Electronic Supplementary Information (ESI)

The yield of pyrolysis products over time at a particle size of 10-40 mesh

Waktu, menit	*Yield*, gram		
	Bio-oil	*Remaining solid*	Gas
2	0,939	45,186	3,875
2,5	1,554	44,443	4,003
3	3,226	41,631	5,143
3,5	3,366	41,005	5,629
4	4,001	40,224	5,775
5	4,296	39,284	6,42
6	5,756	36,65	7,594
7	7,181	32,971	9,848
10	9,725	28,656	11,619
15	11,647	25,26	13,093
20	11,96	19,337	18,703

The yield of pyrolysis products over time at a particle size of 40-70 mesh

Waktu, menit	*Yield*, gram		
	Bio-oil	*Remaining solid*	Gas
2	2,698	42,33	4,972
2,5	4,190	38,764	7,046
3	5,619	33,566	10,815
3,5	6,900	33,136	9,964
4	8,183	30,843	10,974
4,5	8,286	28,157	13,557
5	9,019	27,002	13,979
5,5	9,894	25,155	14,951
8	10,901	24,863	14,236
10	12,284	20,182	17,534
15	12,921	19,198	17,881
20	13,232	17,851	18,917

The yield of pyrolysis products over time at a particle size of 70-100 mesh

Waktu, menit	*Yield*, gram		
	Bio-oil	*Remaining solid*	Gas
2	0,622	46,238	3,14
2,5	2,886	43,699	3,415
3	3,564	42,101	4,335
3,5	4,685	40,189	5,126
4	5,645	39,447	4,908
4,5	6,255	35,336	8,409
5	6,601	34,162	9,237
6	7,673	32,415	9,912
7	8,611	31,773	9,616
8	9,269	30,164	10,567
10	9,841	26,195	13,964
15	10,317	21,774	17,909
20	10,595	18,844	20,561

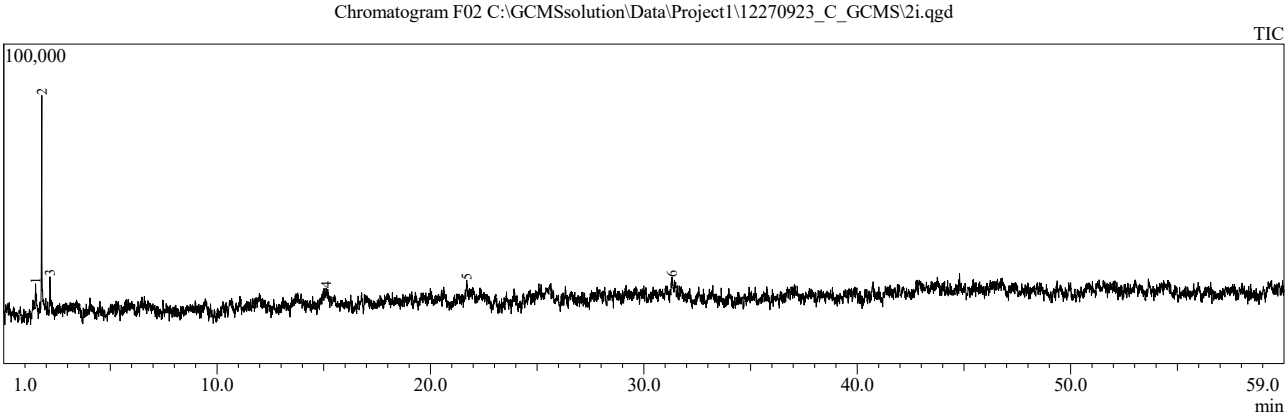
The yield of pyrolysis products over time at a particle size of >100 mesh

Waktu, menit	*Yield*, gram		
	Bio-oil	*Remaining solid*	Gas
2	1,493	45,682	2,825
2,5	3,215	43,220	3,565
3	4,274	41,466	4,260
3,5	5,538	37,898	6,564
4	6,950	35,310	7,740
5	7,990	31,280	10,730
7	8,544	28,096	13,360
10	8,946	25,853	15,201
15	9,342	19,637	21,021
20	9,789	14,774	25,437

Sample Information

Analyzed by	: Admin
Analyzed	: 02/10/2023 12.17.38
Sample Name	: F02
Sample ID	: 2
Vial #	: 2
Injection Volume	: 1.00
Tuning File	: C:\GCMSsolution\System\Tune1\11_07_2023.qgt

Chromatogram F02 C:\GCMSsolution\Data\Project1\12270923_C_GCMS\2i.qgd



Peak Report TIC

Peak#	R.Time	I.Time	F.Time	Area	Area%
1	1.500	1.433	1.550	6293	2.53
2	1.790	1.733	1.808	100826	40.53
3	2.173	2.092	2.325	44916	18.05
4	15.108	14.925	15.283	38131	15.33
5	21.699	21.608	21.792	12106	4.87
6	31.316	31.217	31.575	46526	18.70
				248798	100.00

C:\GCMSsolution\Data\Project1\12270923_C_GCMS\2i.qgd

Similarity Search Result

<< Target >>
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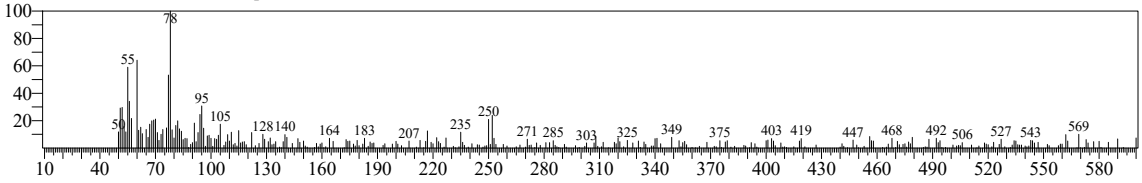
BG Mode:Calc. from Peak Group 1 - Event 1 Scan



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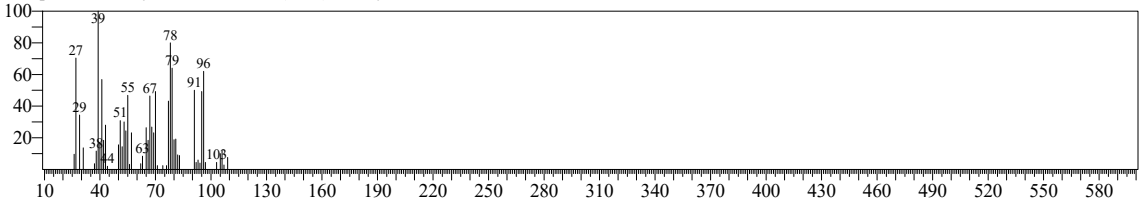
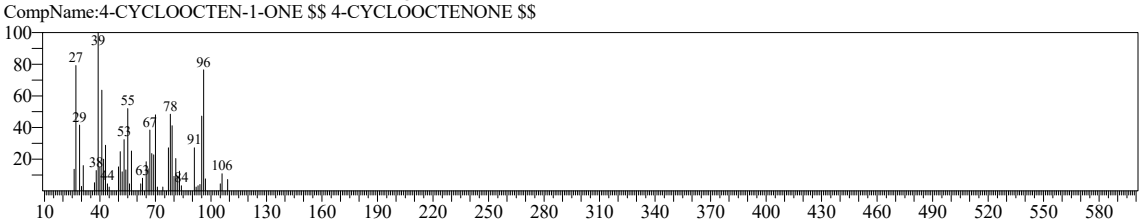
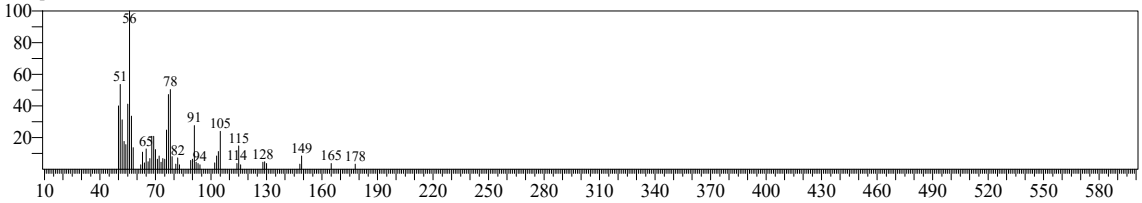


Hit#:2 Entry:17650 Library:WILEY7.LIB
SI:69 Formula:C8 H12 O CAS:6925-14-0 MolWeight:124 RetIndex:0
CompName:4-CYCLOOCTEN-1-ONE $$ 4-CYCLOOCTENONE $$



Hit#:3 Entry:187462 Library:WILEY7.LIB
SI:67 Formula:C20 H23 N CAS:0-00-0 MolWeight:277 RetIndex:0
CompName:DIMETHYLDIPHENYLTETHYLIDYLPYRROLIDINE $$



Hit#:4 Entry:192948 Library:WILEY7.LIB
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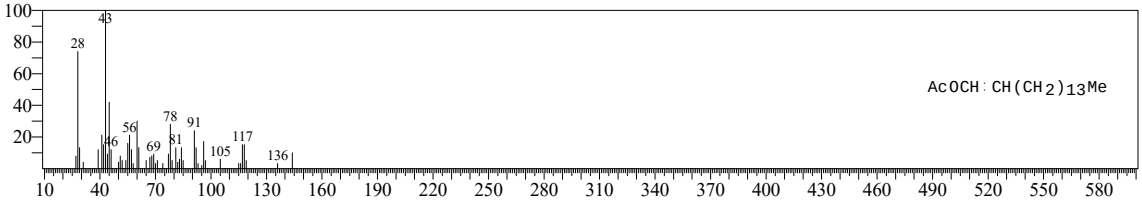

Hit#:5 Entry:304238 Library:WILEY7.LIB
SI:66 Formula:C21 H22 O11 CAS:8001-23-8 MolWeight:450 RetIndex:0
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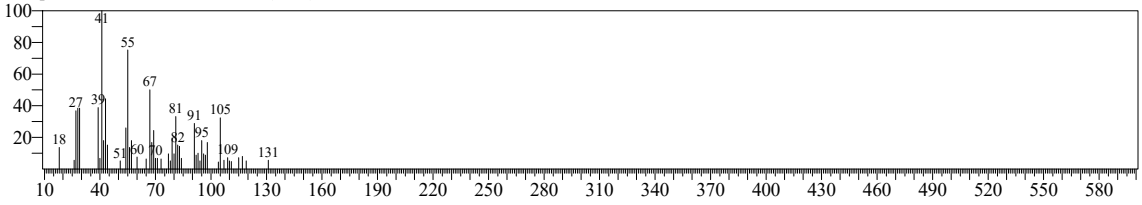

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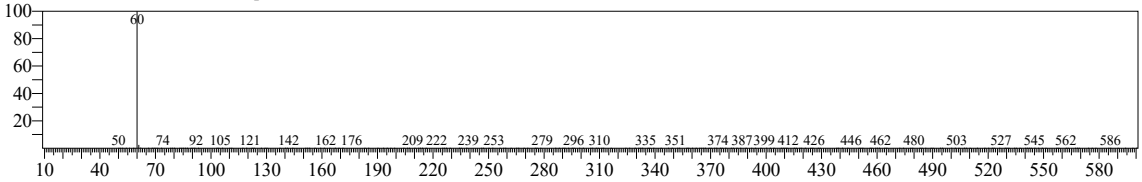

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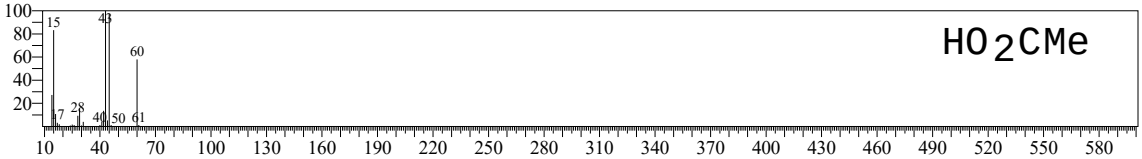
SI:98 Formula:C2 H4 O2 CAS:64-19-7 MolWeight:60 RetIndex:0
CompName:Acetic acid (CAS) Ethylic acid $$ Vinegar acid $$ Ethanoic acid $$ Glacial acetic acid $$ Methanecarboxylic acid $$ CH3COOH $$ co mponent of Aci-Jel $$ Acetasol $$ Acide acetique $$ Acido acetico $$ Azijnzuur $$ Essigsaeure $$ Octowy kwas $$ Acetic acid, glacial $$ Kyselin a octova $$ UN 2789 $$ UN 2790 $$ Ethanoic acid monomer $$ Aci-Jel $$



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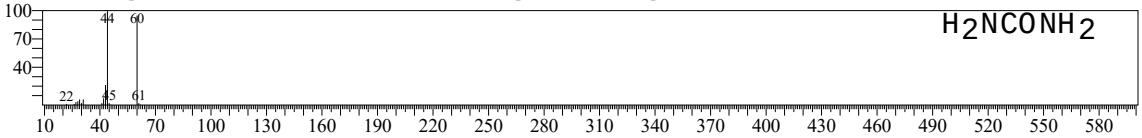
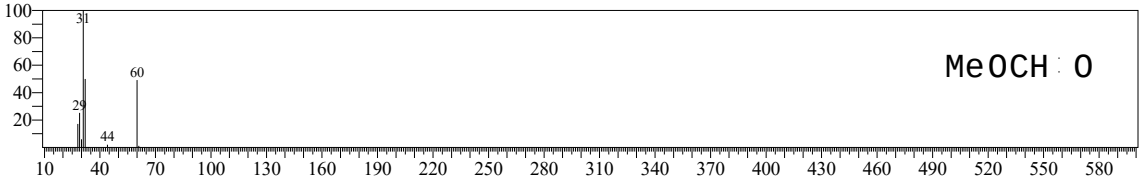
SI:98 Formula:C H4 N2 O CAS:57-13-6 MolWeight:60 RetIndex:0
CompName:Urea (CAS) Urevert $$ B-I-K $$ Ureophil $$ Ureaphil $$ Urea-13C $$ UR $$ Carbamide $$ Isourea $$ Carbamide resin $$ Carbonyl d iamide $$ Pseudourea $$ Carbamimidic acid $$ Varioform ii $$ Benural 70 $$ Urepearl $$ Carbonyldiamide $$ (NH2)2CO $$ Carbonyl Diamine $$ component of Artra Ashy Skin Cream $$ Alphadrate $$ Aquacare HP $$ Aquadrate $$ Calmurid $$ Carbaderm $$ Keratinamin $$ NCI-C02119 $$ Pastaron $$ Prespersion, 75 urea $$ Ultra Mide $$ Mocovina $$ Supercel 3000 $$ Aqua Care $$



Hit#:3 Entry:642 Library:WILEY7.LIB
SI:98 Formula:C2 H4 O2 CAS:107-31-3 MolWeight:60 RetIndex:0
CompName:Formic acid, methyl ester (CAS) Methyl formate $$ Methyl methanoate $$ Methyl ester of formic acid $$ HCOOCH3 $$ Formiate de m ethyle $$ Methylester kyseliny mravenci $$ Methylformiaat $$ Methylformiat $$ Metil $$ Mravencan methylnaty $$ UN 1243 $$



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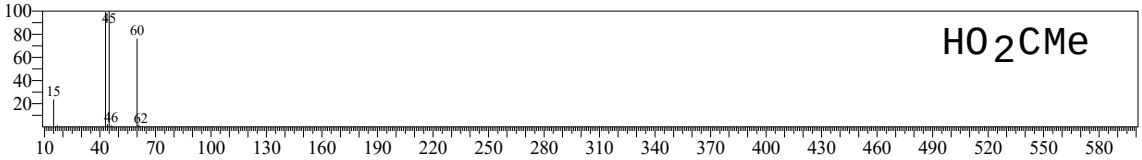
CompName:Acetic acid (CAS) Ethylic acid $$ Vinegar acid $$ Ethanoic acid $$ Glacial acetic acid $$ Methanecarboxylic acid $$ CH3COOH $$ co mponent of Aci-Jel $$ Acetasol $$ Acide acetique $$ Acido acetico $$ Azijnzuur $$ Essigsaeure $$ Octowy kwas $$ Acetic acid, glacial $$ Kyselin a octova $$ UN 2789 $$ UN 2790 $$ Ethanoic acid monomer $$ Aci-Jel $$



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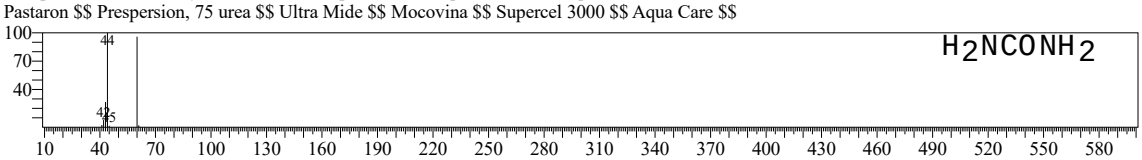
CompName:Urea (CAS) Urevert $$ B-I-K $$ Ureophil $$ Ureaphil $$ Urea-13C $$ UR $$ Carbamide $$ Isourea $$ Carbamide resin $$ Carbonyl d iamide $$ Pseudourea $$ Carbamimidic acid $$ Varioform ii $$ Benural 70 $$ Urepearl $$ Carbonyldiamide $$ (NH2)2CO $$ Carbonyl Diamine $$ component of Artra Ashy Skin Cream $$ Alphadrate $$ Aquacare HP $$ Aquadrate $$ Calmurid $$ Carbaderm $$ Keratinamin $$ NCI-C02119 $$ Pastaron $$ Prespersion, 75 urea $$ Ultra Mide $$ Mocovina $$ Supercel 3000 $$ Aqua Care $$



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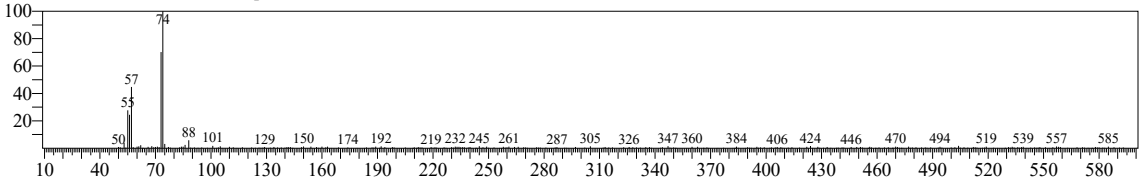
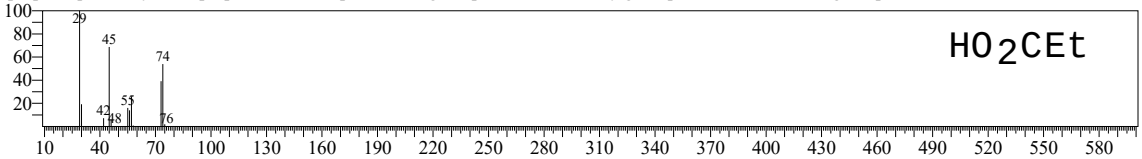
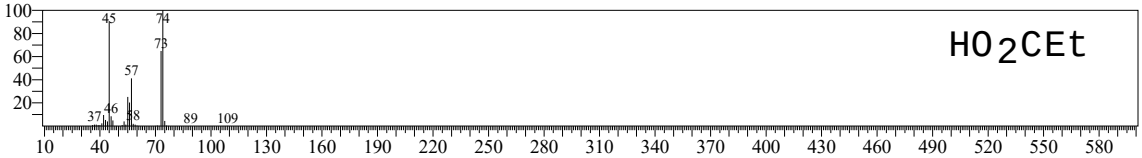


Hit#:1 Entry:1680 Library:WILEY7.LIB
SI:89 Formula:C3 H6 O2 CAS:79-09-4 MolWeight:74 RetIndex:0
CompName:Propanoic acid (CAS) Propionic acid $$ Prozoin $$ Luprosil $$ Luprisol $$ Carboxyethane $$ Metacetonic acid $$ Ethylformic acid $$ Pseudoacetic acid $$ Ethanecarboxylic acid $$ Methylacetic acid $$ MonoProp $$ Antischim B $$ Propkorn $$ Propcorn $$ C2H5COOH $$ Acide propionique $$ Kyselina propionova $$ Propionic acid grain preserver $$ Sentry grain preserver $$ Tenox P grain preservative $$ UN 1848 $$



Hit#:2 Entry:1677 Library:WILEY7.LIB
SI:88 Formula:C3 H6 O2 CAS:79-09-4 MolWeight:74 RetIndex:0
CompName:Propanoic acid (CAS) Propionic acid $$ Prozoin $$ Luprosil $$ Luprisol $$ Carboxyethane $$ Metacetonic acid $$ Ethylformic acid $$ Pseudoacetic acid $$ Ethanecarboxylic acid $$ Methylacetic acid $$ MonoProp $$ Antischim B $$ Propkorn $$ Propcorn $$ C2H5COOH $$ Acide propionique $$ Kyselina propionova $$ Propionic acid grain preserver $$ Sentry grain preserver $$ Tenox P grain preservative $$ UN 1848 $$



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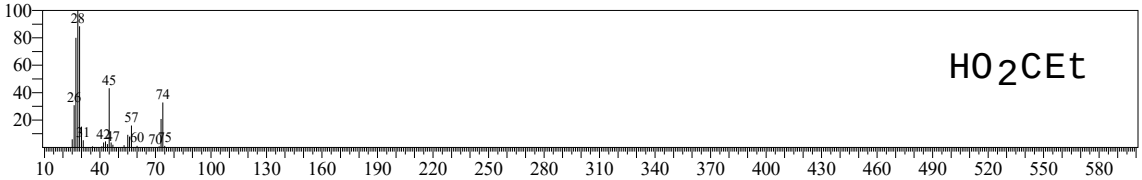

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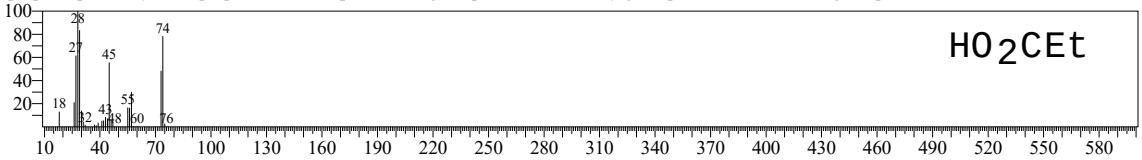

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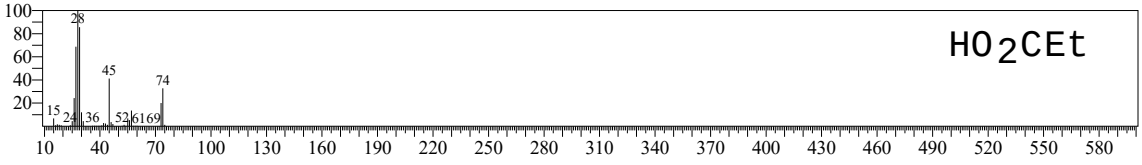

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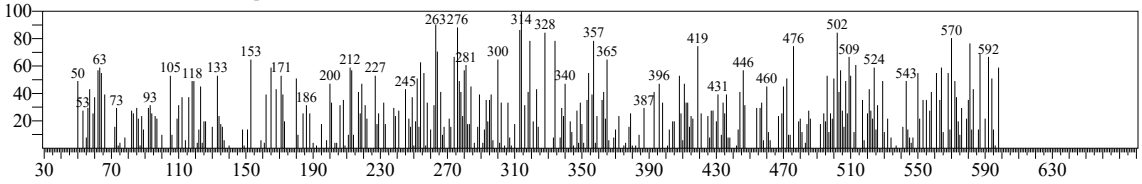
BG Mode:Calc. from Peak Group 1 - Event 1 Scan



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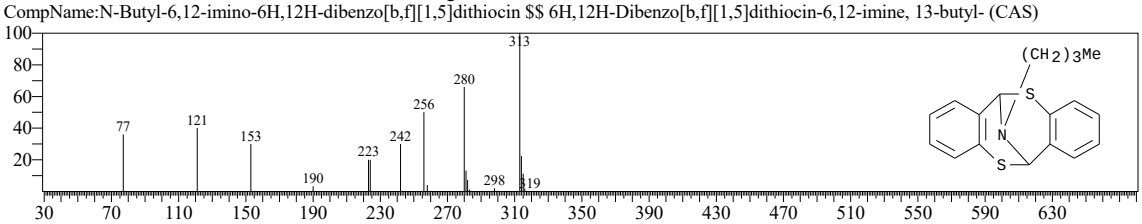
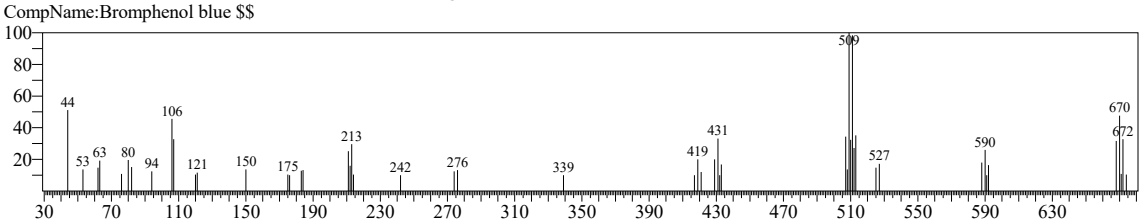
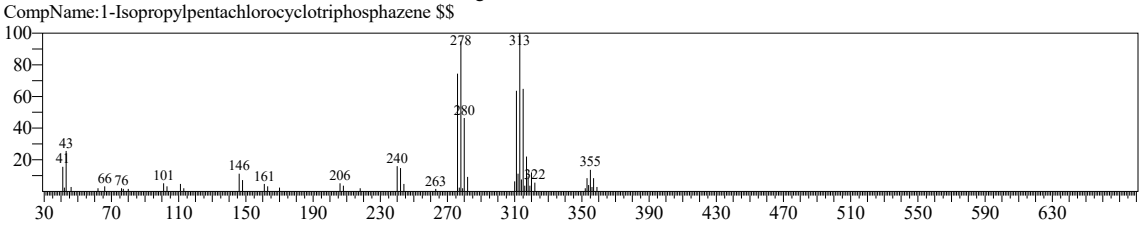


Hit#:2 Entry:332873 Library:WILEY7.LIB
SI:18 Formula:C19 H10 BR4 O5 S CAS:0-00-0 MolWeight:666 RetIndex:0
CompName:Bromphenol blue $$



Hit#:3 Entry:255957 Library:WILEY7.LIB
SI:18 Formula:C3 H7 CL5 N3 P3 CAS:75155-05-4 MolWeight:353 RetIndex:0
CompName:1-Isopropylpentachlorocyclotriphosphazene $$



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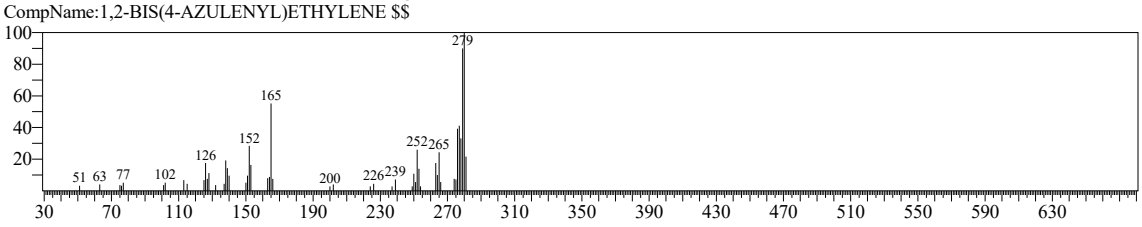
CompName:1,2-BIS(4-AZULENYL)ETHYLENE $$



Hit#:5 Entry:294029 Library:WILEY7.LIB
SI:17 Formula:C24 H24 BR N O CAS:0-00-0 MolWeight:421 RetIndex:0
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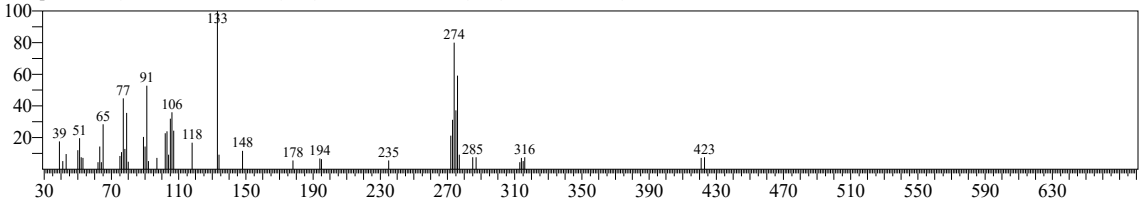

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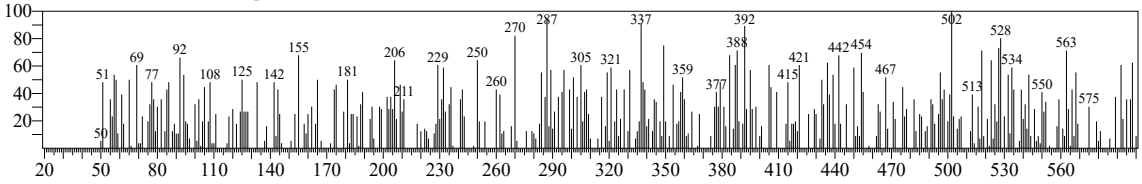
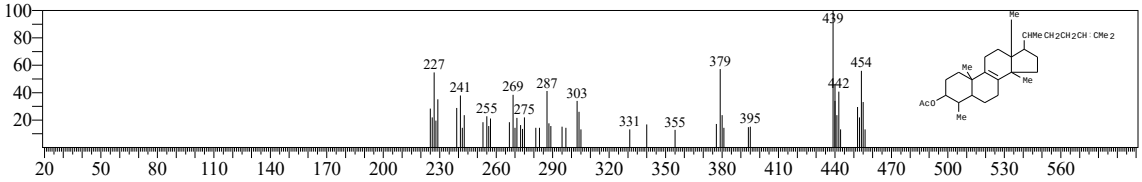
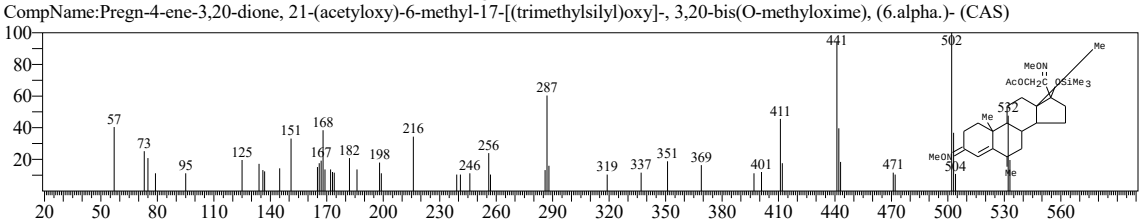


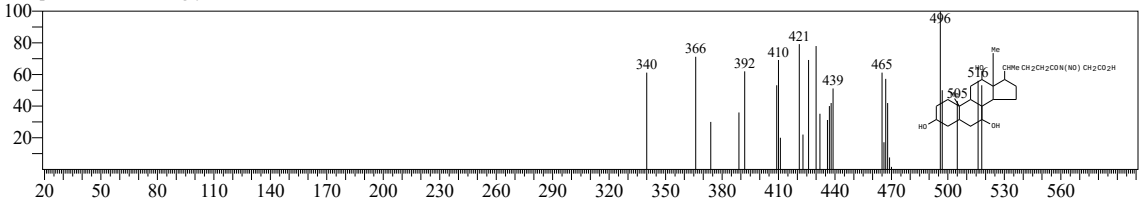
Hit#:1 Entry:305659 Library:WILEY7.LIB
SI:18 Formula:C31 H50 O2 CAS:55331-92-5 MolWeight:454 RetIndex:0
CompName:Cholesta-8,24-dien-3-ol, 4,14-dimethyl-, acetate, (3.beta.,4.alpha.)- (CAS) 3.BETA.-ACETOXY-4.ALPHA.,14.ALPHA.-DIMETHYLC HOLESTA-8,24-DIENE $$



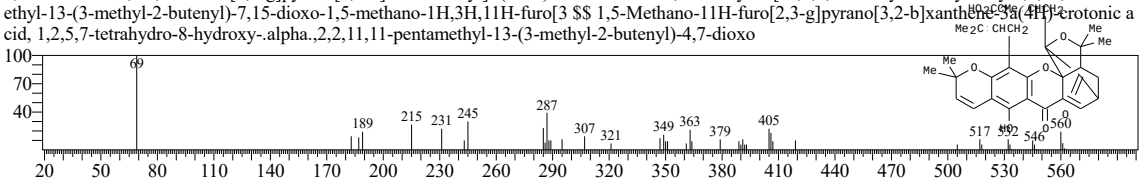
Hit#:2 Entry:321805 Library:WILEY7.LIB
SI:18 Formula:C29 H48 N2 O5 SI CAS:74299-02-8 MolWeight:532 RetIndex:0
CompName:Pregn-4-ene-3,20-dione, 21-(acetyloxy)-6-methyl-17-[(trimethylsilyl)oxy]-, 3,20-bis(O-methyloxime), (6.alpha.)- (CAS)



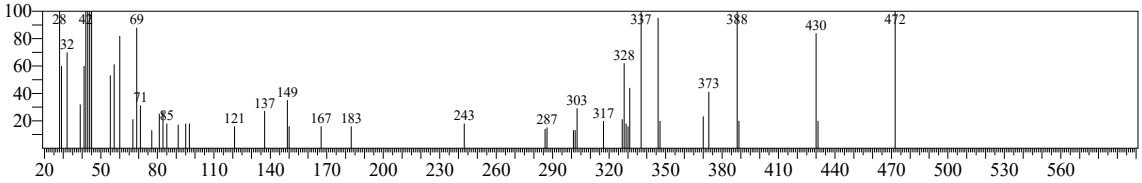
Hit#:3 Entry:315556 Library:WILEY7.LIB
SI:18 Formula:C26 H42 N2 O7 CAS:76757-85-2 MolWeight:494 RetIndex:0
CompName:N-Nitroso glycocholic acid $$



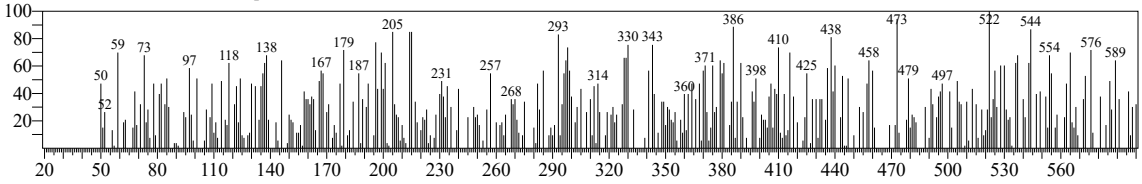
Hit#:4 Entry:325277 Library:WILEY7.LIB
SI:17 Formula:C33 H36 O8 CAS:5304-71-2 MolWeight:560 RetIndex:0
CompName:Morellic acid $$ 2-Butenoic acid, 2-methyl-4-[3a,4,5,7-tetrahydro-8-hydroxy-3,3,11,11-tetramethyl-13-(3-methyl-2-butenyl)-7,15-dioxo-1,5-methano-1H,3H,11H-furo[3,4-g]pyrano[3,2-b]xanthen-1-yl]- (CAS) 2-Butenoic acid, 2-methyl-4-[3a,4,5,7-tetrahydro-8-hydroxy-3,3,11,11-tetramethyl-13-(3-methyl-2-butenyl)-7,15-dioxo-1,5-methano-1H,3H,11H-furo[3 $$ 1,5-Methano-11H-furo[2,3-g]pyrano[3,2-b]xanthene-3a(4H)-crotonic acid, 1,2,5,7-tetrahydro-8-hydroxy-.alpha.,2,2,11,11-pentamethyl-13-(3-methyl-2-butenyl)-4,7-dioxo



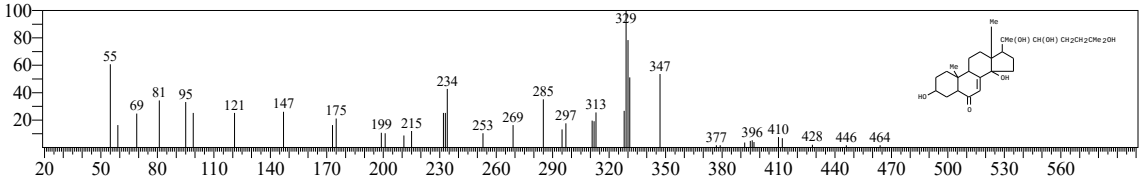
Hit#:5 Entry:334244 Library:WILEY7.LIB
SI:17 Formula:C33 H32 O17 CAS:0-00-0 MolWeight:700 RetIndex:0
CompName:2-(2-ACETOXY-1-(3',4',5'-TRIACETOXY-2-ACETOXYCARBONYLPYRAN-6-YLOXY)PHEN-4-YL-5,7-DIHYDROXY-3,6-DIME THYLBENZO[B]PYRAN OR SPINATINPENTAACETATE $$



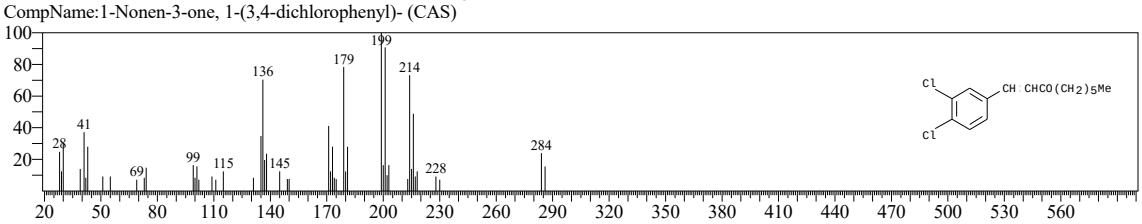
<< Target >>
Line#:6 R.Time:31.317(Scan#:3759) MassPeaks:359
RawMode:Averaged 31.308-31.325(3758-3760) BasePeak:522.00(53)
BG Mode:Calc. from Peak Group 1 - Event 1 Scan



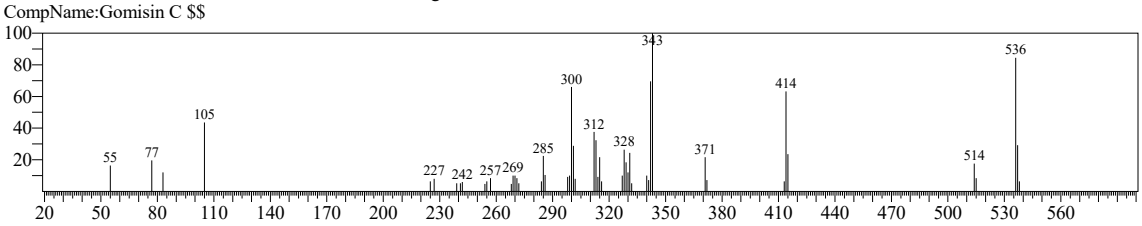
Hit#:1 Entry:308539 Library:WILEY7.LIB
SI:19 Formula:C27 H44 O6 CAS:17942-08-4 MolWeight:464 RetIndex:0
CompName:Deoxycrustecdysone $$ Cholest-7-en-6-one, 3,14,20,22,25-pentahydroxy-, (3.beta.,5.beta.,22R)- (CAS) 2-Deoxycrustecdysone $$ Crustecdysone, deoxy- $$ 2-Deoxy-.beta.-ecdysone $$ 5.beta.-Cholest-7-en-6-one, 3.beta.,14,20,22,25-pentahydroxy-, (22R)- $$



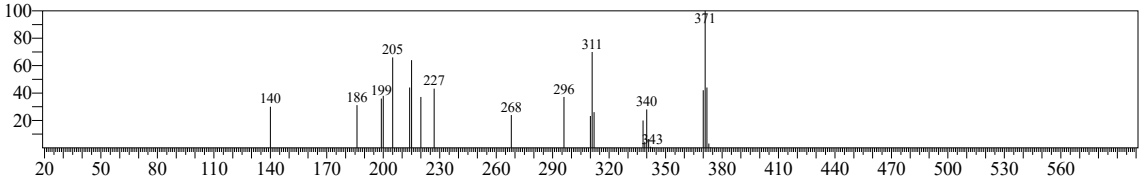
Hit#:2 Entry:194611 Library:WILEY7.LIB
SI:19 Formula:C15 H18 CL2 O CAS:36383-95-6 MolWeight:284 RetIndex:0
CompName:1-Nonen-3-one, 1-(3,4-dichlorophenyl)- (CAS)



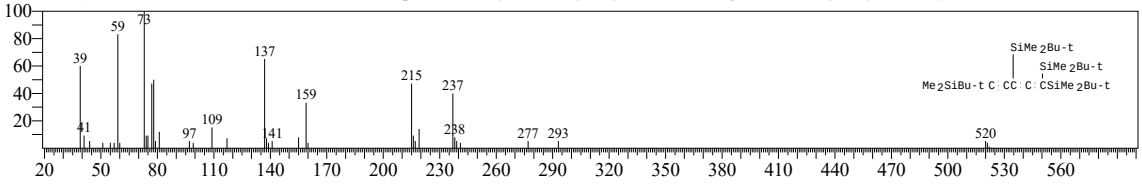
Hit#:3 Entry:322453 Library:WILEY7.LIB
SI:19 Formula:C30 H32 O9 CAS:58546-56-8 MolWeight:536 RetIndex:0
CompName:Gomisin C $$



Hit#:4 Entry:268312 Library:WILEY7.LIB
SI:18 Formula:C21 H29 N3 O3 CAS:0-00-0 MolWeight:371 RetIndex:0
CompName:(+-)-13c.beta.-(2-Amino-3-hydroxypropyl)-12-methoxy-1,2,3a.beta.,4,5,7,8,13-13b.beta.,13c-decahydrofuro[3,2-a]]indolo[3,2-h]quinoline $$



Hit#:5 Entry:320044 Library:WILEY7.LIB
SI:18 Formula:C29 H60 SI4 CAS:41898-92-4 MolWeight:520 RetIndex:0
CompName:Silane, 3,4-pentadien-1-yne-1,3-diyl-5-ylidenetetrakis[(1,1-dimethylethyl)dimethyl- (CAS) 1,1,3,5-TETRAKIS(TERT-BUTYLDIMETHYLSILYL)-1,2-PENTADIEN-4-YNE $$ Silane, 3,4-pentadien-1-yne-1,3-diyl-5-ylidenetetrakis@(1,1-dimethylethyl)dimethyl- $$



UNIVERSITAS ISLAM INDONESIA

Jl. Kaliurang Km 14.5, Sleman Yogyakarta
LABORATORIUM TERPADU
Quantachrome TouchWin v1.22

Report date: Fri Oct 6 2023 **Operator:** Yusuf
Filename: 12570923_1.qcuPhysIso

Analysis Information

Sample

ID	1257_1	**Weight**	0.0851 g		
Description	CACOI				

Analysis

Data ID	{984ff6bd-2668-48dd-86fc-5660f353aa06}				
Operator	Yusuf	**Date**	2023.10.05	**Duration**	87.8 min
Instrument	St 3 on NOVA touch 4LX [s/n:170170510001]			**Firmware**	1.07
Comments	description of sample				
Ambient Temp.	19.54 °C	**Void Volume Mode**	NOVA mode	**Cell ID**	23
Cell Type	9mm with rod	**Thermal Delay**	300 sec	**Po Mode**	Continuous

Adsorbate

Name	Nitrogen	**Molecular Weight**	28.013 g/mol	**Cross Section Area**	16.2 Å²/mol
Non-ideality	6.580000e-05 1/torr	**Bath Temperature**	77.35 K		

Degas information

Time	3.0 hours	**Temp**	300.000000 °C		

Data Reduction Parameters

Thermal Transpiration	no				
Temp. Comp	no				
Thickness Method	deBoer				
P-tags below 0.35	ignored			**Moving Pt. Average**	off

Adsorbate Model

Name	Nitrogen	**Molecular Weight**	28.0134 g	**Cross Section Area**	16.2 Å²/molec
Bath Temperature	77.35 K				

Area-Volume Summary results

Surface Area Results

Multipoint BET	12.296 m²/g
BJH adsorption	3.07529 m²/g
BJH desorption	0.973583 m²/g

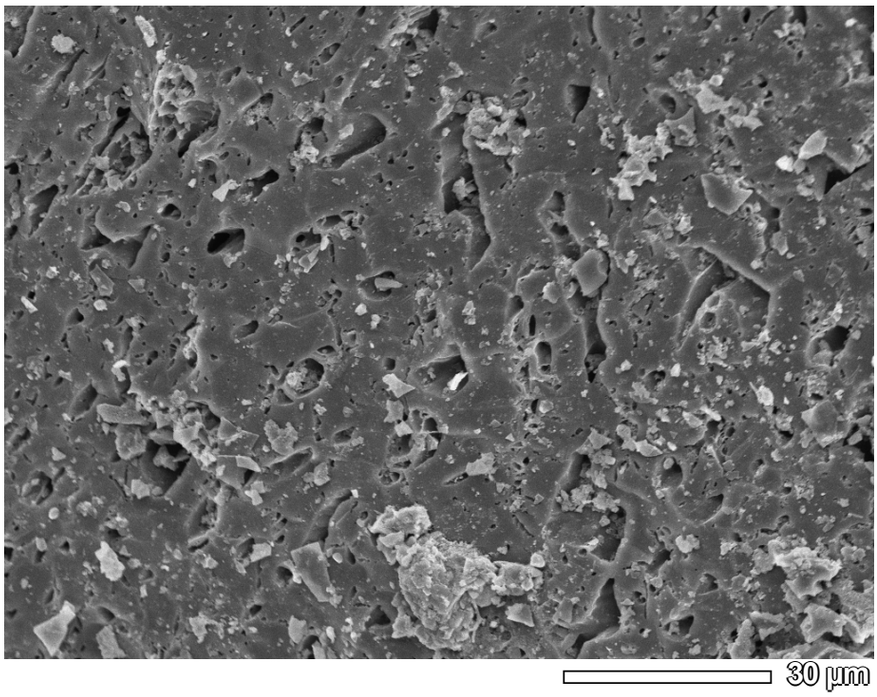
Pore Volume Results

BJH adsorption cumulative micropore volume	0.00745314 cc/g
BJH desorption cumulative micropore volume	0.00239761 cc/g
Total Pore Volume	0.0116114 cc/g

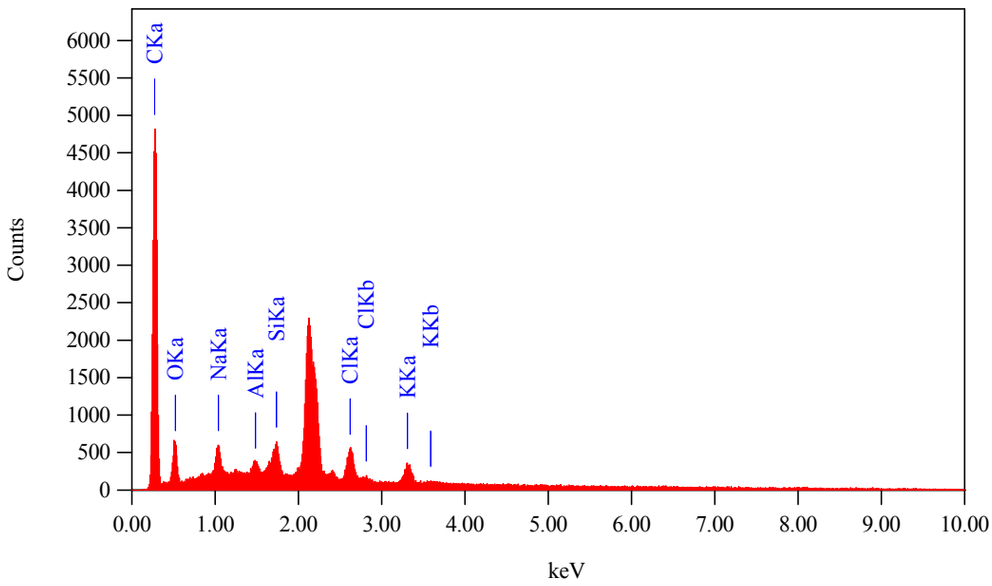
Pore Size Results

BJH adsorption pore radius	2.04523 nm
BJH desorption pore radius	2.0498 nm
Average Pore Size	1.88865 nm

Coconut Activated Carbon



Title	: IMG1
Instrument	: 6510(LA)
Volt	: 10.00 kV
Mag.	: x 1,000
Date	: 2023/10/04
Pixel	: 1024 x 768



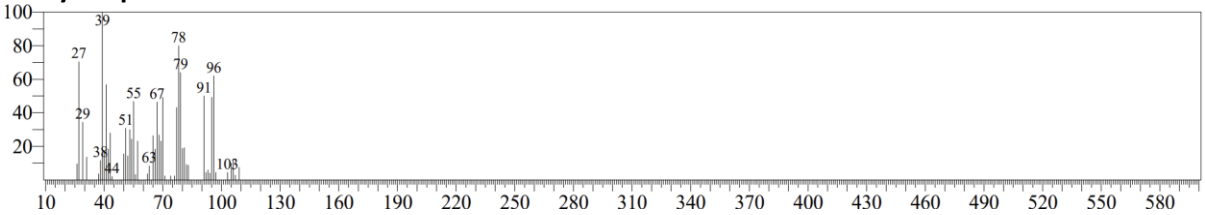
Acquisition Parameter
Instrument : 6510(LA)
Acc. Voltage : 10.0 kV
Probe Current: 1.00000 nA
PHA mode : T3
Real Time : 51.40 sec
Live Time : 50.00 sec
Dead Time : 2 %
Counting Rate: 3068 cps
Energy Range : 0 - 20 keV

ZAF Method Standardless Quantitative Analysis
Fitting Coefficient : 0.2643

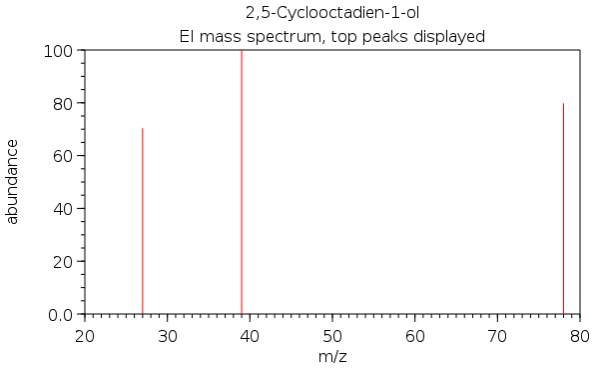
Element	(keV)	Mass%	Sigma	Atom%	Compound	Mass%	Cation	K
C K	0.277	69.58	0.04	81.12				59.5906
O K	0.525	12.86	0.09	11.26				11.3069
Na K	1.041	2.30	0.04	1.40				3.4550
Al K	1.486	1.25	0.05	0.65				1.9522
Si K	1.739	2.41	0.06	1.20				4.0012
Cl K	2.621	5.73	0.07	2.26				9.8754
K K	3.312	5.88	0.10	2.11				9.8187
Total		100.00		100.00				

a. 2,5-Cyclooctadien-1-ol (CAS: 10054-74-7)

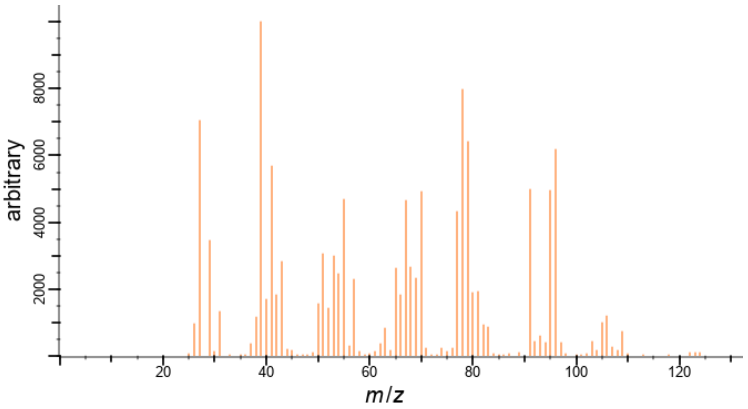
Analysis spectra



Library spectra



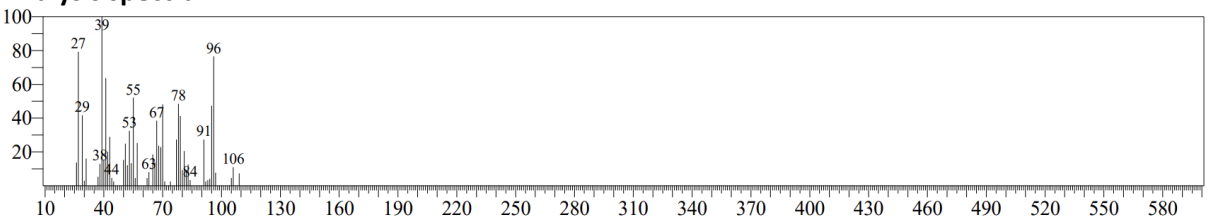
https://pubchem.ncbi.nlm.nih.gov/compound/2_5-Cyclooctadien-1-ol



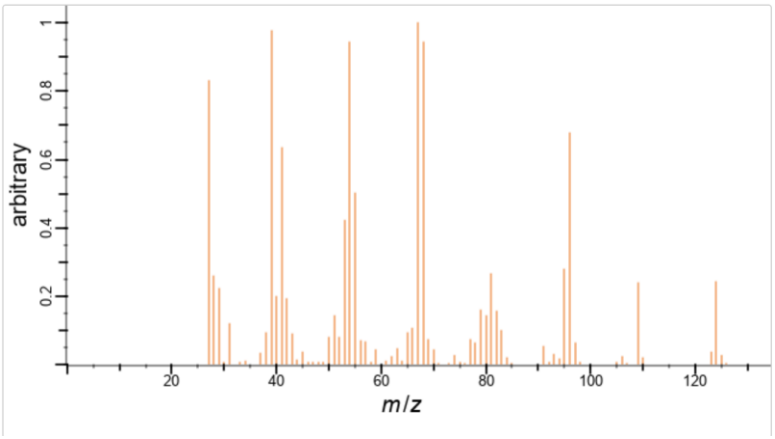
https://spectrabase.com/spectrum/L3P3fztJzgy

b. 4-Cycloocten-1-one

Analysis spectra



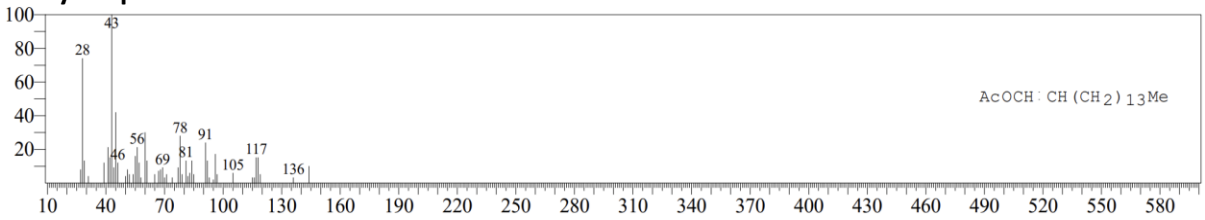
Library spectra



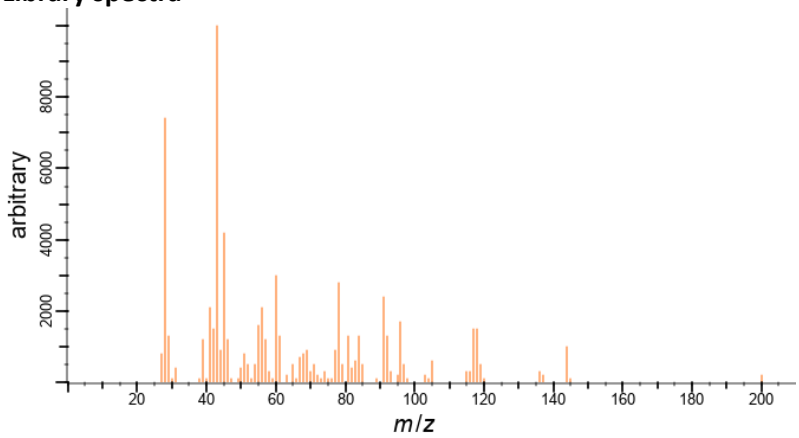
https://spectrabase.com/spectrum/1YMzftGcWxC\

c. 1-Hexadecene-1-ol acetate

Analysis spectra



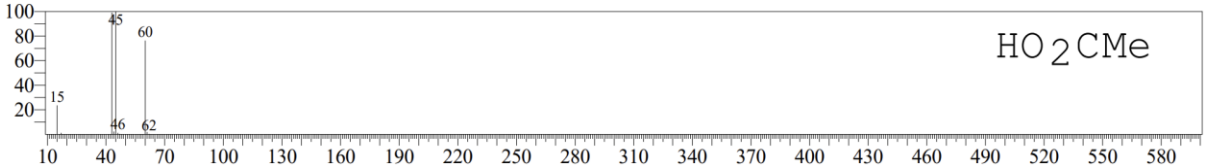
Library spectra



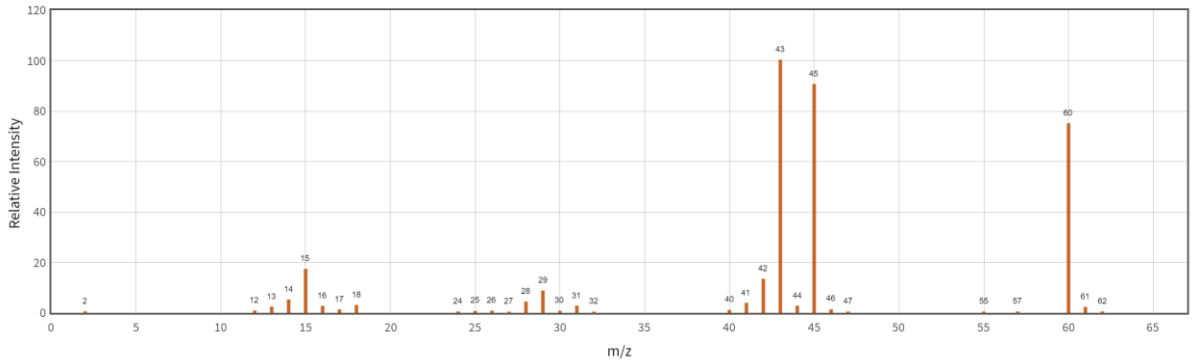
https://spectrabase.com/spectrum/6AnlWQa0zGO

d. Acetic acid

Analysis spectra



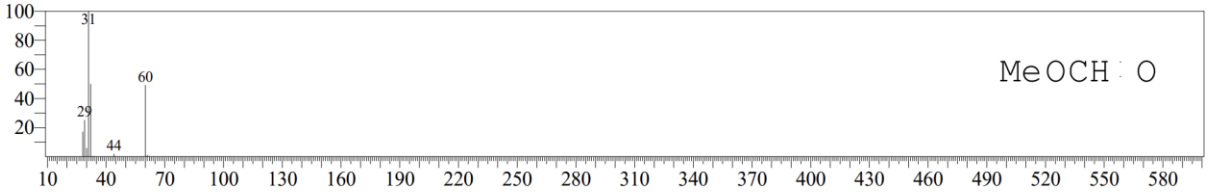
Library spectra



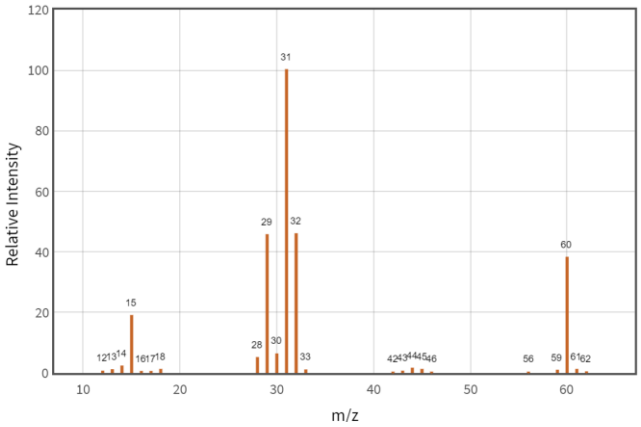
https://webbook.nist.gov/cgi/cbook.cgi?ID=C64197&Mask=200

e. Methyl formate

Analysis spectra



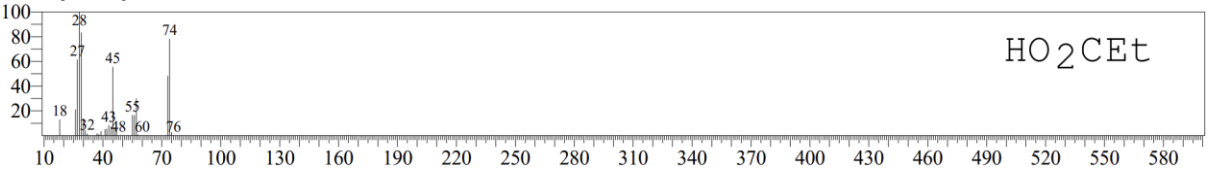
Library spectra



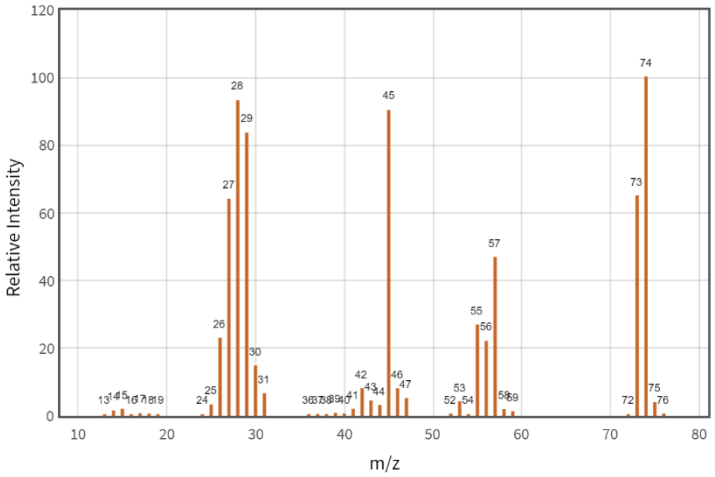
https://webbook.nist.gov/cgi/cbook.cgi?ID=C107313&Mask=200

f. Propanoic acid

Analysis spectra



Library spectra



https://webbook.nist.gov/cgi/cbook.cgi?ID=C79094&Mask=200

g. N-Butyl-6,12-imino-6H, 12H-dibenzo[b,f][1,5] dithiocin

Source

Natividad, R. (1997). A Novel Synthesis of 1,5-Dithiocins. [Master's thesis]. University of Toronto

h. Cholesta-8,24-dien-3-ol, 4,14-dimethyl-acetate (3 beta, 4 alpha)

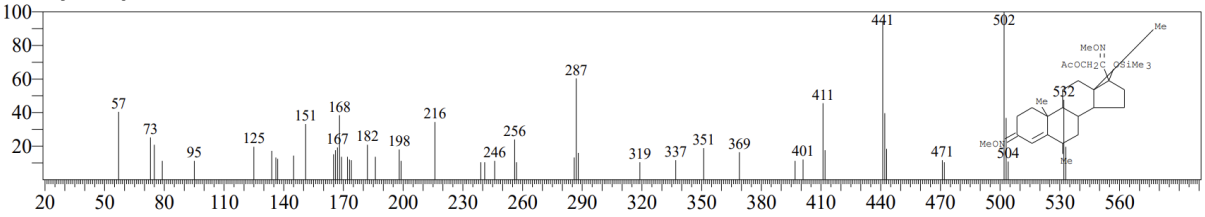
Other name: 31-norlanosterol-acetate

Library

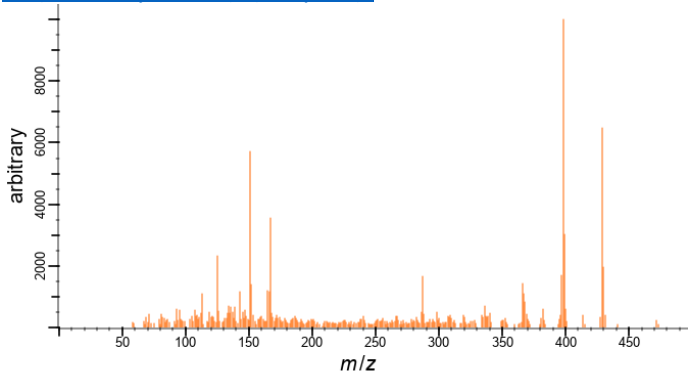
https://pubchem.ncbi.nlm.nih.gov/compound/31-Norlanosterol-acetate
https://www.chemeo.com/cid/49-962-0/31-Norlanosterol-acetate
https://febs.onlinelibrary.wiley.com/doi/pdf/10.1111/j.1432-1033.1987.tb11075.x

i. Pregn-4-ene-3, 20-dione, 21-(acetyloxy)-6-methyl-17-[(trimethylsilyl)oxy]-, 3,20-bis(O-methyloxime), (6 alpha)

Analysis spectra

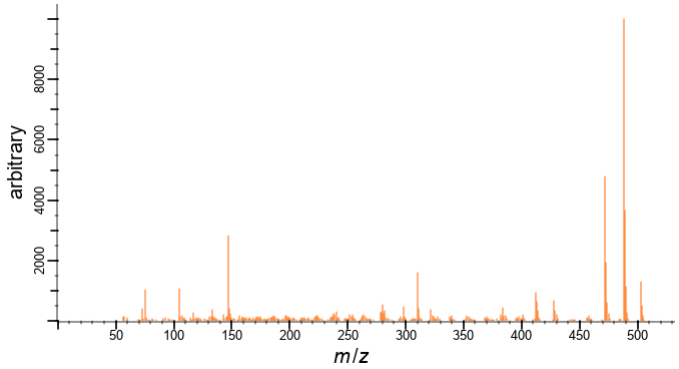


Library spectra: Pregn-4-ene-3,20-dione, 17-(acetyloxy)-6-methyl-21-[(trimethylsilyl)oxy]-, 3,20-bis(O-methyloxime), (6.alpha.)-



https://spectrabase.com/spectrum/8vaaubOHvBe

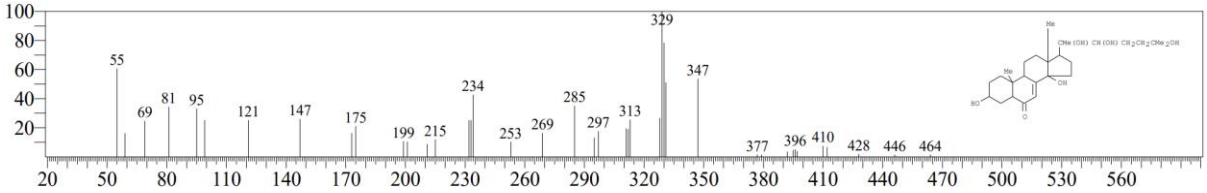
Library spectra: Pregn-4-ene-3,20-dione, 17-(acetyloxy)-6-methyl-6-[(trimethylsilyl)oxy]-, 3-(O-methyloxime), (6.beta.)-



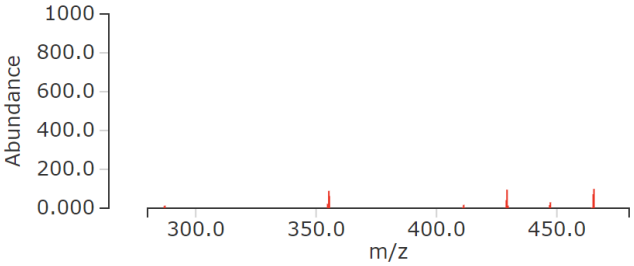
https://spectrabase.com/spectrum/B1e4wQNNZ68

j. Deoxycrustecdysone

Analysis spectra



Library spectra



https://massbank.eu/MassBank/RecordDisplay?id=MSBNK-RIKEN_NPDepo-NGA00021&dsn=RIKEN_NPDepo

Lab Kimia Organik FMIPA - UGM

GCMS-QP2010S SHIMADZU
Kolom : DB-5MS
Panjang : 30 meter
ID : 0,25 mm
Film : 0,25 um
Gas pembawa : Helium
Pengionan : EI 70 Ev

Method

[Comment]

====== Analytical Line 1 ======

[GC-2010]
Column Oven Temp. :100.0 ℃
Injection Temp. :300.00 ℃
Injection Mode :Splitless
Sampling Time :1.00 min
Flow Control Mode :Pressure
Pressure :13.7 kPa
Total Flow :24.8 mL/min
Column Flow :0.44 mL/min
Linear Velocity :24.5 cm/sec
Purge Flow :3.0 mL/min
Split Ratio :49.0
High Pressure Injection :OFF
Carrier Gas Saver :OFF
Oven Temp. Program

Rate	Temperature(℃)	Hold Time(min)
-	100.0	5.00
5.00	300.0	45.00

< Ready Check Heat Unit >
Column Oven : Yes
SPL1 : Yes
MS : Yes
< Ready Check Detector(FTD) >
< Ready Check Baseline Drift >
< Ready Check Injection Flow >
SPL1 Carrier : Yes
SPL1 Purge : Yes
< Ready Check APC Flow >
< Ready Check Detector APC Flow >
External Wait :No
Equilibrium Time :3.0 min

[GC Program]

[GCMS-QP2010]
IonSourceTemp :250.00 ℃
Interface Temp. :305.00 ℃
Solvent Cut Time :5.00 min
Detector Gain Mode :Relative
Detector Gain :+0.00 kV
Threshold :0

[MS Table]
--Group 1 - Event 1--
Start Time :5.20min
End Time :90.00min
ACQ Mode :Scan
Event Time :0.50sec
Scan Speed :1250
Start m/z :28.00
End m/z :600.00

Sample Inlet Unit :GC

[MS Program]
Use MS Program :OFF