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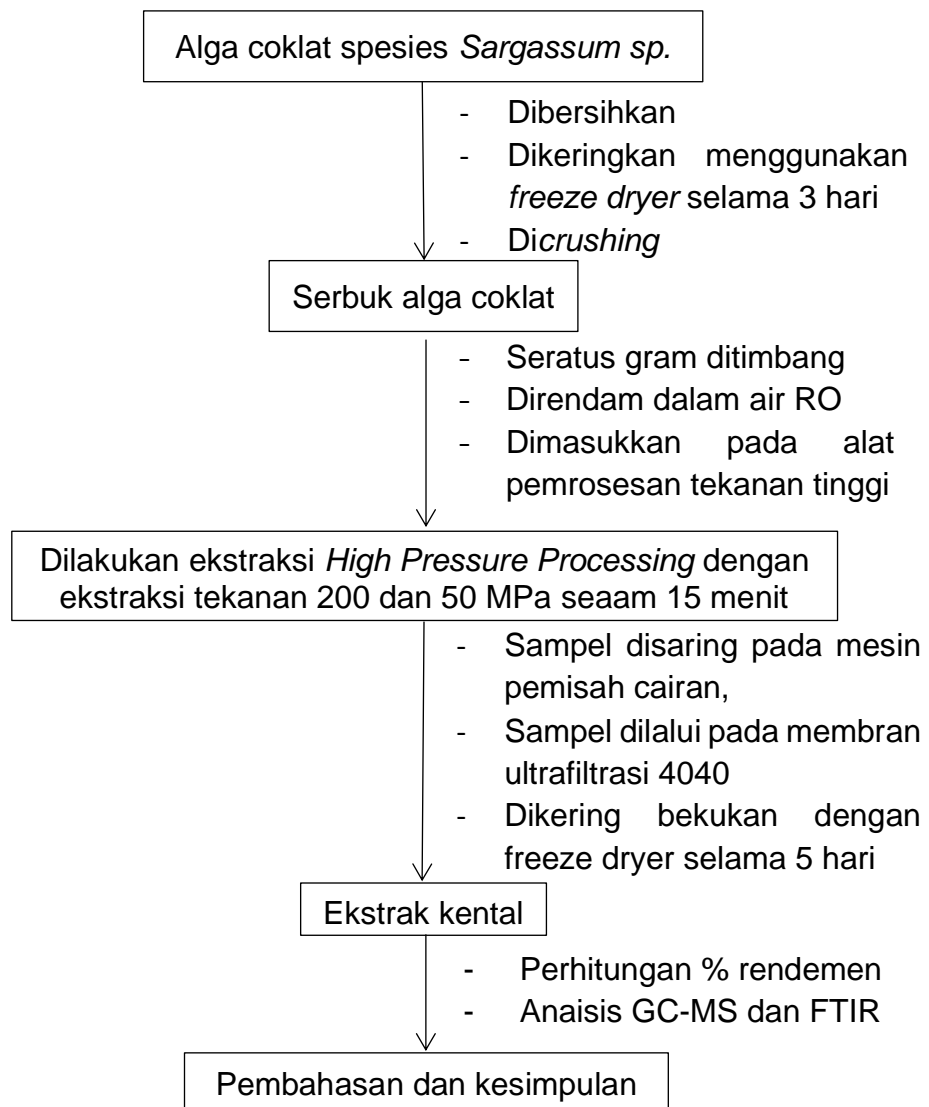
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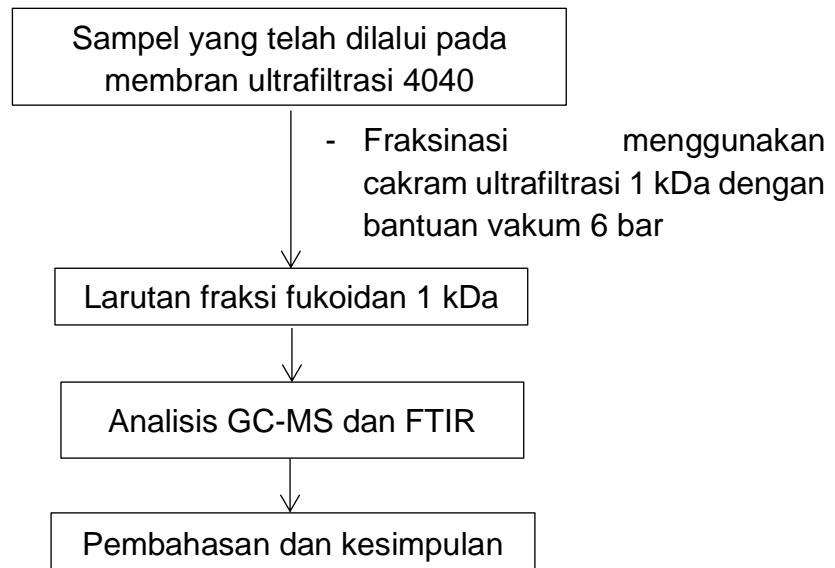
## LAMPIRAN

### Lampiran 1 Skema Kerja

#### 1. Ekstraksi Alga Coklat *Sargassum sp.*



## 2. Fraksinasi menggunakan Cakram Ultrafiltrasi 1 kDa



## Lampiran 2. Perhitungan

### Perhitungan % Rendemen

Perhitungan rendemen Alga Cokat *Sargassum sp.*

- Tekanan 200 MPa

$$\begin{aligned}\text{Rendamen} &= \frac{\text{Berat fukoidan hasil ekstraksi (g)}}{\text{Berat sampel awal sebelum diekstrak (g)}} \times 100\% \\ &= \frac{62,7397}{100} \times 100\% \\ &= 62,7397\%\end{aligned}$$

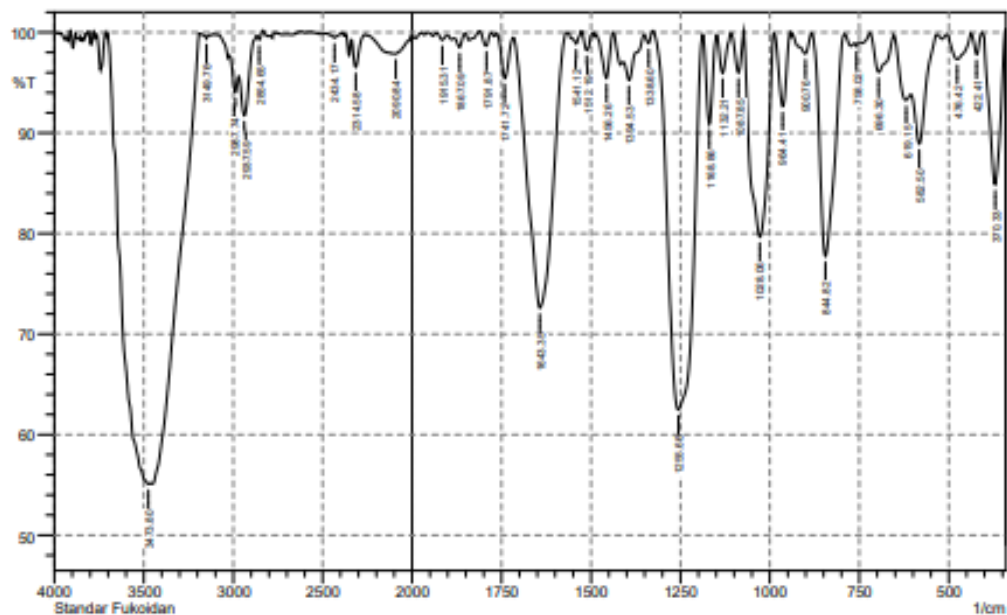
- Tekanan 50 MPa

$$\begin{aligned}\text{Rendamen} &= \frac{\text{Berat fukoidan hasil ekstraksi (g)}}{\text{Berat sampel awal sebelum diekstrak (g)}} \times 100\% \\ &= \frac{50,4688}{100} \times 100\% \\ &= 50,4688\%\end{aligned}$$



## Lampiran 3. Profil Hasi GC-MS dan FTIR

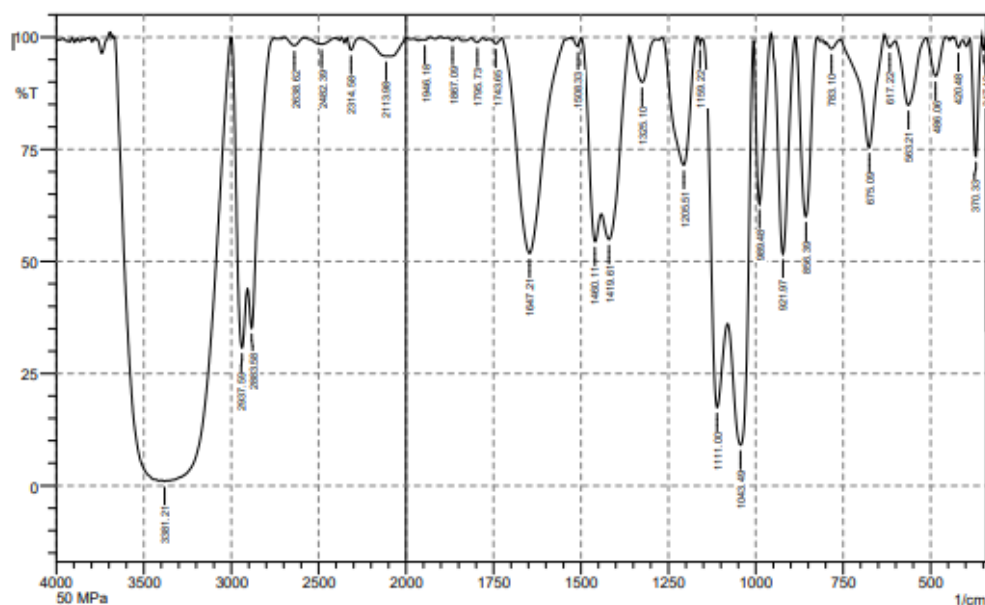
SHIMADZU



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	370.33	84.873	14.986	405.05	343.33	2.356	2.32
2	422.41	97.81	2.125	437.84	406.98	0.144	0.135
3	476.42	97.338	2.484	505.35	437.84	0.508	0.458
4	582.5	88.911	6.83	605.65	534.28	1.931	0.93
5	619.15	93.254	2.06	651.94	607.58	0.985	0.305
6	696.3	96.039	3.834	719.45	653.87	0.701	0.657
7	758.02	98.667	0.241	763.81	748.38	0.078	0.005
8	844.82	77.753	22.096	881.47	790.81	4.768	4.708
9	900.76	97.881	2.004	937.4	883.4	0.297	0.266
10	964.41	92.641	7.299	989.48	943.19	0.757	0.744
11	1028.06	79.671	20.301	1072.42	989.48	5.105	5.097
12	1087.85	95.988	4.015	1109.07	1072.42	0.331	0.329
13	1132.21	95.96	3.842	1149.57	1109.07	0.368	0.335
14	1168.86	90.897	8.853	1188.15	1149.57	0.792	0.75
15	1255.66	62.477	37.471	1325.1	1188.15	14.922	14.891
16	1338.6	98.917	1.036	1350.17	1327.03	0.059	0.054
17	1394.53	95.251	2.491	1409.96	1350.17	0.689	0.268
18	1456.26	95.444	4.455	1485.19	1438.9	0.464	0.438
19	1512.19	98.23	1.811	1527.62	1492.9	0.125	0.13
20	1541.12	98.87	1.196	1568.13	1527.62	0.094	0.101
21	1643.35	72.6	27.092	1714.72	1570.06	10.195	10.005
22	1741.72	95.435	4.235	1762.94	1718.58	0.472	0.406
23	1791.87	98.653	1.354	1813.09	1778.37	0.093	0.098
24	1867.09	98.505	1.154	1882.52	1853.59	0.113	0.068
25	1915.31	99.235	0.576	1930.74	1901.81	0.058	0.035
26	2090.84	97.856	1.843	2262.5	2004.04	1.542	1.22
27	2314.58	96.531	2.882	2337.72	2264.43	0.565	0.409
28	2434.17	99.459	0.461	2478.53	2387.87	0.113	0.082
29	2854.65	99.239	0.632	2868.15	2833.43	0.058	0.047
30	2937.59	91.738	5.156	2968.45	2870.08	1.995	0.994
31	2987.74	94.048	2.293	3020.53	2970.38	1.003	0.253
32	3149.76	99.382	0.458	3192.19	3107.32	0.108	0.049
33	3473.8	55.089	2.224	3701.4	3462.22	40.929	9.676

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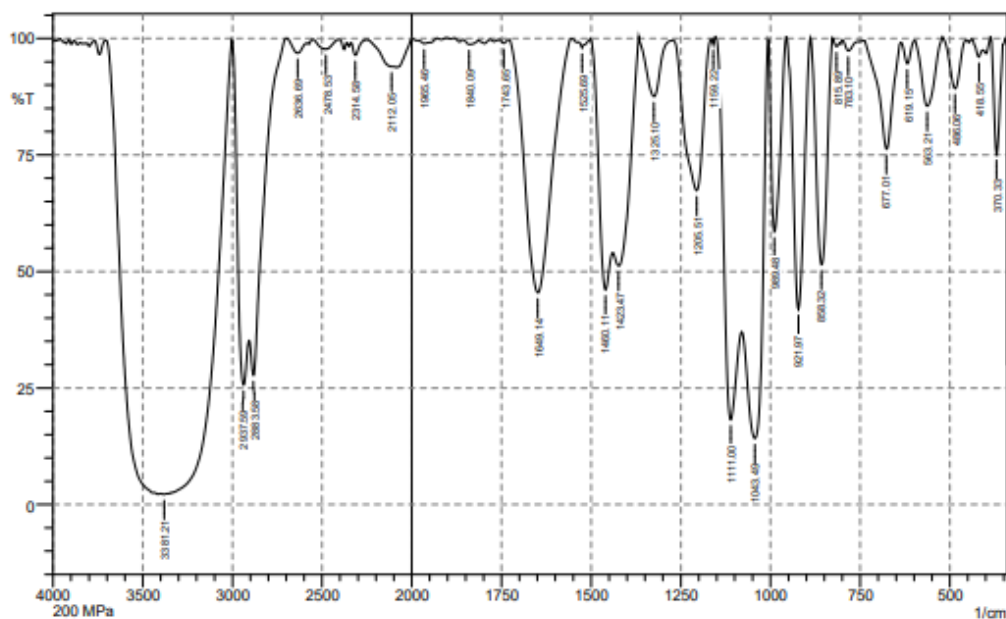
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	347.19	97.242	2.712	352.97	341.4	0.087	0.084
2	370.33	73.436	25.953	387.69	354.9	2.114	2.027
3	420.48	97.724	1.889	433.98	406.98	0.143	0.097
4	486.06	91.33	8.616	511.14	457.13	1.107	1.096
5	563.21	84.845	14.625	599.86	513.07	2.957	2.78
6	617.22	97.781	2.132	632.65	599.86	0.178	0.159
7	675.09	75.411	24.788	758.1	632.65	5.913	5.932
8	783.1	97.405	1.655	798.53	758.1	0.297	0.14
9	856.39	60.007	39.958	887.26	825.53	6.615	6.606
10	921.97	51.656	48.461	954.76	889.18	8.276	8.305
11	989.48	62.808	36.512	1004.91	956.69	4.885	4.834
12	1043.49	9.089	58.5	1080.14	1006.84	44.942	28.997
13	1111	17.448	45.044	1151.5	1082.07	28.81	13.24
14	1159.22	98.405	1.452	1166.93	1153.43	0.035	0.029
15	1205.51	71.513	28.486	1267.23	1166.93	7.715	7.703
16	1325.1	89.979	9.655	1359.82	1284.59	1.734	1.612
17	1419.61	54.908	16.24	1440.83	1361.74	12.866	4.467
18	1460.11	54.451	18.238	1498.69	1442.75	8.866	2.685
19	1508.33	97.932	1.916	1525.69	1500.62	0.124	0.11
20	1647.21	51.784	47.827	1724.36	1546.91	21.563	21.25
21	1743.65	98.556	1.09	1757.15	1726.29	0.121	0.076
22	1795.73	98.856	0.921	1813.09	1780.3	0.099	0.067
23	1867.09	99.238	0.74	1882.52	1853.59	0.044	0.041
24	1946.18	99.401	0.19	1951.96	1928.82	0.037	0.01
25	2113.98	95.764	0.309	2268.29	2102.41	1.624	0.123
26	2314.58	97.168	2.651	2337.72	2268.29	0.421	0.362
27	2482.39	98.465	1.214	2551.82	2407.16	0.632	0.432
28	2638.62	98.157	1.765	2696.48	2584.61	0.469	0.432
29	2883.58	35.146	17.203	2906.73	2754.35	26.641	4.235
30	2937.59	30.757	30.974	2999.31	2908.65	27.99	11.583
31	3381.21	0.978	0.174	3398.57	3365.78	64.697	1.127

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Resolution;

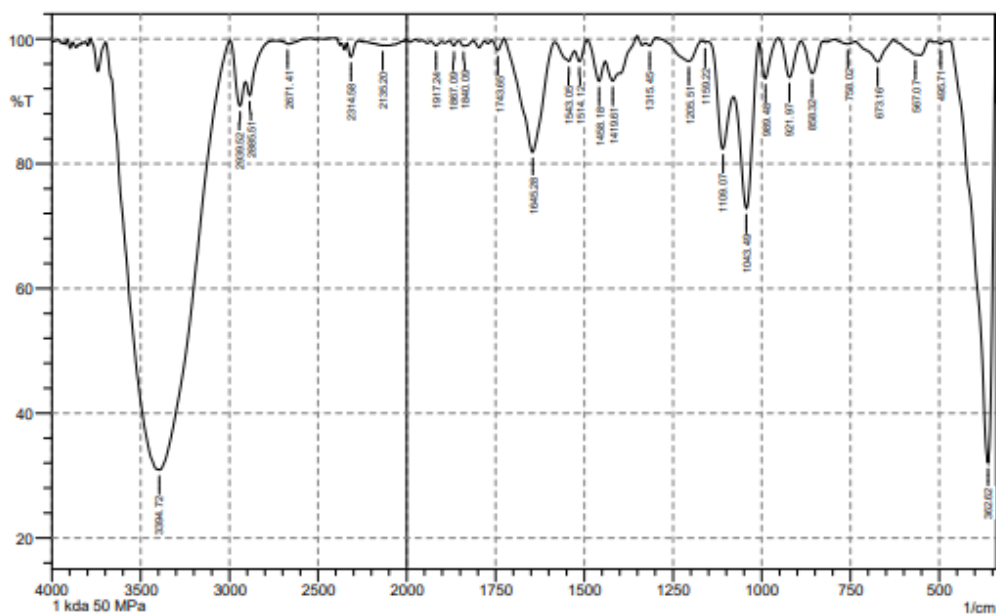
Apodization;



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	370.33	75.177	24.29	385.76	352.97	2.178	2.088
2	418.55	96.027	2.292	439.77	406.98	0.339	0.147
3	486.06	89.249	10.606	518.85	455.2	1.507	1.467
4	563.21	85.46	14.367	596	520.78	2.679	2.644
5	619.15	94.576	4.716	636.51	597.93	0.488	0.372
6	677.01	76.271	22.973	736.81	636.51	5.092	4.775
7	783.1	97.333	2.288	798.53	742.59	0.327	0.226
8	815.89	98.269	1.229	827.46	806.25	0.104	0.062
9	858.32	51.451	48.405	887.26	827.46	8.798	8.765
10	921.97	41.929	58.263	954.76	889.18	10.878	10.932
11	989.48	58.546	41.006	1004.91	956.69	6.044	5.995
12	1043.49	14.207	53.2	1078.21	1006.84	38.579	23.478
13	1111	18.246	46.088	1151.5	1080.14	30.207	14.561
14	1159.22	98.711	1.397	1165	1153.43	0.019	0.024
15	1205.51	67.37	32.375	1271.09	1165	9.368	9.235
16	1325.1	87.527	12.162	1365.6	1273.02	2.399	2.268
17	1423.47	51.221	12.807	1438.9	1367.53	13.29	4.057
18	1480.11	46.099	22.642	1500.62	1440.83	12.196	4.042
19	1525.69	98.009	1.417	1535.34	1502.55	0.152	0.089
20	1649.14	45.432	54.385	1728.22	1552.7	25.282	25.149
21	1743.65	98.967	0.787	1757.15	1728.22	0.077	0.046
22	1840.09	98.721	0.909	1855.52	1813.09	0.171	0.098
23	1965.46	98.895	1.025	1998.25	1928.82	0.191	0.169
24	2112.05	93.943	0.321	2249	2104.34	2.143	0.177
25	2314.58	96.423	2.819	2337.72	2249	0.648	0.414
26	2478.53	97.703	2.087	2553.75	2407.16	0.877	0.743
27	2636.69	96.835	2.612	2696.48	2584.61	0.909	0.657
28	2883.58	27.712	14.671	2906.73	2698.41	39.115	4.39
29	2937.59	25.679	29.515	3001.24	2908.65	33.831	12.525
30	3381.21	2.182	0.15	3398.57	3363.86	57.155	0.485

Comment;  
200 MPa

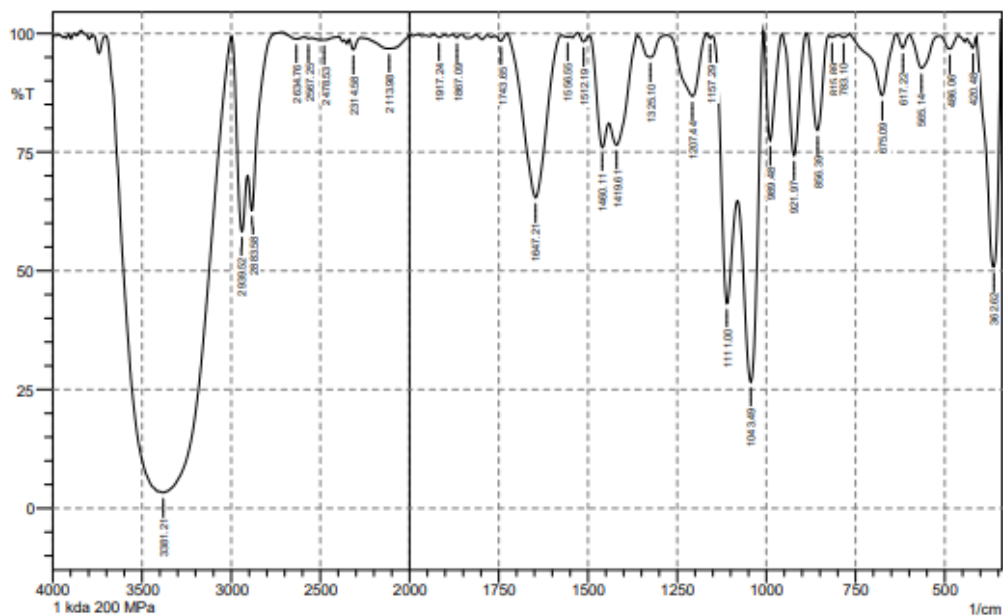
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Resolution;  
Apodization;



	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	362.62	32.1	64.1	476.42	343.33	22.56	21.16
2	495.71	99.13	0.47	509.21	476.42	0.08	0.02
3	567.07	97.48	0.15	630.72	563.21	0.41	0.02
4	673.16	96.35	3.41	734.88	630.72	0.87	0.74
5	758.02	99.19	0.52	794.67	734.88	0.14	0.08
6	858.32	94.48	5.15	889.18	829.39	0.78	0.69
7	921.97	93.83	6.06	952.84	889.18	0.8	0.77
8	989.48	93.66	6.02	1008.77	952.84	0.71	0.66
9	1043.49	72.83	22.23	1078.21	1008.77	5.41	3.88
10	1109.07	82.4	11.89	1151.5	1080.14	3.24	1.66
11	1159.22	99.42	0.19	1166.93	1153.43	0.03	0
12	1205.51	96.42	3.41	1296.16	1166.93	0.95	0.91
13	1315.45	98.88	0.77	1327.03	1296.16	0.08	0.04
14	1419.61	93.26	2.07	1440.83	1402.25	0.98	0.19
15	1458.18	93.21	4.36	1490.97	1440.83	0.88	0.46
16	1514.12	96.38	2.33	1527.62	1490.97	0.35	0.18
17	1543.05	96.42	2.04	1581.63	1527.62	0.57	0.28
18	1645.28	81.83	17.92	1726.29	1583.56	5.72	5.59
19	1743.65	98.17	1.79	1761.01	1726.29	0.14	0.14
20	1840.09	98.86	0.89	1855.52	1813.09	0.14	0.1
21	1867.09	98.9	0.84	1880.6	1855.52	0.07	0.04
22	1917.24	98.94	0.6	1932.67	1901.81	0.1	0.04
23	2135.2	98.95	0.06	2272.15	2125.56	0.44	0.02
24	2314.58	97.12	2.35	2337.72	2272.15	0.44	0.31
25	2871.41	99.17	0.66	2738.92	2544.11	0.3	0.21
26	2885.51	90.91	3.12	2908.65	2740.85	2.47	0.39
27	2939.52	89.28	6.08	2995.45	2910.58	2.61	1.22
28	3394.72	30.93	68.68	3697.54	2997.38	172.42	171.27

Comment;  
1 kda 50 MPa

Date/Time; 2/22/2023 1:10:48 PM  
No. of Scans;  
Resolution;  
Apodization;



	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	362.62	50.825	46.126	410.84	343.33	10.328	9.614
2	420.48	98.94	2.197	437.84	410.84	0.244	0.135
3	486.06	96.705	2.827	514.99	462.92	0.435	0.328
4	565.14	92.684	6.886	597.93	514.99	1.38	1.219
5	617.22	96.948	2.823	636.51	599.86	0.252	0.217
6	675.09	86.955	12.975	767.67	636.51	3.099	3.066
7	783.1	99.132	0.74	798.53	767.67	0.074	0.056
8	815.89	99.16	0.364	825.53	806.25	0.056	0.016
9	856.39	79.602	20.19	889.18	825.53	2.986	2.928
10	921.97	74.307	25.498	954.78	891.11	3.743	3.689
11	989.48	77.411	22.279	1006.84	958.69	2.752	2.695
12	1043.49	26.59	56.498	1080.14	1008.77	23.039	16.557
13	1111	43.142	36.039	1151.5	1082.07	13.561	6.861
14	1157.29	98.972	0.751	1165	1151.5	0.039	0.025
15	1207.44	86.768	13.108	1278.81	1166.93	3.422	3.334
16	1325.1	94.995	4.598	1363.67	1278.81	0.937	0.787
17	1419.61	76.468	9.703	1440.83	1363.67	5.691	2.195
18	1460.11	75.974	11.204	1494.83	1442.75	3.885	1.384
19	1512.19	98.27	1.408	1529.55	1500.62	0.126	0.094
20	1556.55	99.204	0.172	1573.91	1550.77	0.066	0.01
21	1647.21	65.417	34.388	1726.29	1573.91	12.219	12.095
22	1743.65	98.376	1.428	1762.94	1726.29	0.141	0.107
23	1867.09	99.077	0.747	1880.6	1855.52	0.058	0.038
24	1917.24	99.161	0.554	1930.74	1901.81	0.071	0.035
25	2113.98	96.783	0.258	2272.15	2098.55	1.628	0.111
26	2314.58	96.571	2.314	2337.72	2274.07	0.597	0.299
27	2478.53	98.608	0.544	2549.89	2395.59	0.763	0.201
28	2567.25	98.877	0.202	2592.33	2549.89	0.18	0.013
29	2634.76	98.808	0.751	2713.84	2592.33	0.372	0.22
30	2883.58	62.689	10.901	2906.73	2713.84	11.355	1.691
31	2939.52	58.256	21.969	2997.38	2908.65	12.741	5.646
32	3381.21	3.287	96.133	3701.4	2999.31	493.349	491.541

Date/Time; 2/22/2023 1:03:31 PM

No. of Scans;

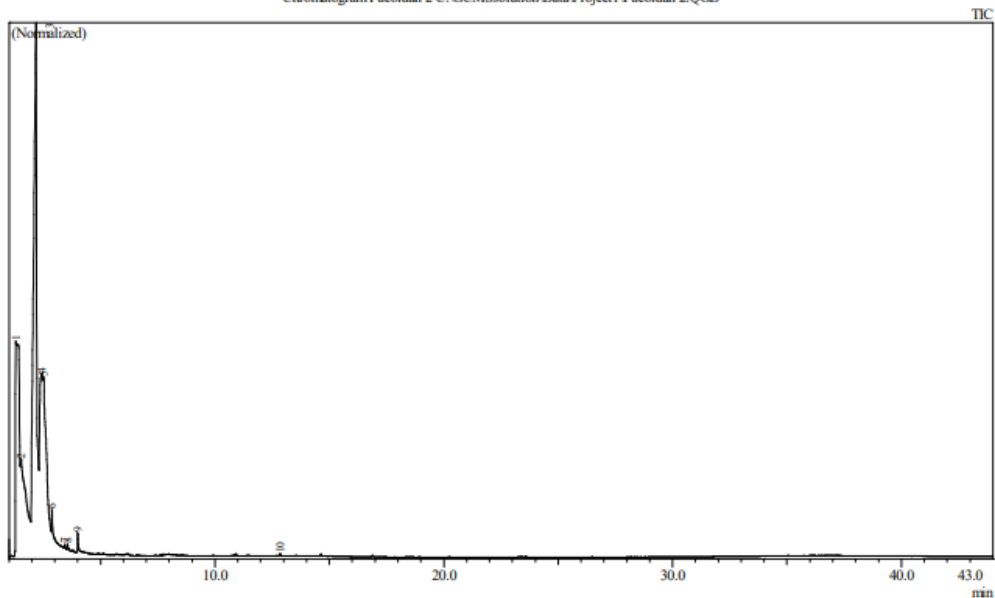
Resolution;

## DATA REPORT GCMS-QP2010 ULTRA SHIMADZU

Analyzed by : Admin  
 Analyzed : 5/03/2023 12:16:20 PM  
 Sample Type : Unknown  
 Level # : 1  
 Sample Name : Fucoidan 2  
 Sample ID : Fucoidan 2  
 IS Amount : [1]=1  
 Sample Amount : 1

### Sample Information

Chromatogram Fucoidan 2 C:\GCMSsolution\Data\Project1\Fucoidan 2.QGD



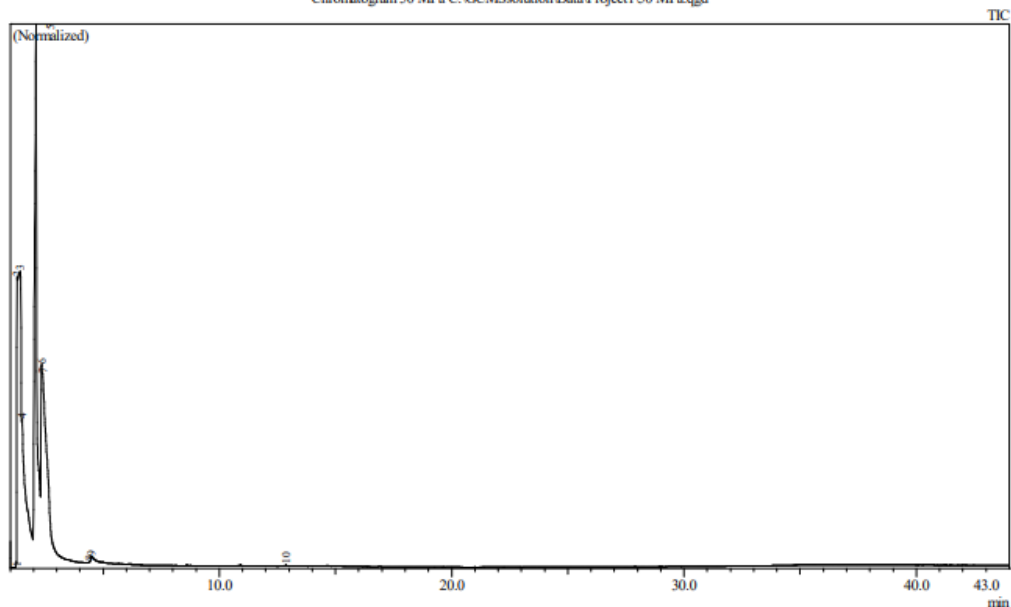
Peak Report TIC					
Peak#	R.Time	Area	Area%	A/H	Name
1	1.296	235678433	19.17	11.40	ETHANE, 2-CHLORO-1,1-DIMETHOXY-
2	1.529	158707584	12.91	17.30	Ethane, 2-chloro-1,1-dimethoxy- (CAS)
3	2.181	492602782	40.07	9.74	Ethyl 2-(2-chloroacetamido)-3,3,3-trifluorolactate
4	2.436	141700422	11.53	8.48	Trifluoroacetic acid
5	2.517	182220579	14.82	11.14	Butanoic acid
6	2.878	12294088	1.00	3.70	2,5-FURANDIONE
7	3.443	672909	0.05	1.68	Ethanone, 1-(2-furanyl)- (CAS)
8	3.563	773871	0.06	1.67	ETHANOL, 2,2-DIETHOXY-
9	4.003	4414673	0.36	2.37	2-Furancarboxaldehyde, 5-methyl-
10	12.854	418427	0.03	1.84	SILICATE ANION TETRAMER
		1229483768	100.00		

## DATA REPORT GCMS-QP20 10 ULTRA SHIMADZU

Analyzed by : Admin  
 Analyzed : 5/03/2023 3:02:57 PM  
 Sample Type : Unknown  
 Level # : 1  
 Sample Name : 50 MPa  
 Sample ID :  
 IS Amount : [1]=1  
 Sample Amount : 1

### Sample Information

Chromatogram 50 MPa C:\GCMSsolution\Data\Project1\50 MPa.qgd



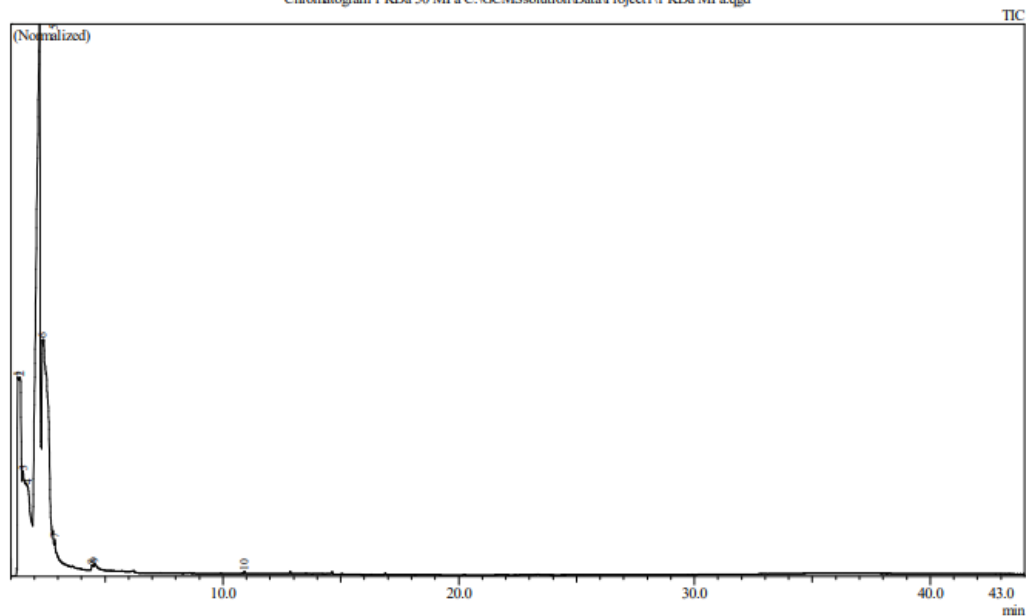
Peak#	R.Time	Area	Area%	A/H Name
1	1.033	342587	0.04	6.86 Cyclopentene, 1,5-dimethyl-
2	1.296	51161857	5.69	2.51 ETHANE, 2-CHLORO-1,1-DIMETHOXY-
3	1.423	198619069	22.11	9.60 Ethane, 2-chloro-1,1-dimethoxy-
4	1.510	132762002	14.78	12.83 Prenol, TBDMS derivative
5	2.111	273972258	30.49	7.25 PREGNA-1,4-DIENE-3,11,20-TRIONE, 17,21-DIHYDROXY-, BIS(TRIFLUOROAC
6	2.350	53659750	5.97	3.87 Acetic acid, trifluoro-
7	2.400	184133652	20.49	13.94 BUTYRIC ACID
8	4.408	138998	0.02	3.06 2-BUTENE, 1-[(1,1-DIMETHYLETHYL)SULFINYL]-3-METHYL-
9	4.495	3530782	0.39	9.17 1-Diisopropylsilyloxy-cyclopentane
10	12.866	150196	0.02	2.12 SILICATE ANION TETRAMER
		898471151	100.00	

## DATA REPORT GCMS-QP2010 ULTRA SHIMADZU

Analyzed by : Admin  
 Analyzed : 5/03/2023 2:11:32 PM  
 Sample Type : Unknown  
 Level # : 1  
 Sample Name : 1 KDa 50 MPa  
 Sample ID :  
 IS Amount : [1]=1  
 Sample Amount : 1

### Sample Information

Chromatogram 1 KDa 50 MPa C:\GCMSsolution\Data\Project1\1 KDa MPa.qgd



Peak#	R.Time	Area	Area%	A/H	Name
1	1.299	82631047	5.12	4.01	Ethane, 2-chloro-1,1-dimethoxy- (CAS)
2	1.393	147305359	9.13	7.19	Ethane, 2-chloro-1,1-dimethoxy-
3	1.515	125836889	7.80	11.69	ETHANE, 2-CHLORO-1,1-DIMETHOXY-
4	1.717	94217165	5.84	10.40	ESSIGSAEURE, TRIFLUORO-, ETHYLESTER
5	2.224	680303412	42.16	12.01	Ethyl 2-(2-chloroacetamido)-3,3,3-trifluorolactate
6	2.347	452266284	28.03	18.94	Acetic acid, trifluoro- (CAS)
7	2.875	21753259	1.35	7.57	1,3-Propanediol (CAS)
8	4.445	2863843	0.18	5.01	1,4-Dioxan-2,5-diol, di(trifluoroacetate)
9	4.552	5657305	0.35	8.94	3-Bromo-2-methoxyoxepane
10	10.916	664344	0.04	2.23	2-OCTANONE, 3-ETHYLIDENE-4-METHYL-4-(TRIMETHYLSILYL)-, (E)-
		1613498907	100.00		



#### Lampiran 4. Dokumentasi Penelitian



**Gambar 8.** Pengeringan sampel pada *Freeze dryer*



**Gambar 9.** Serbuk *Sargassum sp.* yang telah *dicrushing*



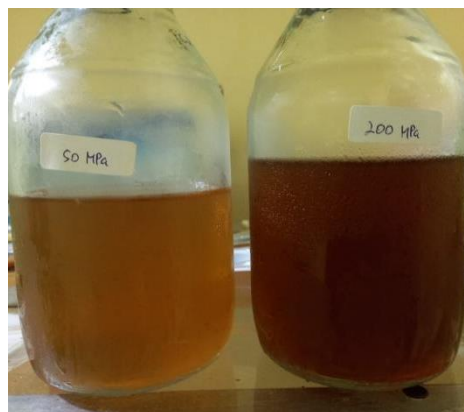
**Gambar 10.** Proses ekstraksi metode pemrosesan tekanan tinggi



**Gambar 11.** Proses penyaringan sampel hasil ekstraksi pemrosesan tekanan tinggi



**Gambar 12. Proses penyaringan sampel melalui membran ultrafiltrasi 4040**



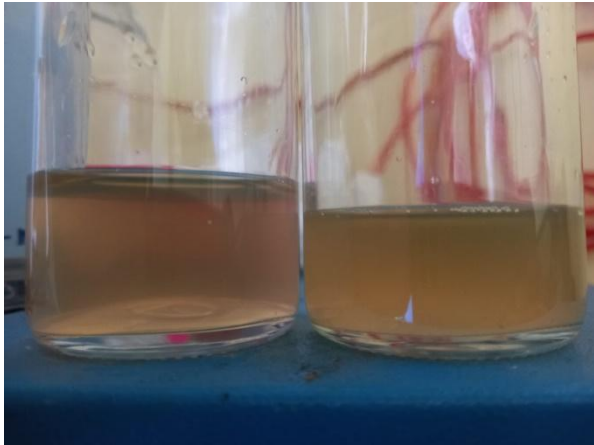
**Gambar 13. Ekstrak cair *Sargassum* sp. tekanan 200 MPa dan 50 MPa**



**Gambar 14. Ekstrak kering *Sargassum* sp.**



**Gambar 13. Proses fraksinasi fukoidan 1 kDa**



**Gambar 15. Fraksinasi fukoidan 1 kDa**