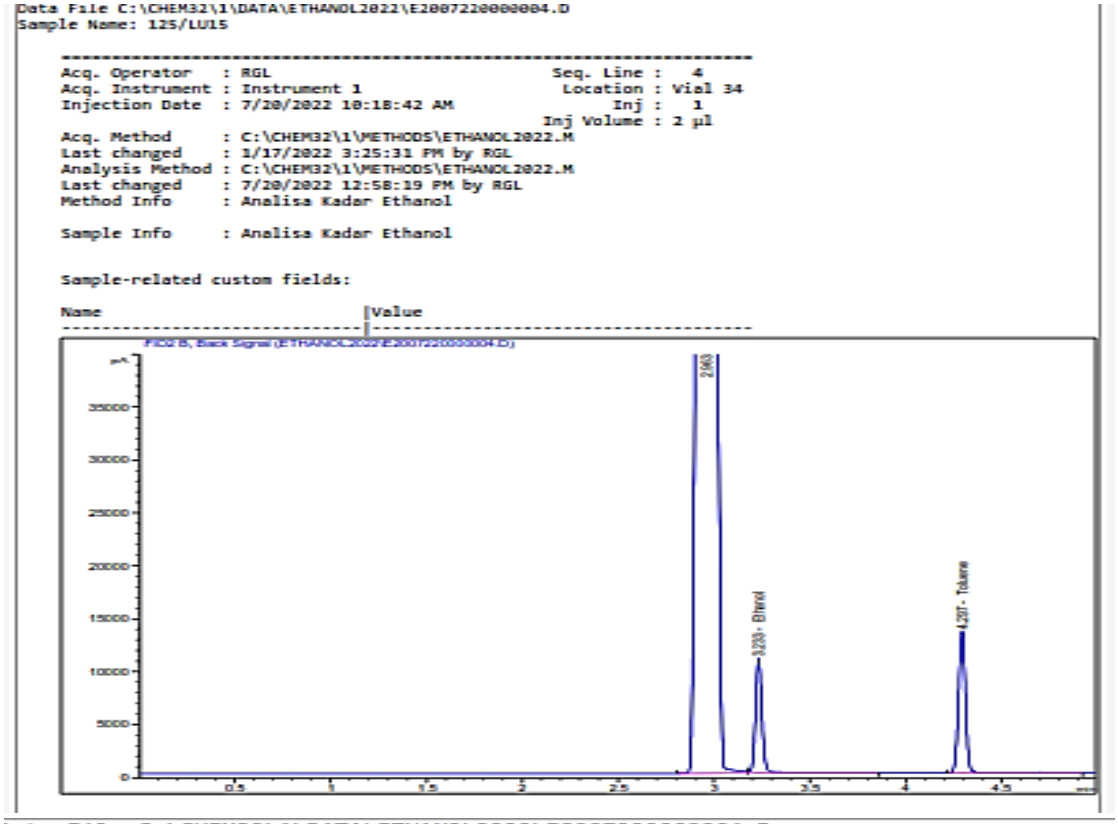
Setelah Hidrolisis dengan HNO_3



Setelah Hidrolisis dengan H_2SO_4

Lampiran 5 Hasil Analisis Etanol Menggunakan GC

1. Kromatogram Etanol Standar



Data File C:\CHEM32\1\DATA\ETHANOL2022\E2007220000004.D
Sample Name: 125/LU15

Internal Standard Report

Sorted By : Signal
Calib. Data Modified : 7/20/2022 12:57:51 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs
Sample ISTD Information:

ISTD #	ISTD Amount [mg/ml]	Name
1	9.99100	Toluene

Signal 1: FID2 B, Back Signal

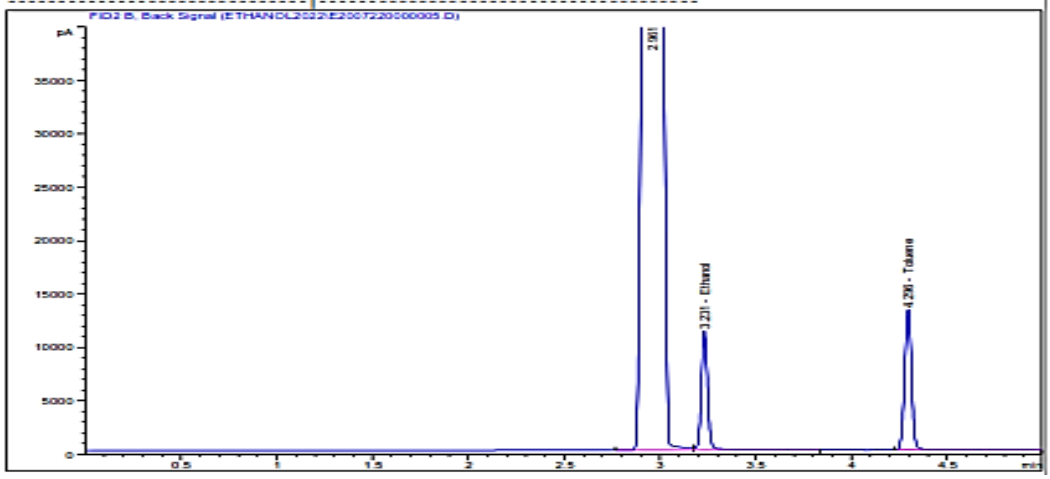
RetTime [min]	Type	ISTD used	Area [pA*s]	Amt/Area ratio	Amount [mg/ml]	Grp	Name
3.233	VB S+	1	2.65391e4	1.94491	15.26864		Ethanol
4.297	VB S I	1	3.37749e4	1.00000	9.99100		Toluene

Totals without ISTD(s) : 15.26864

*** End of Report ***

2. Kromatogram Etanol Sampel

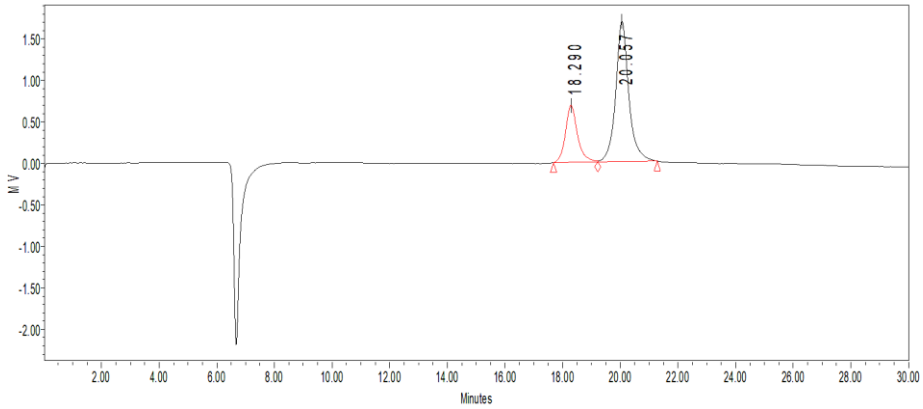
```
Data File C:\CHEM32\1\DATA\ETHANOL2022\E2007220000005.D
Sample Name: 125/LU15

------------------------------------------------------------------------
Acq. Operator   : RGL                          Seq. Line :   4
Acq. Instrument : Instrument 1                  Location : Vial 34
Injection Date  : 7/20/2022 10:26:50 AM            Inj :   2
                                               Inj Volume : 2 µl
Acq. Method     : C:\CHEM32\1\METHODS\ETHANOL2022.M
Last changed    : 1/17/2022 3:25:31 PM by RGL
Analysis Method : C:\CHEM32\1\METHODS\ETHANOL2022.M
Last changed    : 7/20/2022 12:58:19 PM by RGL
Method Info     : Analisa Kadar Ethanol

Sample Info     : Analisa Kadar Ethanol


Sample-related custom fields:

Name                           |Value
-------------------------------|----------------------------------------
```

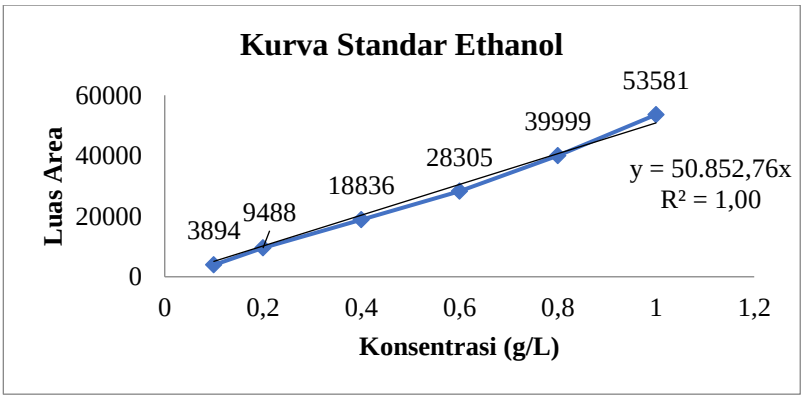



```
Data File C:\CHEM32\1\DATA\ETHANOL2022\E2007220000005.D
Sample Name: 125/LU15

========================================================================
                    Internal Standard Report
========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      7/20/2022 12:57:51 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs
Sample ISTD Information:
ISTD  ISTD Amount   Name
  #    [mg/ml]
----|-------------|-------------------------
  1      9.99100   Toluene


Signal 1: FID2 B, Back Signal

RetTime  Type  ISTD    Area     Amt/Area    Amount   Grp   Name
 [min]         used  [pA*s]      ratio     [mg/ml]
-------|------|----|----------|----------|----------|--|------------------
  3.231 VB S+     1 2.62457e4     1.94465   15.29145    Ethanol
  4.296 VBAS I    1 3.33472e4     1.00000    9.99100    Toluene

Totals without ISTD(s) :               15.29145


========================================================================
                         *** End of Report ***
```

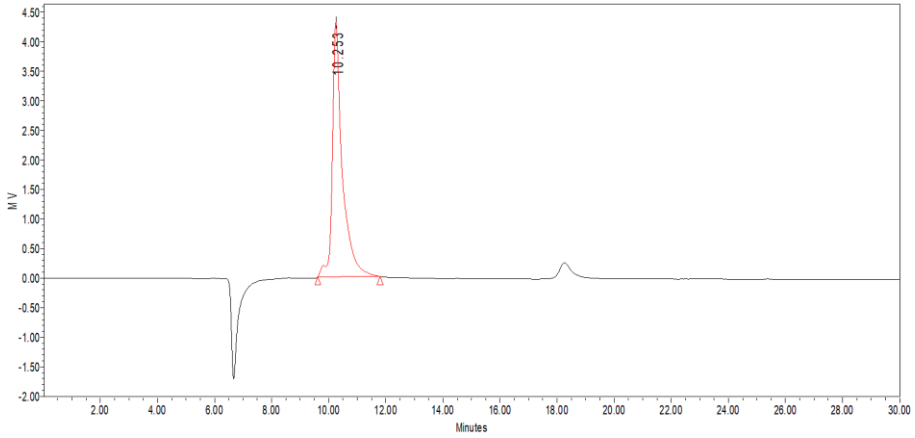
Lampiran 6 Hasil Analisis Etanol Menggunakan HPLC

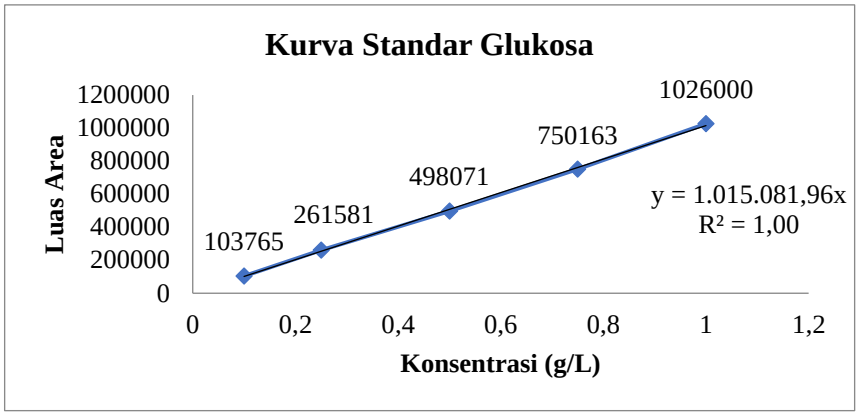
1. Kromatogram Etanol Standar dan Kurva Etanol Standar



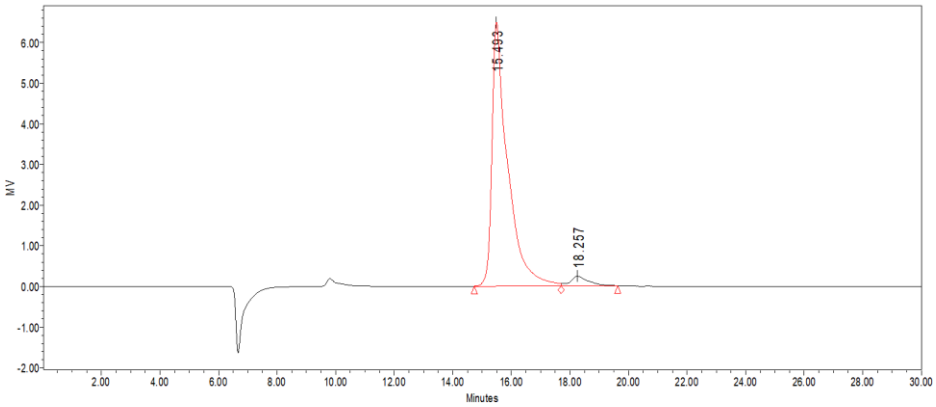


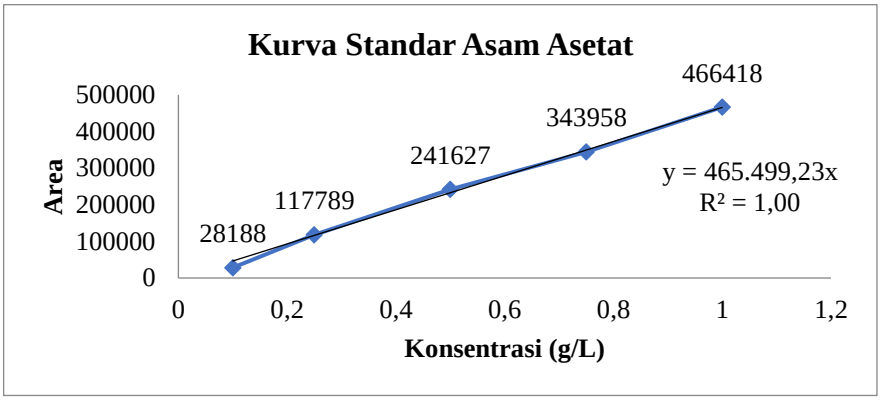
2. Kromatogram Glukosa Standar dan Kurva Standar



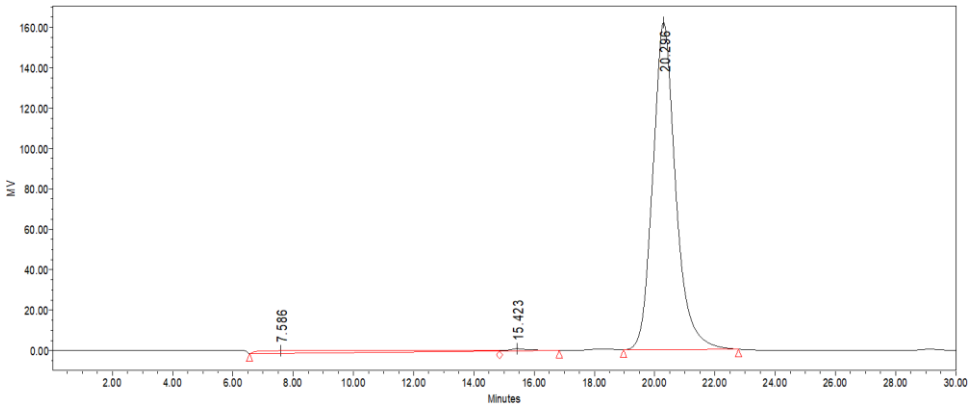


3. Kromatogram Asam Asetat Standar dan Kurva Standar





4. Kromatogram Sampel *Ulva reticulata*



DAFTAR RIWAYAT HIDUP

Penulis dilahirkan di Kakait, Provinsi Nusa Tenggara Timur pada 11 Maret 2002, sebagai anak keempat dari lima bersaudara dari pasangan Bapak Andereas Klau dan Mama Yuliana Luruk. Pada tahun 2008 penulis mengikuti pendidikan pada Sekolah Dasar Impres Weliman, tamat dan berijazah pada tahun 2014, penulis melanjutkan pendidikan di Sekolah Menengah Pertama Negeri Weliman dan berijazah pada tahun 2017, penulis melanjutkan pendidikan pada SMA Raden Adjeng Kartini Maktihan dan tamat berijazah pada tahun 2020. Pada tahun yang sama penulis mendaftarkan diri pada Fakultas Pertanian, Sains dan Kesehatan, Program Studi Kimia Universitas Timor-TTU lewat jalur SBMPTN hingga selesainya penyusunan skripsi ini, dengan moto "**Yakin dan Percaya adalah Kunci dari Segala Permasalahan**"

Kefamenanu, 2023

Patrisius Maryanto Bria