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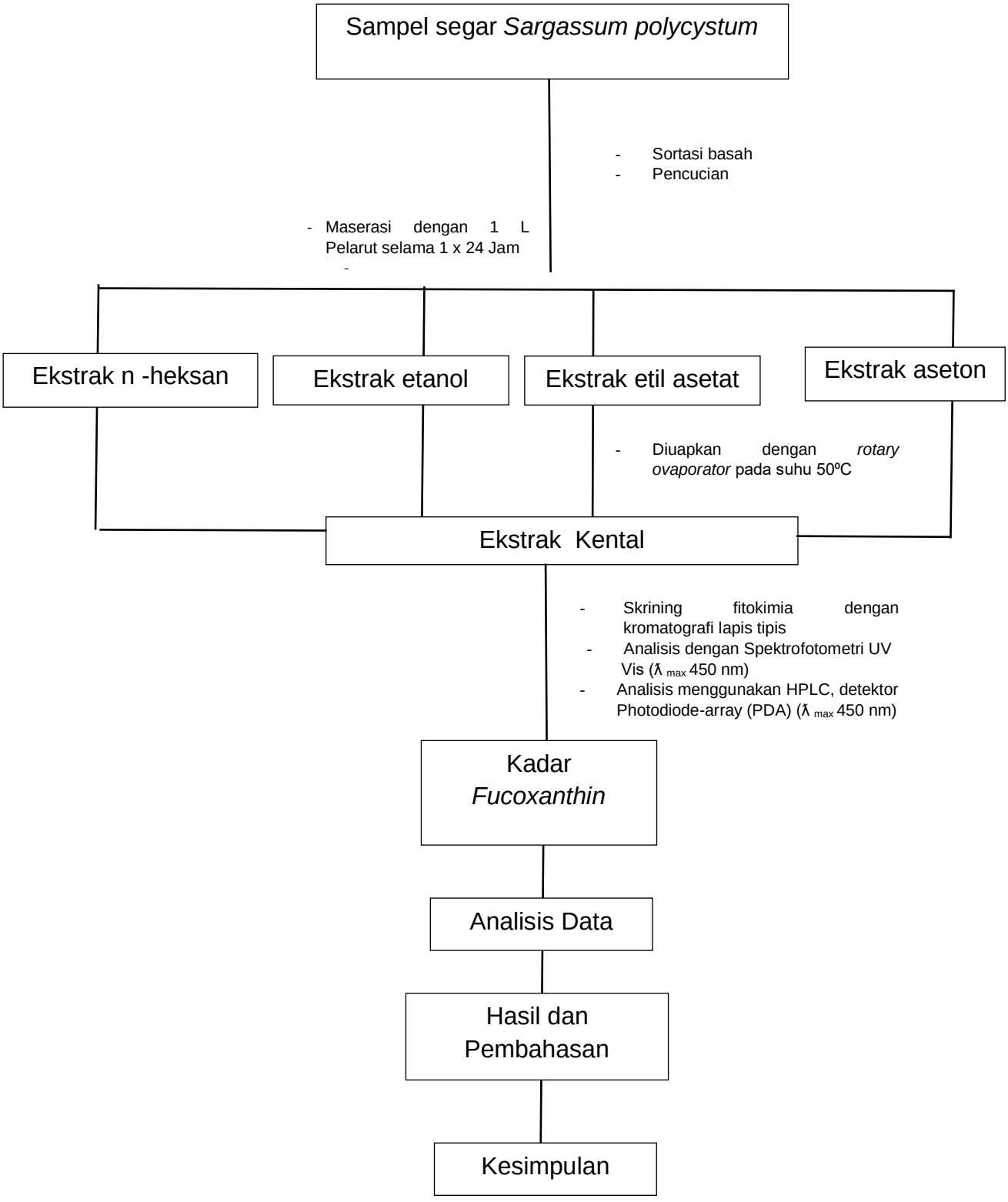
LAMPIRAN

Lampiran 1.Skema Kerja



Lampiran 2. Identifikasi sampel

LABORATORIUM ILMU LINGKUNGAN DAN KELAUTAN
DEPARTEMEN BIOLOGI
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
UNIVERSITAS HASANUDDIN, KAMPUS TAMALANREA
JL. PERINTIS KEMERDEKAAN KM.10, MAKASSAR

No : 062/ILK.BIO/PP.13/10/2021
Hal : Identifikasi Algae
Lamp : 1 Lembar

SURAT KETERANGAN

Yang bertanda tangan dibawah ini, menerangkan bahwa setelah mengkaji karakter sampel ganggang algae dan identifikasi maka terdapat tiga spesies yaitu :

Alga Coklat (Phaeophyta)
Sampel : Terima tanggal 06/10/2022
Kondisi sampel : lembab

1. Jenis : *Sargassum polycystum* C. Agardh
   Diskripsio : Tanaman cukup besar, panjangnya antara 10-40 cm. Alga berwarna coklat, melekat pada substrat keras. Stipula silindris, kaku, dapat tegak sepanjang thallus. Cabang utama kaku mengeluarkan cabang sekunder tumbuh selang-seling dan pada cabang ini terdapat daun , thallus bercabang berbentuk lembaran seperti daun bergelombang, tepi daun bergerigi tidak beraturan, dengan permukaan licin dan agak kaku, dari nudus terdapat bulatan-bulatan banyak menyerupai buah. Tangkai vesikula oval, melekat banyak pada cabang tertier, tunggal atau bergerombol.

2. Jenis : *Sargassum sp.*
   Diskripsio : Tanaman besar, panjang antara 20-40 cm, berwarna coklat. Bentuk daun besar. oval, dengan tepi bergerigi atau berombak dan ujung agak meruncing. Permukaan licin. Thallus silindris. Tidak memiliki organ pelekat (*holdfast*).

3. Jenis : *Padina australis* Hanch, 1887
   Diskripsio : Thallus terdiri dari beberapa helaian bentuk kipas/filament berwarna coklat. Ukuran filament ini sedikit lebih besar dibandingkan jenis lain dari *Padina*. Tepi luar filament menebal dan permukaan atas filament mempunyai garis konsentris warna putih. Organ pelekat (*holdfast*) bentuk discoid.

Makassar, 10 Oktober 2022
Kepala Laboratorium ILK,

LABORATORIUM ILMU LINGKUNGAN BIOLOGI MAKASSAR

Dr. Magdalena Litaay, M.Sc
NIP.19640929 198903 2 002

Tembusan :
1. Arsip

LABORATORIUM ILMU LINGKUNGAN DAN KELAUTAN
DEPARTEMEN BIOLOGI
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
UNIVERSITAS HASANUDDIN, KAMPUS TAMALANREA
JL. PERINTIS KEMERDEKAAN KM.10, MAKASSAR

Lampiran

Gambar 1. *Sargassum polycystum* C. Agardh

Gambar 2. *Sargassum sp.*

Gambar 3. *Padina australis* Hanch, 1887

Lampiran 3. Hasil Analisis HPLC

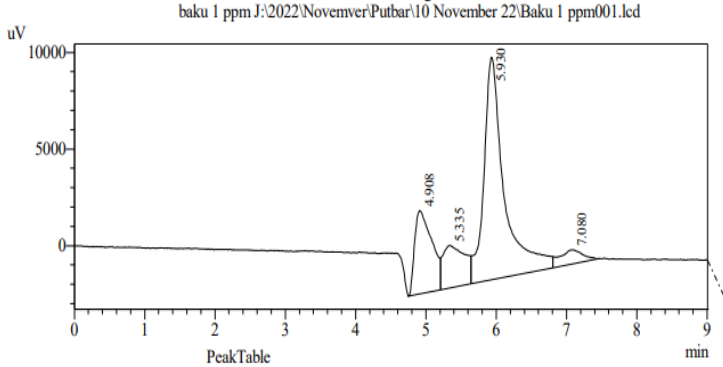
a. Baku 1 ppm

BIOFARMAKA

Sat01Jan012005

Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian

Chromatogram
baku 1 ppm J:\2022\Novemver\Putbar\10 November 22\Baku 1 ppm001.lcd



Sample Information

Acquired by	: Admin
Sample Name	: baku 1 ppm
Sample ID	: baku 1 ppm
Tray#	: 1
Vail#	: 2
Injection Volume	: 20 uL
Data Filename	: Baku 1 ppm001.lcd
Method Filename	: 1 method.lcm
Batch Filename	: 1.lcb
Report Filename	: Default.lcr

fase gerak = 1 method.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.908	73810	4327	19.947	23.049
2	5.335	48289	2208	13.050	11.761
3	5.930	230990	11509	62.424	61.313
4	7.080	16947	728	4.580	3.877
Total		370035	18771	100.000	100.000

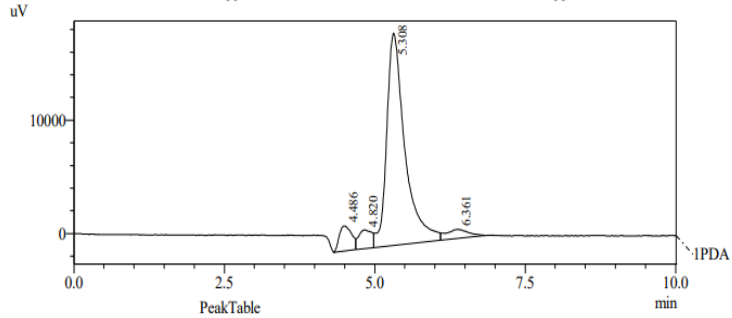
b. Baku 2 ppm

BIOFARMAKA

Sat01Jan012005

Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian

Chromatogram
baku 2 ppm J:\2022\Novemver\Putbar\10 November 22\Baku 2 ppm.lcd



Sample Information

Acquired by	: Admin
Sample Name	: baku 2 ppm
Sample ID	: baku 2 ppm
Tray#	: 1
Vail#	: 3
Injection Volume	: 20 uL
Data Filename	: Baku 2 ppm.lcd
Method Filename	: baku 2 ppm method.lcm
Batch Filename	: 1.lcb
Report Filename	: Default.lcr

fase gerak = baku 2 ppm method.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

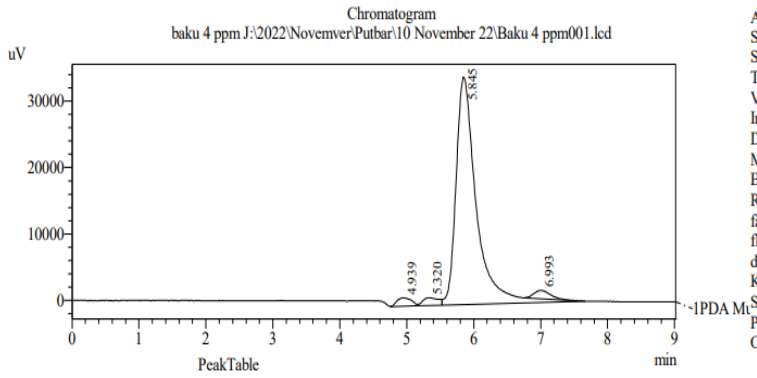
Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.486	31687	2205	6.699	9.427
2	4.820	25356	1655	5.360	7.075
3	5.308	394980	18726	83.502	80.060
4	6.361	20994	804	4.438	3.438
Total		473016	23390	100.000	100.000

c. Baku 4 ppm

BIOFARMAKA

Sat01Jan012005

Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian



Sample Information

Acquired by	: Admin
Sample Name	: baku 4 ppm
Sample ID	: baku 4 ppm
Tray#	: 1
Vail#	: 4
Injection Volume	: 20 uL
Data Filename	: Baku 4 ppm001.lcd
Method Filename	: 4 method.lcm
Batch Filename	: 78.lcb
Report Filename	: Default.lcr

fase gerak = 4 method.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.939	18653	1236	2.373	3.261
2	5.320	18997	1164	2.417	3.069
3	5.845	726306	34266	92.411	90.365
4	6.993	21997	1253	2.799	3.305
Total		785953	37919	100.000	100.000

d. Baku 8 ppm

BIOFARMAKA

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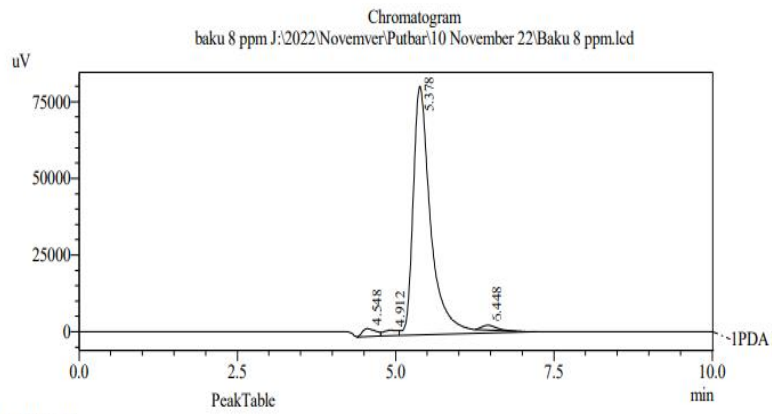
Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian



Sample Information

Acquired by	: Admin
Sample Name	: baku 8 ppm
Sample ID	: baku 8 ppm
Tray#	: 1
Vail#	: 5
Injection Volume	: 20 uL
Data Filename	: Baku 8 ppm.lcd
Method Filename	: baku 8 ppm method.lcm
Batch Filename	: 1.lcb
Report Filename	: Default.lcr

fase gerak = baku 8 ppm method.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.548	38227	2572	2.275	2.959
2	4.912	28155	1822	1.676	2.095
3	5.378	1589974	81022	94.641	93.207
4	6.448	23645	1511	1.407	1.738
Total		1680000	86927	100.000	100.000

e. Baku 16 ppm

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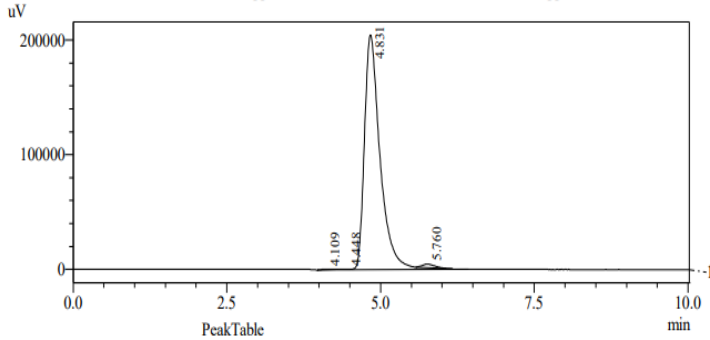
Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian



Sample Information

Acquired by	: Admin
Sample Name	: baku 16 ppm
Sample ID	: baku 16 ppm
Tray#	: 1
Vail#	: 6
Injection Volume	: 20 uL
Data Filename	: Baku 16 ppm.lcd
Method Filename	: Baku 16 ppm.lcm
Batch Filename	: Baku 1 ppm.lcb
Report Filename	: Default.lcr

fase gerak = Baku 16 ppm.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.109	11267	845	0.304	0.404
2	4.448	8940	739	0.242	0.353
3	4.831	3635632	204702	98.248	97.791
4	5.760	44620	3042	1.206	1.453
Total		3700458	209327	100.000	100.000

f. Sampel Etanol

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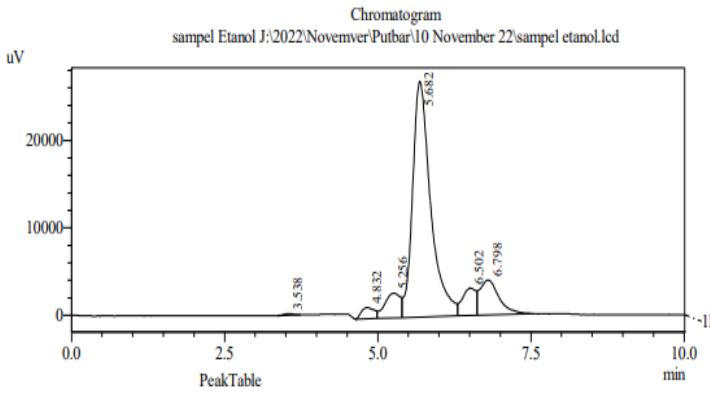
Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian



Sample Information

Acquired by	: Admin
Sample Name	: sampel Etanol
Sample ID	: sampel Etanol
Tray#	: 1
Vail#	: 12
Injection Volume	: 20 uL
Data Filename	: sampel etanol.lcd
Method Filename	: etanol method.lcm
Batch Filename	: 1.lcb
Report Filename	: Default.lcr

fase gerak = etanol method.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	3.538	1928	194	0.253	0.504
2	4.832	18995	1259	2.492	3.280
3	5.256	50572	2813	6.634	7.326
4	5.682	555065	26963	72.808	70.228
5	6.502	49272	3157	6.463	8.222
6	6.798	86540	4008	11.351	10.439
Total		762373	38394	100.000	100.000

g. Sampel Aseton

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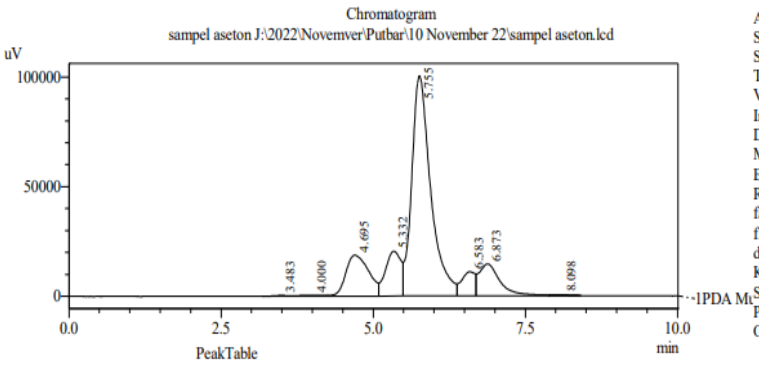
Sat01Jan012005

Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian



Sample Information

Acquired by	: Admin
Sample Name	: sampel aseton
Sample ID	: sampel aseton
Tray#	: 1
Vail#	: 13
Injection Volume	: 20 uL
Data Filename	: sampel aseton.lcd
Method Filename	: aseton method.lcm
Batch Filename	: 1.lcb
Report Filename	: Default.lcr

fase gerak = aseton method.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	3.483	5730	410	0.161	0.247
2	4.000	14251	485	0.399	0.292
3	4.695	488290	18645	13.687	11.232
4	5.332	365750	20418	10.252	12.300
5	5.755	2170237	100307	60.834	60.425
6	6.583	168332	11001	4.719	6.627
7	6.873	351336	14488	9.848	8.728
8	8.098	3557	249	0.100	0.150
Total		3567482	166003	100.000	100.000

h. Sampel Etil asetat

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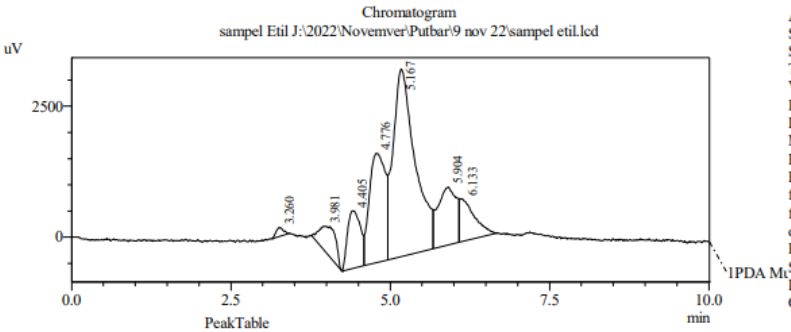
Sat01Jan012005

Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian



Sample Information

Acquired by	: Admin
Sample Name	: sampel Etil
Sample ID	: sampel Etil
Tray#	: 1
Vail#	: 10
Injection Volume	: 20 uL
Data Filename	: sampel etil.lcd
Method Filename	: etil method.lcm
Batch Filename	: Baku 1 ppm.lcb
Report Filename	: Default.lcr

fase gerak = etil method.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	3.260	1375	171	0.743	1.823
2	3.981	9319	481	5.037	5.140
3	4.405	15725	1107	8.500	11.827
4	4.776	36785	2090	19.884	22.333
5	5.167	86145	3581	46.566	38.263
6	5.904	22485	1110	12.154	11.862
7	6.133	13162	819	7.115	8.752
Total		184996	9360	100.000	100.000

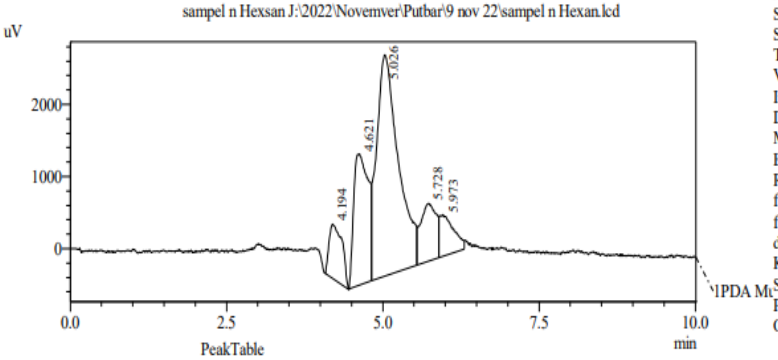
i. Sampel Heksan

BIOFARMAKA

Sat01Jan012005

Pusat Penelitian Fakultas Farmasi
lantai 4 wing B Gedung Pusat Kegiatan Penelitian

Chromatogram
sampel n Hexsan J:\2022\Novemver\Putbar\9 nov 22\sampel n Hexan.lcd



Sample Information

Acquired by	: Admin
Sample Name	: sampel n Hexsan
Sample ID	: sampel n Hexsan
Tray#	: 1
Vail#	: 8
Injection Volume	: 20 uL
Data Filename	: sampel n Hexan.lcd
Method Filename	: N Hexan Method.lcm
Batch Filename	: Baku 1 ppm.lcb
Report Filename	: Default.lcr

fase gerak = N Hexan Method.lcm
flow rate = 0.7 ml/min
detektor : PDA
Kolom : Shim-Pack Vp-Ods
Suhu Kolom ; RT oC
Panjang gelombang 450 nm
Operator : Dewi

PDA Ch1 450nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	4.194	11061	746	7.993	10.658
2	4.621	30086	1820	21.741	25.997
3	5.026	74220	3071	53.634	43.867
4	5.728	14137	799	10.216	11.416
5	5.973	8878	564	6.415	8.063
Total		138382	7000	100.000	100.000

Lampiran 4. Perhitungan

Lampiran 4.1 Perhitungan Rendemen

a. Etanol

$$\% \text{ Rendemen} = \frac{\text{Bobot Ekstrak (g)}}{\text{Bobot Simplisia (g)}} \times 100\%$$

$$\% \text{ Rendemen} = \frac{1{,}88 \text{ g}}{1000 \text{ g}} \times 100\%$$

%Rendemen = 0,188 %

b. Aseton

$$\% \text{ Rendemen} = \frac{\text{Bobot Ekstrak (g)}}{\text{Bobot Simplisia (g)}} \times 100\%$$

$$\%\text{Rendemen} = \frac{1{,}09 \text{ g}}{1000 \text{ g}} \times 100\%$$

% Rendemen = 0,109 %

c. Etil Asetat

$$\% \text{ Rendemen} = \frac{\text{Bobot Ekstrak (g)}}{\text{Bobot Simplisia (g)}} \times 100\%$$

$$\%\text{Rendemen} = \frac{0{,}83 \text{ g}}{1000 \text{ g}} \times 100\%$$

% Rendemen = 0,083 %

d. Heksan

$$\% \text{ Rendemen} = \frac{\text{Bobot Ekstrak (g)}}{\text{Bobot Simplisia (g)}} \times 100\%$$

$$\%\text{Rendemen} = \frac{0{,}87 \text{ g}}{1000 \text{ g}} \times 100\%$$

% Rendemen = 0,087 %

Lampiran 4.2 Perhitungan Kadar *Fucoxanthin* dari HPLC

Persamaan : y = 228718 x – 102474

Y : Luas area

X : Konsentrasi

a. Ekstrak Etanol

Replika 1

Luas area = 555.065

Y = 228718 x -102474

555.065 = 228718 x – 102474

$X = \frac{555.065 + 102474}{228718}$

X = 2,874 ppm

Sampel ekstrak etanol dibuat konsentrasi 50 ppm yaitu 1 mg sampel dalam 20mL labu tentukur, sehingga kadar yang diperoleh ialah :

$Kadar = \frac{X.\ v.\ fp}{(g)}$

$Kadar = \frac{2{,}874\ mg\ x\ 20mL}{1000\ ml\ x\ 1\ mg}$

= 0,0575 mg/mg

Replika 2

Luas area = 547321

$X = \frac{547.321 + 102474}{228718}$

X = 2,841 ppm

$Kadar = \frac{2{,}841\ mg\ x\ 20mL}{1000\ ml\ x\ 1\ mg}$

= 0,0568 mg/mg

Replika 3

Luas area = 607948

$X = \frac{607.948 + 102474}{228718}$

X = 3,106 ppm

Kadar = $\frac{3{,}106 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1 \text{ mg}}$

= 0,0621 mg/mg

b. Ekstrak Aseton

Replika 1

Luas area = 2.170.237

Y = 228718 x -102474

2.170.237= 228718 x – 102474

$X = \frac{2.170.2375 + 102474}{228718}$

X = 9,936 ppm

Sampel ekstrak aseton dibuat konsentrasi 50 ppm yaitu 1 mg sampel dalam 20mL labu tentukur, sehingga kadar yang diperoleh ialah :

Kadar = $\frac{X.\ v.\ fp}{(g)}$

Kadar = $\frac{9{,}936 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1}$

= 0,1987 mg/mg

Replika 2

Luas area = 2230769

$X = \frac{2230769 + 102474}{228718}$

X = 10,201 ppm

Kadar = $\frac{10{,}201 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1 \text{ mg}}$

= 0,2040 mg/mg

Replika 3

Luas area = 2207652

$X = \frac{2207652 + 102474}{228718}$

X = 10,100 ppm

Kadar = $\frac{10{,}100 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1 \text{ mg}}$

= 0,2020 mg/mg

c. Ekstrak Etil Asetat

Replika 1

Luas area = 22485

Y = 228718 x -102474

22485 = 228718 x – 102474

$X = \frac{22485 + 102474}{228718}$

X = 0,546 ppm

Sampel ekstrak etil asetat dibuat konsentrasi 50 ppm yaitu 1 mg sampel dalam 20mL labu tentukur, sehingga kadar yang diperoleh ialah :

Kadar = $\frac{X.\ v.\ fp}{(g)}$

Kadar = $\frac{0{,}546 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1}$

= 0,0109 mg/mg

Replika 2

Luas area = 25776

X = $\frac{25776 + 102474}{228718}$

X =0,561 ppm

Kadar = $\frac{0{,}561\text{mg x } 20\text{mL}}{1000 \text{ ml x } 1 \text{ mg}}$

= 0,0112 mg/mg

Replika 3

Luas area = 29881

X = $\frac{29881 + 102474}{228718}$

X = 0,579 ppm

Kadar = $\frac{0{,}579 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1 \text{ mg}}$

= 0,0116 mg/mg

d. Ekstrak Heksan

Replika 1

Luas area = 14137

Y = 228718 x -102474

14137 = 228718 x – 102474

X = $\frac{14137 + 102474}{228718}$

X = 0,510 ppm

Sampel ekstrak etil asetat dibuat konsentrasi 50 ppm yaitu 1 mg sampel dalam 20mL labu tentukur, sehingga kadar yang diperoleh ialah :

$$\text{Kadar} = \frac{\text{X. v. } fp}{(g)}$$

$$\text{Kadar} = \frac{0{,}510 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1}$$

= 0,0102 mg/mg

Replika 2

Luas area = 12887

$$X = \frac{12887 + 102474}{228718}$$

X = 0,504 ppm

$$\text{Kadar} = \frac{0{,}504 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1 \text{ mg}}$$

= 0,0101 mg/mg

Replika 3

Luas area = 16712

$$X = \frac{16712 + 102474}{228718}$$

X = 0,521 ppm

$$\text{Kadar} = \frac{0{,}521 \text{ mg x } 20\text{mL}}{1000 \text{ ml x } 1 \text{ mg}}$$

= 0,0104 mg/mg

Lampiran 5. Uji Statistik Kadar *Fucoxanthin* dari HPLC

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Pelarut	Statistic	df	Sig.	Statistic	df	Sig.
Kadar	Etanol	.341	3	.	.847	3	.233
	Aseton	.231	3	.	.980	3	.731
	Etil asetat	.204	3	.	.993	3	.843
	N-Heksan	.253	3	.	.964	3	.637

a. Lilliefors Significance Correction

ANOVA

Kadar

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.073	3	.024	6271.785	.000
Within Groups	.000	8	.000		
Total	.073	11			

Multiple Comparisons

Dependent Variable: Kadar

Tukey HSD

		Mean Difference			95% Confidence Interval	
(I) Pelarut	(J) Pelarut	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Etanol	Aseton	-.1427667*	.0016125	.000	-.147930	-.137603
	Etil asetat	.0475667*	.0016125	.000	.042403	.052730
	N-Heksan	.0485667*	.0016125	.000	.043403	.053730
Aseton	Etanol	.1427667*	.0016125	.000	.137603	.147930
	Etil asetat	.1903333*	.0016125	.000	.185170	.195497
	N-Heksan	.1913333*	.0016125	.000	.186170	.196497
Etil asetat	Etanol	-.0475667*	.0016125	.000	-.052730	-.042403
	Aseton	-.1903333*	.0016125	.000	-.195497	-.185170
	N-Heksan	.0010000	.0016125	.923	-.004164	.006164
N-Heksan	Etanol	-.0485667*	.0016125	.000	-.053730	-.043403
	Aseton	-.1913333*	.0016125	.000	-.196497	-.186170
	Etil asetat	-.0010000	.0016125	.923	-.006164	.004164

*. The mean difference is significant at the 0.05 level.

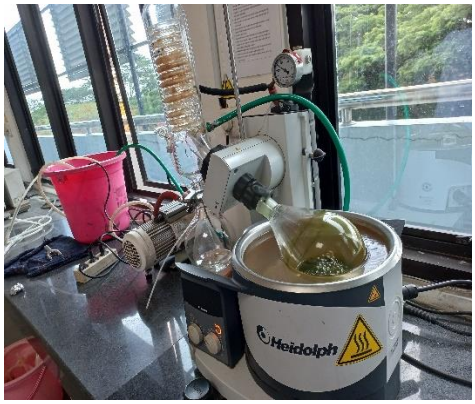
Lampiran 6. Dokumentasi Penelitian

Gambar 11. Pengambilan sampel *Sargassum polycystum*

Gambar 12. Pemisahan dan pembersihan sampel

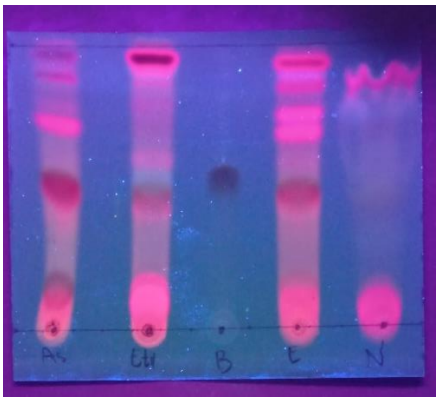
Gambar 13. Proses maserasi sampel *Sargassum polycystum*

Gambar 14. Penyaringan sampel

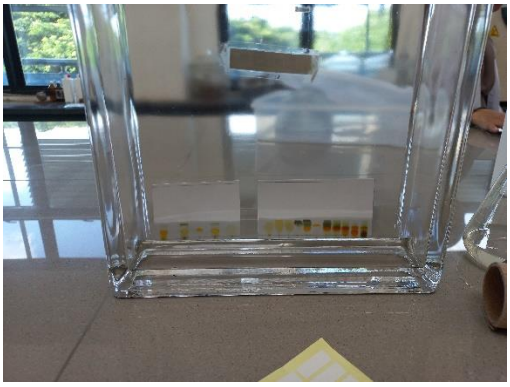


Gambar 15. Pemekatan Sampel menggunakan *Rotary evaporator*

Gambar 16. Ekstrak Kental



Gambar 17. Proses KLT



Gambar 18. Proses elusi

Gambar 19. Alat HPLC