

51.104	217	6993242	175243	29dbR
51.969	217	4292941	102319	29daR
52.553	217	2491356	68309	28aaS
52.950	217	2679106	111131	29daS+28bbR
53.317	217	5356797	129569	28bbS
53.820	217	3667499	70761	28aaR
54.538	217	2692086	118452	
54.818	217	4810618	212485	
55.186	217	2618018	57882	29aaS
55.817	217	2658543	71716	29bbR
56.330	217	1739048	54242	29bbS
57.148	217	656003	28964	29aaR
57.440	217	2782591	95417	30aaS
49.703	218	892670	41395	27bbR
49.837	218	769676	31624	27bbS
52.950	218	1219481	50246	28bbR
53.312	218	2810535	86043	28bbS
55.811	218	1684300	63600	29bbR
56.091	218	1476996	48483	29bbS
58.415	218	390021	15459	30bbR
58.695	218	222808	11408	30bbS
51.245	177	8310139	298656	25nor28ab
55.887	177	6819074	289115	25nor30ab

E3687 SAT

7616/11-U-01(C1) 13.15m Sst.

RT	QM	AREA	HEIGHT	ID
30.701	191	5825800	365992	23/3
32.870	191	3857329	226857	24/3
37.121	191	3285392	103000	25/3
39.099	191	6302407	369864	24/4
40.360	191	1115362	66135	26/3
40.639	191	1158052	67123	26/3
50.464	191	3112608	156283	27Ts
51.740	191	49365288	2871307	27Tm
52.846	191	8937819	417089	4
55.035	191	211562576	8467576	28ab
56.499	191	61688444	3439641	29ab
57.419	191	9105586	385911	30d
57.981	191	33324812	1578385	29ba
59.255	191	108948832	5795200	30ab
59.620	191	19286896	1080808	
60.405	191	47245448	2466444	30ba
62.480	191	72322816	3905767	31abS
62.846	191	54455556	2964852	31abR
63.830	191	39059904	1861504	
65.035	191	25721520	1395140	32abS
65.559	191	22712848	1163509	32abR
66.394	191	5755071	285249	
66.632	191	9071271	474262	
67.984	191	14230490	576541	33abS
68.702	191	12064743	503346	33abR
69.426	191	3999315	121619	
69.835	191	4052447	191908	
71.040	191	8745787	360286	34abS
71.911	191	6967622	308638	34abR
74.035	191	2813464	121240	35abS
75.077	191	3504345	116204	35abR
27.162	217	1982838	104306	21a
31.269	217	1381616	59698	22a
43.812	217	4003022	228494	27dbS
45.092	217	2212468	122567	27dbR
45.983	217	1334021	64646	27daR
46.633	217	1223634	68747	27daS
46.824	217	1773153	93296	28dbS
47.076	217	1963731	93955	28dbS
48.406	217	2593093	77683	28dbR
49.118	217	3842337	113443	27aaS+28daR
49.457	217	947587	51848	
49.661	217	7572412	300879	29dbS+27bbR
49.963	217	825196	39144	28daS+27bbS
50.458	217	2603260	121127	27aaR
51.158	217	5721275	203909	29dbR
51.727	217	3173177	152925	29daR
52.505	217	2411008	49414	28aaS
52.882	217	4911542	236295	29daS+28bbR
53.217	217	1382264	61901	28bbS
54.069	217	2448086	76045	28aaR
55.058	217	19971190	648997	29aaS
55.763	217	4350478	127884	29bbR

56.017	217	1972832	107860	29bbS
57.085	217	7758972	335337	29aaR
57.981	217	648224	35465	30bbR
58.451	217	618353	21820	30bbS
59.620	217	1217510	57178	30aaR
49.637	218	2216497	90496	27bbR
49.771	218	1051332	65864	27bbS
52.882	218	2615308	129192	28bbR
53.217	218	1633192	77942	28bbS
55.763	218	3664172	177467	29bbR
56.030	218	3577317	151886	29bbS
57.981	218	340982	17918	30bbR
58.402	218	256521	9142	30bbS
51.361	177	61439512	2299918	25nor28ab
54.348	177	3982713	103239	25nor30ab

E3704 SAT

7616/11-U-01(C1) 36.21m Sltst.

RT	QM	AREA	HEIGHT	ID
30.797	191	4548264	232428	23/3
32.963	191	3057656	144556	24/3
37.219	191	4342218	81528	25/3
39.222	191	23980076	1232260	24/4
40.460	191	1394678	75797	26/3
40.764	191	2371153	104219	26/3
50.626	191	8213553	328509	27Ts
51.998	191	390442752	14628913	27Tm
53.055	191	58375288	2390755	4
55.285	191	365987072	10701567	28ab
56.073	191	21920900	933180	25nor30ab
56.817	191	507001856	17347016	29ab
57.671	191	34901664	1322724	29Ts
58.295	191	238719104	9114696	30d
59.588	191	685362560	24563432	29ba
59.909	191	83384592	4329192	30ab
60.331	191	21609476	1044968	
60.683	191	326804160	15467118	30ba
62.781	191	558209280	19799308	31abS
63.147	191	416585120	17971554	31abR
63.556	191	38767484	2249849	
64.111	191	280532576	10644277	
65.286	191	195678352	8739153	32abS
65.792	191	155341968	7818290	32abR
66.578	191	46102640	2084177	
66.844	191	74965944	3728721	
68.162	191	79199344	3812306	33abS
68.872	191	70514640	3510833	33abR
70.317	191	127275360	6212945	
71.184	191	54901796	2620748	34abS
72.058	191	49582732	2362183	34abR
72.692	191	105141920	4453648	
74.159	191	36337320	819735	35abS
74.523	191	61133520	2969598	
75.209	191	19666790	685210	35abR
27.258	217	3790528	181337	21a
31.351	217	1977250	76520	22a
43.934	217	9646120	440204	27dbS
45.225	217	4577159	217663	27dbR
46.130	217	2682587	123765	27daR
46.778	217	2425431	124696	27daS
46.953	217	3455326	181074	28dbS
47.198	217	3392087	162434	28dbS
48.547	217	7422167	149588	28dbR
49.289	217	9880115	296197	27aaS+28daR
49.832	217	18526084	645935	29dbS+27bbR
50.141	217	2344141	76177	28daS+27bbS
50.643	217	8335193	388777	27aaR
51.373	217	12710370	477560	29dbR
51.951	217	19390248	543641	29daR
52.687	217	8114205	175101	28aaS
53.066	217	13624301	578987	29daS+28bbR
53.411	217	3695733	148755	28bbS

54.275	217	7756860	249454	28aaR
55.332	217	53181052	1411740	29aaS
56.108	217	17748668	387071	29bbR
56.278	217	6592622	345092	29bbS
57.312	217	36409688	1410538	29aaR
57.832	217	3912764	177806	30aaS
58.289	217	6805707	257641	30bbR
58.742	217	1858611	59934	30bbS
59.885	217	3603552	164258	30aaR
49.832	218	5464446	199061	27bbR
49.989	218	2066896	115364	27bbS
53.066	218	7697865	320679	28bbR
53.417	218	4382741	189421	28bbS
56.009	218	13047681	433014	29bbR
56.289	218	11302549	453869	29bbS
58.295	218	3840363	142688	30bbR
58.649	218	726781	18516	30bbS
51.560	177	67829896	1704852	25nor28ab
56.079	177	11119406	382310	25nor30ab

E3725 SAT

7616/11-U-01(C1) 56.25m Sst.

RT	QM	AREA	HEIGHT	ID
30.826	191	14784421	837602	23/3
32.969	191	11017798	615607	24/3
37.220	191	7245550	222286	2573
39.188	191	13173664	716112	24/4
40.443	191	3491428	212925	26/3
40.723	191	3612091	196056	26/3
50.574	191	28612350	1336453	27Ts
51.817	191	29969510	1649804	27Tm
52.057	191	9044357	479014	
52.968	191	5396660	202710	4
54.597	191	8818237	397831	
55.064	191	32966226	1264942	28ab
56.588	191	66702168	2968601	29ab
56.757	191	30832656	1432059	29Ts
57.516	191	26625286	1231773	30d
58.059	191	17428900	583639	29ba
59.355	191	120522304	5804764	30ab
59.712	191	8718593	400973	
59.928	191	6363918	353174	
60.488	191	23982056	1148278	30ba
62.549	191	51174748	2661574	31abS
62.917	191	35901704	1856173	31abR
63.886	191	14912106	606006	
65.124	191	29744506	1529312	32abS
65.644	191	20515450	1001298	32abR
68.067	191	17406820	771834	33abS
68.779	191	12848731	559293	33abR
71.109	191	11552716	462651	34abS
72.003	191	8039456	326753	34abR
74.099	191	6335941	209761	35abS
75.167	191	5084515	160829	35abR
27.288	217	15838548	742846	21a
31.398	217	11513665	397650	22a
43.900	217	22265192	1105490	27dbS
45.178	217	15001867	725681	27dbR
46.060	217	6473554	306208	27daR
46.732	217	6713846	333160	27daS
46.924	217	6467683	306549	28dbS
47.158	217	9017779	359010	28dbS
48.483	217	14248431	311318	28dbR
49.190	217	12827458	401394	27aaS+28daR
49.558	217	7288321	361932	
49.744	217	14858445	646559	29dbS+27bbR
49.890	217	6347914	337397	28daS+27bbS
50.054	217	2638390	169822	
50.539	217	8228139	364371	27aaR
51.210	217	16142874	516521	29dbR
51.806	217	9552461	212703	29daR
52.588	217	7358435	133675	28aaS
52.979	217	14590015	665305	29daS+28bbR
53.312	217	8790812	345697	28bbS
53.715	217	12219734	251361	
54.141	217	5123734	170468	28aaR

54.854	217	4286193	196899	
55.262	217	11437360	405788	29aaS
55.858	217	13774421	498087	29bbR
56.121	217	10146653	456290	29bbS
56.763	217	2382055	102483	
57.166	217	10198550	406565	29aaR
57.516	217	3385973	106956	30aaS
58.252	217	2698645	110758	30bbR
58.503	217	3509050	131420	30bbS
59.700	217	2306131	101301	30aaR
49.558	218	10314497	531858	27bbR
49.890	218	9951214	451847	27bbS
52.979	218	9755259	464796	28bbR
53.306	218	8813281	397946	28bbS
55.852	218	15032251	647162	29bbR
56.115	218	14810632	650472	29bbS
58.275	218	2324088	109168	30bbR
58.485	218	2511361	108554	30bbS
51.432	177	34390312	1515849	25nor28ab
55.899	177	4973885	197725	25nor30ab

E3731 SAT

7616/11-U-01(C1) 65.08m Sst.

RT	QM	AREA	HEIGHT	ID
30.806	191	1443259	91590	23/3
32.953	191	1329189	68972	24/3
37.225	191	1167751	35578	25/3
39.183	191	6932479	418143	24/4
40.453	191	389414	25837	26/3
40.718	191	438765	23982	26/3
50.552	191	2037879	117782	27Ts
51.516	191	15233141	421724	
51.851	191	34923808	1992131	27Tm
52.961	191	5795329	240198	4
55.105	191	88737656	3635881	28ab
56.589	191	51139532	2618919	29ab
57.538	191	5925446	224372	30d
58.069	191	21595552	893285	29ba
59.350	191	75497704	3907518	30ab
59.725	191	16603406	859538	
60.504	191	28566058	1439053	30ba
62.564	191	43247692	2238086	31abS
62.928	191	30098050	1569474	31abR
63.391	191	6166789	348131	
63.918	191	19574594	901066	
65.136	191	16865422	822550	32abS
65.649	191	14868346	652291	32abR
66.488	191	2948759	141592	
66.738	191	5682438	226488	
68.078	191	10614109	371787	33abS
68.788	191	6510713	263443	33abR
71.133	191	5023207	183902	34abS
72.003	191	3607682	143110	34abR
74.110	191	2245086	76849	35abS
75.174	191	2471645	65213	35abR
27.257	217	1445685	72965	21a
31.358	217	661643	28083	22a
43.884	217	2030656	113792	27dbS
45.183	217	1085920	59754	27dbR
46.068	217	705509	33510	27daR
46.916	217	799744	45564	27daS
47.152	217	1017772	52295	28dbS
47.502	217	532435	28391	28dbS
48.491	217	1472528	43377	28dbR
49.202	217	1958398	62490	27aaS+28daR
49.754	217	6459277	243875	29dbS+27bbR
50.063	217	559712	19348	28daS+27bbS
50.552	217	933241	47948	27aaR
51.286	217	6379098	255509	29dbR
51.830	217	2428322	115885	29daR
52.472	217	1856488	43849	28aaS
52.978	217	3345672	156713	29daS+28bbR
53.311	217	682825	30709	28bbS
53.852	217	1005587	48158	
54.358	217	836230	37844	28aaR
55.137	217	5944969	248252	29aaS
55.860	217	3717263	116372	29bbR

56.113	217	1914598	100504	29bbS
57.166	217	5242144	214013	29aaR
57.637	217	204194	11062	30aaS
59.720	217	451991	27123	30aaR
49.735	218	2139689	70280	27bbR+27bbS
52.978	218	1501056	70262	28bbR
53.319	218	866180	39861	28bbS
55.854	218	3493034	153590	29bbR
56.113	218	3137682	139829	29bbS
51.516	177	241837312	7132615	25nor28ab

E3537 SAT

7617/11-U-02(D2) 23.34m Slst.

RT	QM	AREA	HEIGHT	ID
30.814	191	1845346	109678	23/3
32.959	191	1212612	73621	24/3
37.209	191	1099427	39077	25/3
39.193	191	1060973	63302	24/4
40.435	191	461993	26143	26/3
40.709	191	388465	24998	26/3
50.514	191	882437	46640	27Ts
50.977	191	800891	37058	
51.755	191	2908378	157793	27Tm
52.894	191	994480	40754	4
54.358	191	595645	26719	
54.928	191	697693	21525	
56.511	191	4081567	206046	29ab
56.703	191	618833	31279	29Ts
57.647	191	369141	18183	30d
58.013	191	1654880	74987	29ba
59.279	191	4737230	246563	30ab
59.662	191	578636	25471	
60.442	191	1960475	94637	30ba
60.809	191	420943	18386	
62.507	191	3070940	151805	31abS
62.876	191	2811925	139039	31abR
63.859	191	1809554	73536	
65.104	191	880658	35552	32abS
65.611	191	890385	37243	32abR
68.076	191	422962	15461	33abS
68.767	191	434787	15879	33abR
27.258	217	422995	21152	21a
31.363	217	496542	18833	22a
43.892	217	1366811	74697	27dbS
45.183	217	494746	25581	27dbR
46.061	217	226614	10261	27daR
46.723	217	182847	10683	27daS
46.891	217	188005	10455	28dbS
47.125	217	182824	10519	28dbS
48.454	217	300144	9392	28dbR
49.191	217	481374	16500	27aaS+28daR
49.512	217	240033	13577	29dbS+27bbR
49.691	217	433560	18047	28daS+27bbS
49.868	217	201961	10790	
50.495	217	307139	16484	27aaR
50.983	217	433042	17693	
51.149	217	303017	12119	29dbR
52.936	217	281877	13712	29daS+28bbR
53.257	217	109782	6489	28bbS
54.372	217	140515	8355	28aaR
55.207	217	158763	6961	29aaS
55.807	217	253212	8442	29bbR
56.046	217	134043	6938	29bbS
57.134	217	293336	11491	29aaR
49.506	218	373056	17261	27bbR
49.857	218	285423	14037	27bbS
52.948	218	226613	11451	28bbR

53.245	218	176212	9178	28bbS
55.794	218	208593	9921	29bbR
56.051	218	205037	9182	29bbS
50.971	177	919374	41631	25nor28ab
55.848	177	278395	12143	25nor30ab

E3645 SAT

7617/11-U-01(D2) 117.80m Slstst.

RT	QM	AREA	HEIGHT	ID
31.404	191	7615500	486677	23/3
33.592	191	5509185	343864	24/3
37.866	191	6620233	222566	25/3
39.857	191	4775906	267061	24/4
41.096	191	2654715	148866	26/3
41.372	191	2443848	149390	26/3
48.321	191	1970775	117938	
48.822	191	1785087	105438	
50.417	191	2136361	125365	
51.017	191	1833773	110874	
51.207	191	6837933	392526	27Ts
52.451	191	6888888	373064	27Tm
53.614	191	3232525	131771	4
54.280	191	1249783	67679	
54.955	191	1189119	65990	
55.659	191	3763831	171098	28ab
56.533	191	1362146	77958	25nor30ab
57.180	191	16817956	901878	29ab
57.366	191	3923401	209930	29Ts
58.140	191	1265359	61283	30d
58.682	191	2301524	109634	29ba
59.950	191	16847190	956930	30ab
60.316	191	1999611	76062	
61.114	191	2403072	129408	30ba
63.179	191	6059687	335483	31abS
63.551	191	6140485	303566	31abR
64.051	191	1049275	60791	
64.535	191	1315630	56799	
65.751	191	3351232	178304	32abS
66.279	191	2439989	123255	32abR
68.726	191	2499353	110777	33abS
69.426	191	2034237	87244	33abR
71.781	191	1051918	51860	34abS
72.658	191	713165	34744	34abR
74.793	191	1084830	44958	35abS
75.849	191	759222	32391	35abR
27.814	217	1947894	100723	21a
31.980	217	1964575	76504	22a
44.549	217	6029106	315969	27dbS
45.836	217	4217576	222819	27dbR
46.707	217	1648953	91776	27daR
47.381	217	1969266	110055	27daS
47.554	217	2215380	115709	28dbS
47.788	217	2445601	111988	28dbS
49.119	217	3390150	98493	28dbR
49.842	217	4183614	132803	27aaS+28daR
50.181	217	2215949	141639	29dbS+27bbR
50.372	217	3144289	143475	28daS+27bbS
50.516	217	2007814	111991	
51.175	217	4054199	190033	27aaR
51.815	217	2736875	96118	29dbR
52.698	217	1721926	48235	29daR
53.014	217	1909285	48254	28aaS

53.601	217	2880574	137523	29daS+28bbR
53.930	217	1524074	75290	28bbS
54.781	217	1667047	55779	28aaR
55.863	217	1881043	60106	29aaS
56.446	217	2145701	88665	29bbR
56.718	217	1678425	74215	29bbS
57.786	217	1795483	82582	29aaR
58.115	217	348087	15999	30aaS
58.873	217	294889	15827	30bbR
59.097	217	571069	20002	30bbS
60.316	217	265134	17864	30aaR
50.181	218	3508236	195002	27bbR
50.497	218	3619407	152882	27bbS
53.607	218	2539505	128023	28bbR
53.923	218	2198900	106775	28bbS
56.446	218	2392769	121162	29bbR
56.718	218	2306444	109769	29bbS
58.880	218	307532	16187	30bbR
59.066	218	325694	16060	30bbS
51.901	177	2527823	117769	25nor28ab
56.533	177	1452569	72879	25nor30ab

E3675 SAT

7617/11-U-02(D2) 147.00m Clst.,slty

RT	QM	AREA	HEIGHT	ID
31.367	191	24833112	1457609	23/3
33.567	191	17027808	983213	24/3
37.865	191	16892712	491203	25/3
39.848	191	12802570	693063	2474
41.077	191	5672730	343191	26/3
41.338	191	5733224	326377	2673
48.245	191	4010524	222866	
48.754	191	3451891	205272	
50.297	191	4085824	235179	
50.915	191	3546962	204687	
51.126	191	14290060	787668	27Ts
52.344	191	15338623	856934	27Tm
53.470	191	9193864	415228	4
54.827	191	2221392	134708	
55.552	191	6247707	296129	28ab
56.390	191	1942563	102304	25nor30ab
57.055	191	37265008	2152946	29ab
57.232	191	7206740	436045	29Ts
58.011	191	2366977	114441	30d
58.538	191	5759068	281816	29ba
59.791	191	37672904	2177868	30ab
60.193	191	5312818	184463	
60.948	191	8909639	496916	30ba
62.993	191	13319086	719719	31abS
63.360	191	15362010	781985	31abR
63.879	191	4738746	265514	
64.343	191	4182742	191378	
65.574	191	7212521	381609	32abS
65.882	191	1346999	69946	
66.085	191	5513172	310839	32abR
67.698	191	5724482	287808	
68.508	191	5112647	239440	33abS
69.240	191	4657954	219915	33abR
71.571	191	2391528	116448	34abS
72.457	191	2206065	105487	34abR
74.553	191	4412720	125522	35abS
75.641	191	2609751	115126	35abR
27.724	217	4958195	228850	21a
31.942	217	5479677	205003	22a
44.487	217	13862201	675387	27dbS
45.759	217	9190923	470247	27dbR
46.644	217	3836426	211428	27daR
47.304	217	4468841	214574	27daS
47.490	217	4416522	227314	28dbS
47.720	217	4574600	219103	28dbS
49.050	217	6990665	210313	28dbR
49.761	217	10299972	306807	27aaS+28daR
50.106	217	5711190	329288	29dbS+27bbR
50.267	217	6590385	308165	
50.414	217	4114656	266455	28daS+27bbS
50.582	217	1366947	81544	
51.071	217	10576871	542975	27aaR
51.700	217	5887730	210521	29dbR

52.555	217	4188625	118682	29daR
52.905	217	4325437	115206	28aaS
53.482	217	6908240	354469	29daS+28bbR
53.803	217	3559750	165487	28bbS
54.655	217	5876044	198014	28aaR
55.756	217	4001449	140323	29aaS
56.323	217	4548793	195281	29bbR
56.571	217	4355926	170115	29bbS
57.634	217	6087442	282032	29aaR
57.986	217	900372	32675	30aaS
58.697	217	736696	34812	30bbR
58.939	217	1374485	55160	30bbS
60.152	217	1627764	76516	30aaR
50.099	218	8486484	459423	27bbR
50.414	218	6463710	380607	27bbS
53.482	218	6141027	324711	28bbR
53.803	218	4726678	231380	28bbS
56.310	218	5555928	265248	29bbR
56.571	218	5048520	249712	29bbS
58.728	218	645997	34318	30bbR
58.913	218	852123	39212	30bbS
51.811	177	5650773	222743	25nor28ab
56.390	177	2772036	109846	25nor30ab

Table A.15

**Aromatic biomarker
peak data**

(m/z 231, 253)

For key to peak identification see Figure A.6

E-3815ARO 7418/01-U-01 71.44 m

RT	QM	AREA	HEIGHT	ID
40.818	231	9945531	619987	a1
43.161	231	8030269	499265	b1
53.208	231	4235330	185365	c1
55.578	231	13077314	536820	d1
57.574	231	6884905	182826	e1
58.569	231	7465657	239722	f1
61.059	231	5900152	190698	g1
25.830	253	9228152	493619	A1
28.844	253	7140571	450969	B1
42.888	253	2458704	162917	C1
43.188	253	3538688	227405	C1
45.431	253	5739245	327099	D1
45.591	253	3157145	158429	D1
45.958	253	6029685	352263	E1
46.099	253	6659292	342071	F1
46.472	253	7992466	352704	F1
48.235	253	9053234	414798	G1
48.715	253	35223452	1011856	G1
49.924	253	23547028	1184997	H1
50.631	253	6787724	321550	H1
51.199	253	6254746	225192	H1
51.372	253	9892264	451688	H1
53.856	253	7412066	297662	I1
13.017	178	525423872	64568196	P
16.324	192	109910424	11372928	3-MP
16.458	192	139228064	14418371	2-MP
17.011	192	169725648	16332624	9-MP
17.160	192	134013544	13770336	1-MP

E-3818ARO 7418/01-U-01 74.62 m

RT	QM	AREA	HEIGHT	ID
40.875	231	17269956	1013102	a1
43.218	231	9424016	565575	b1
53.324	231	25598058	1218320	c1
55.681	231	107352912	4163393	d1
57.683	231	63457520	1703873	e1
58.665	231	66054020	2249547	f1
61.128	231	54863476	1676017	g1
25.855	253	60302360	2856124	A1
28.859	253	53607968	3184495	B1
42.951	253	18493100	1054347	C1
43.251	253	38536912	2263902	C1
45.481	253	51625412	2731105	D1
45.661	253	26033676	1590311	D1
46.021	253	28508320	1759376	E1
46.168	253	87497080	4295796	F1
46.983	253	26176220	823713	F1
48.298	253	78975832	3682003	G1
48.665	253	150424544	4600380	G1
50.026	253	18738428	804864	H1
50.707	253	31458958	1547411	H1
51.295	253	61775104	2158813	H1
51.402	253	48295456	2122338	H1
53.938	253	42508348	1507893	I1
12.997	178	159463040	17878744	P
16.322	192	42178340	4152640	3-MP
16.455	192	49287916	4723638	2-MP
17.010	192	66235400	5966811	9-MP
17.157	192	50613928	4553724	1-MP

E-3819ARO 7418/01-U-01 74.67 m

RT	QM	AREA	HEIGHT	ID
40.802	231	14873809	981586	a1
43.151	231	8968251	621623	b1
53.221	231	13613376	708849	c1
55.584	231	55380876	2383352	d1
57.587	231	30163190	934270	e1
58.575	231	33229796	1141734	f1
61.051	231	26165984	858770	g1
25.795	253	31382746	1535068	A1
28.819	253	29627562	1696350	B1
42.874	253	7818151	480410	C1
43.177	253	17590582	1146293	C1
45.409	253	21911064	1262400	D1
45.585	253	10830608	741798	D1
45.934	253	15417580	877360	E1
46.094	253	33731492	1986449	E1
46.476	253	7215268	391690	F1
46.886	253	12666183	385195	F1
48.218	253	35797088	1867518	G1
48.584	253	73018472	2258962	G1
49.930	253	40532944	2026139	H1
50.631	253	16017340	768099	H1
51.205	253	27788408	987166	H1
51.332	253	21985730	999446	H1
53.842	253	18502864	684984	I1
12.991	178	308869600	35610148	P
16.295	192	70703192	6989676	3-MP
16.436	192	85208496	8347759	2-MP
16.983	192	110530112	10066340	9-MP
17.130	192	83300032	7941154	1-MP

E-3820ARO 7418/01-U-01 74.73 m

RT	QM	AREA	HEIGHT	ID
40.782	231	12767697	847182	a1
43.117	231	8004534	539801	b1
53.194	231	15026305	824263	c1
55.566	231	62541752	2972220	d1
57.605	231	36235604	1205196	e1
58.560	231	36975704	1484726	f1
61.071	231	31416990	1183358	g1
25.755	253	9590994	510172	A1
28.779	253	9179198	496045	B1
46.270	253	2645087	171935	E1
46.420	253	3817114	229165	F1
48.704	253	6812504	370738	G1
49.899	253	16249242	870287	H1
12.964	178	193569584	22668136	P
16.262	192	46090256	4610015	3-MP
16.396	192	53176644	5283451	2-MP
16.936	192	71556136	6454543	9-MP
17.097	192	53961436	5189020	1-MP

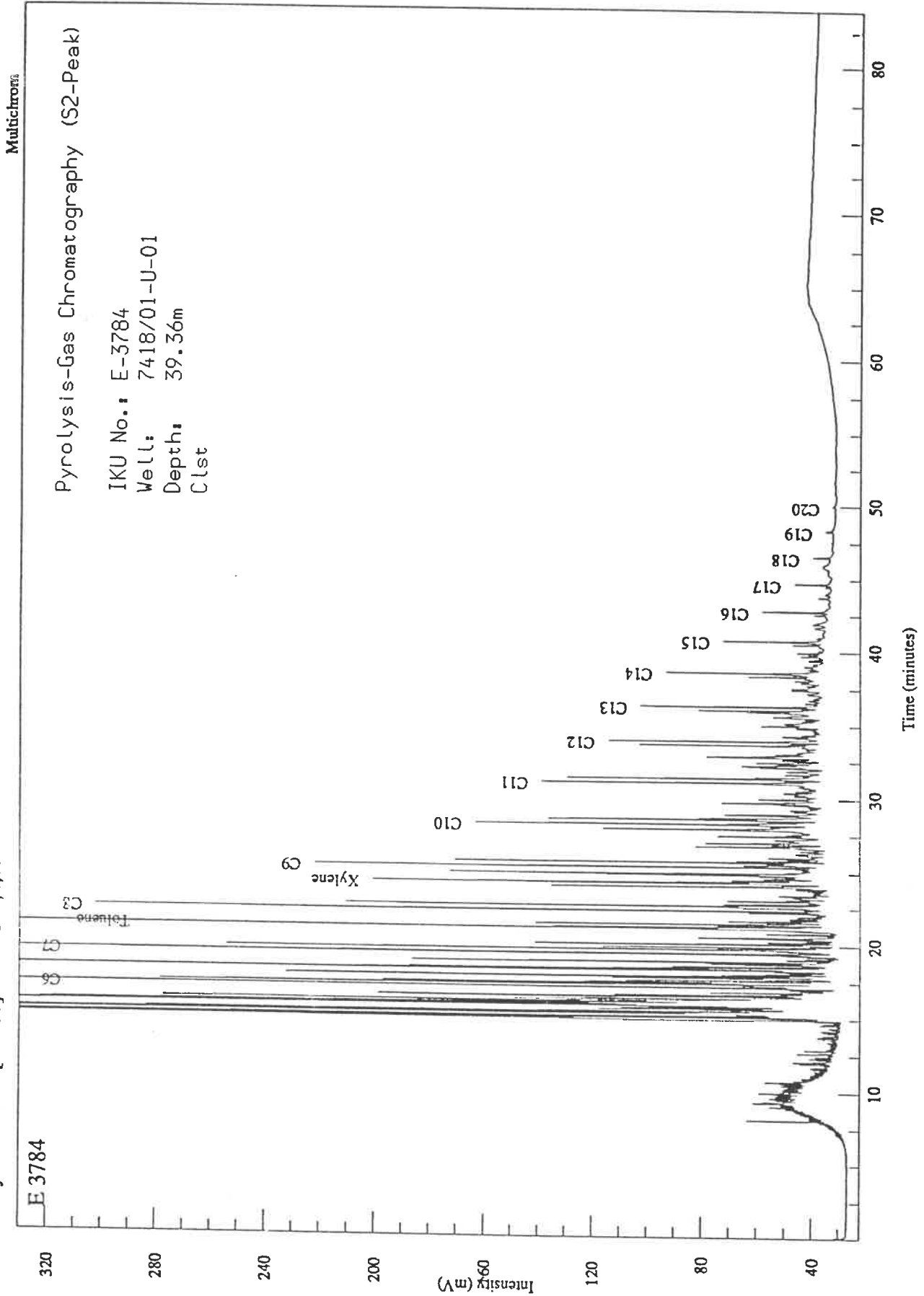
Appendix 2

Figures

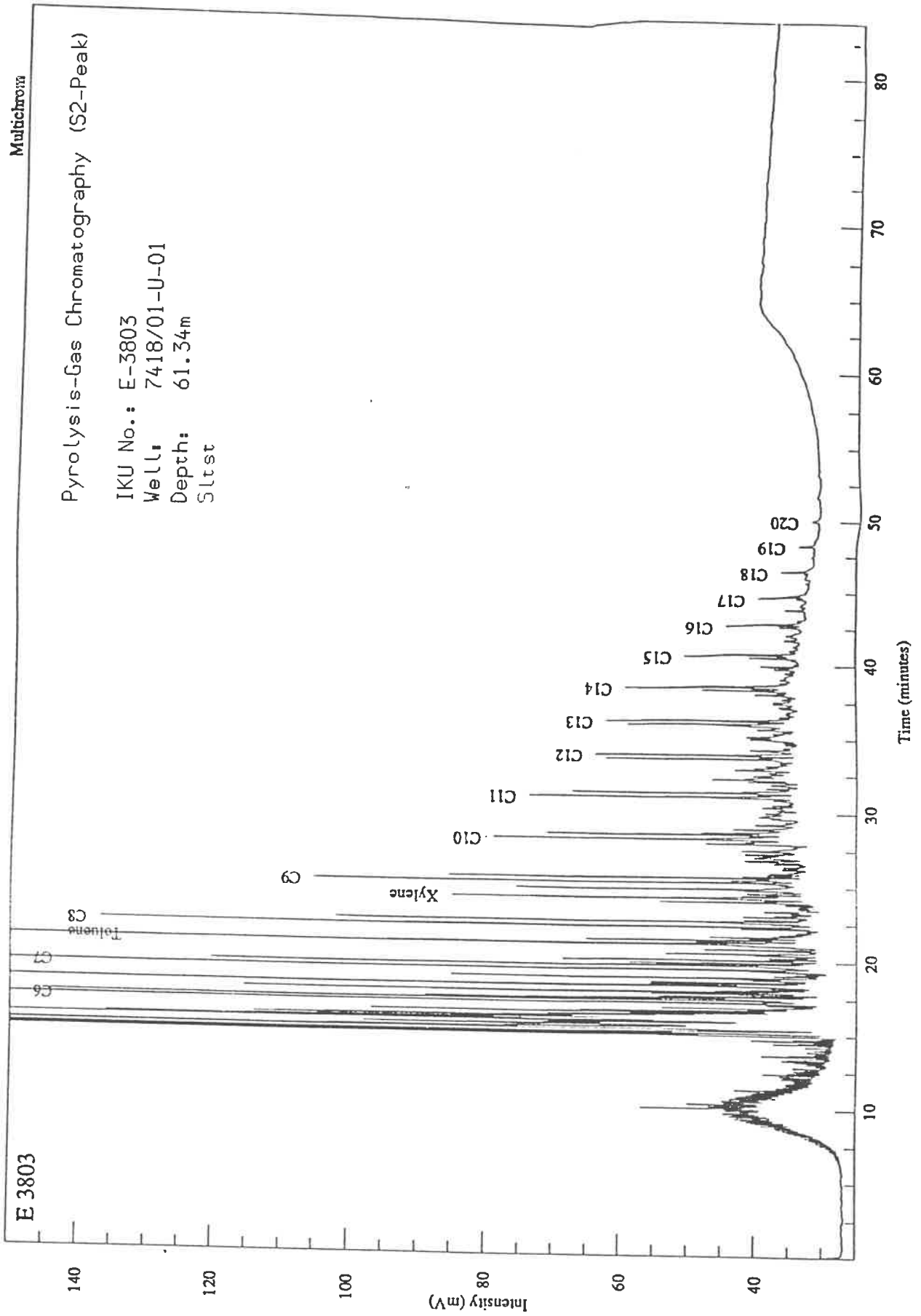
Figure A.1

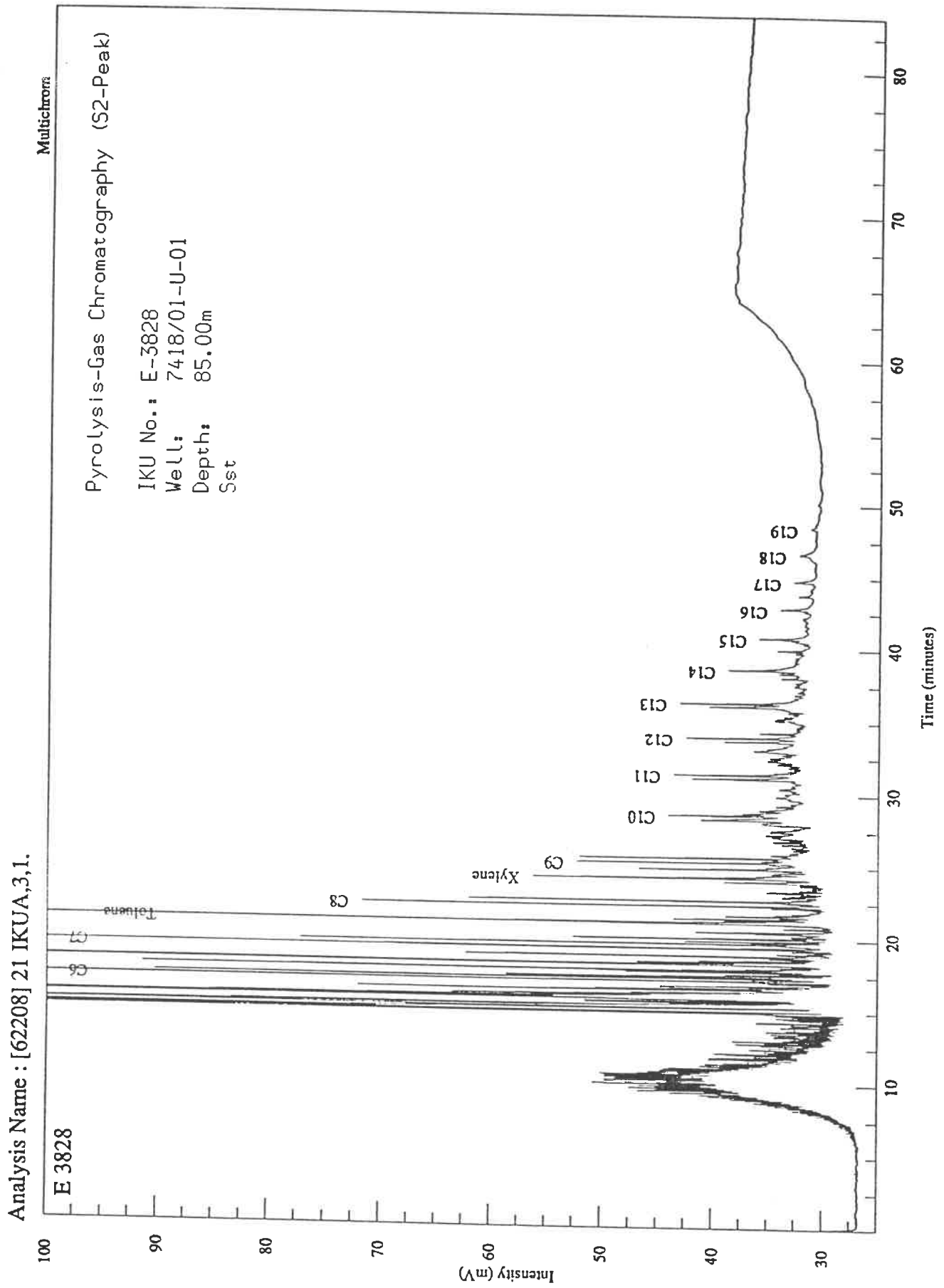
Pyrolysis - gas Chromatograms (S2 peak)

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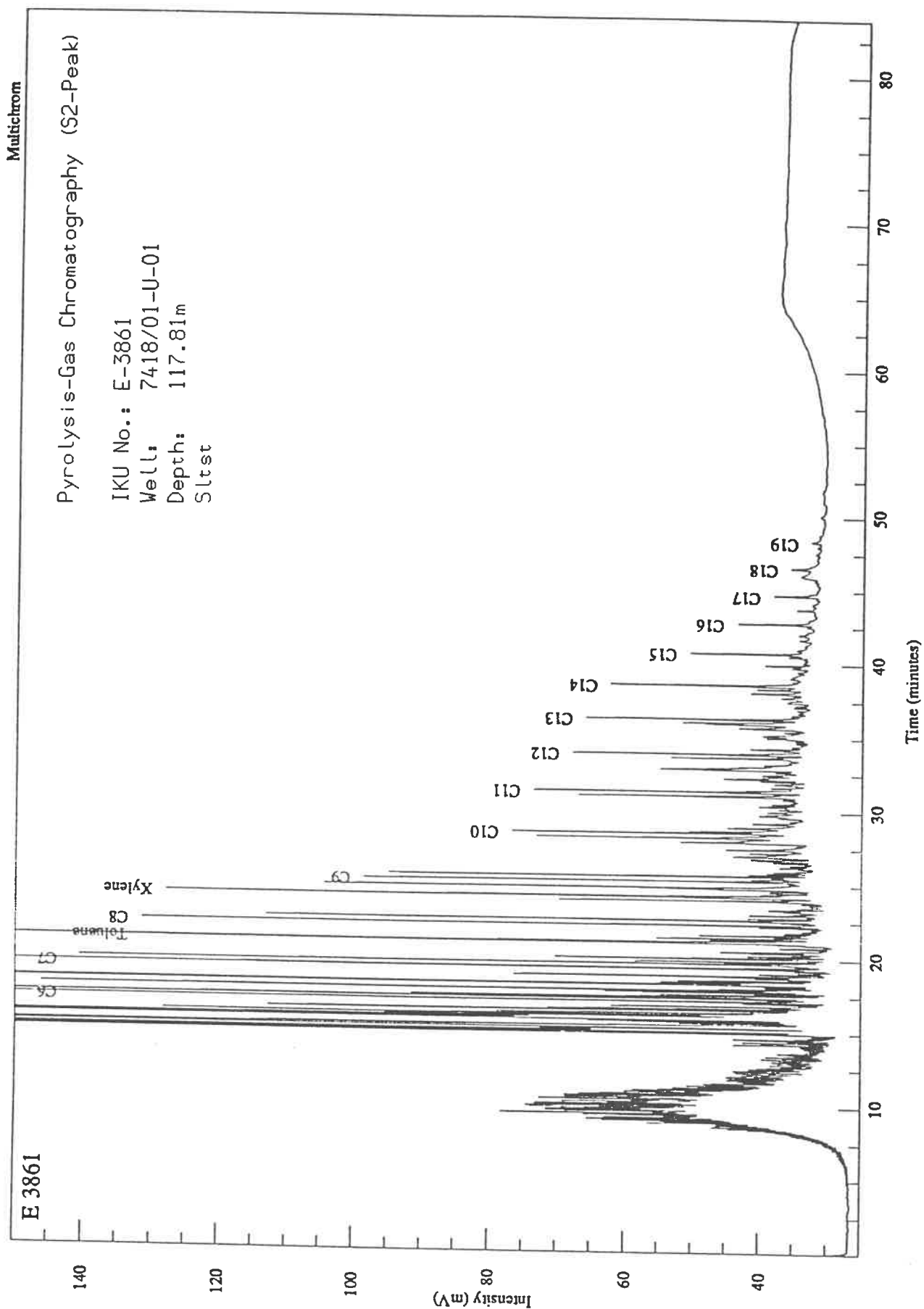


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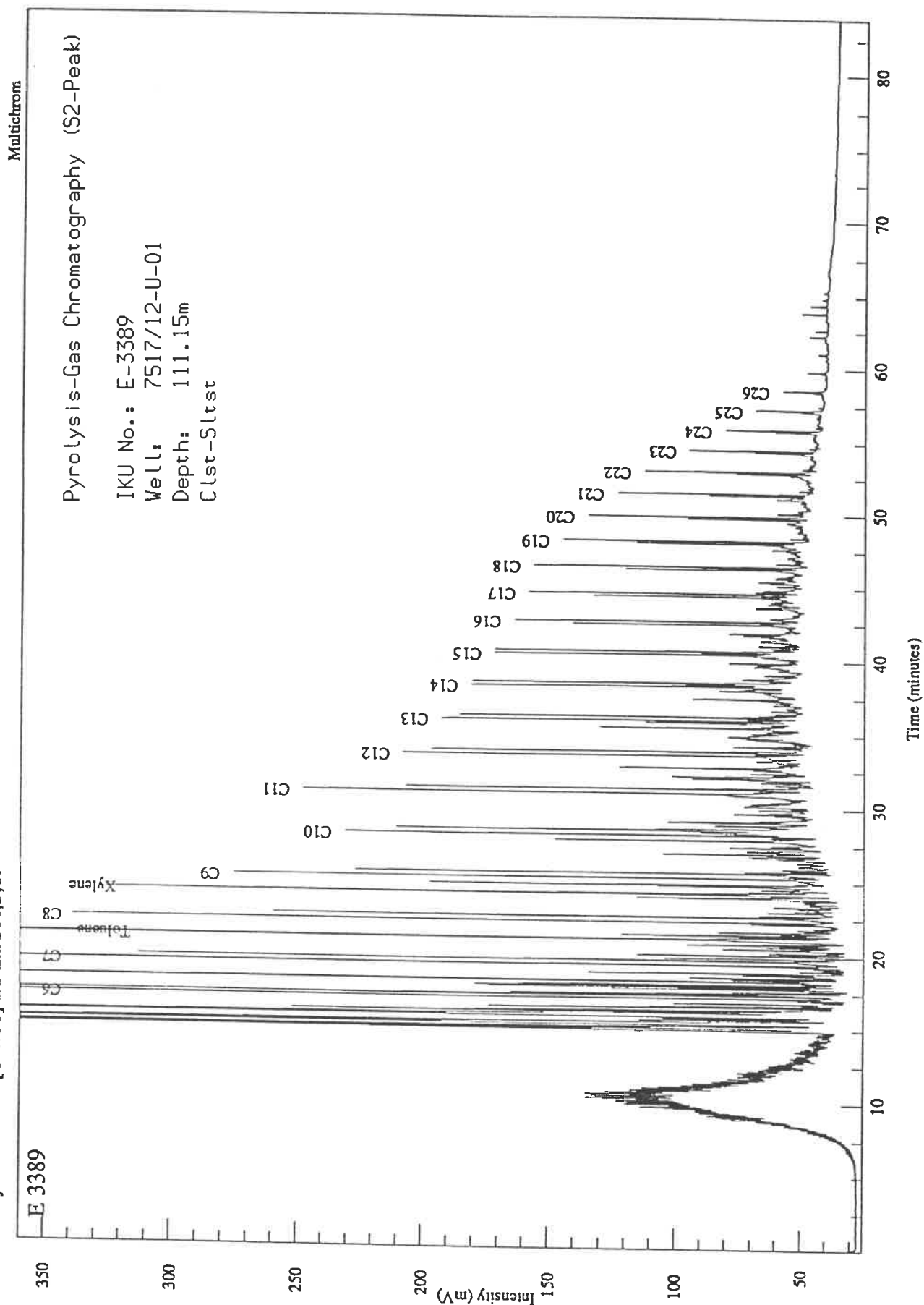




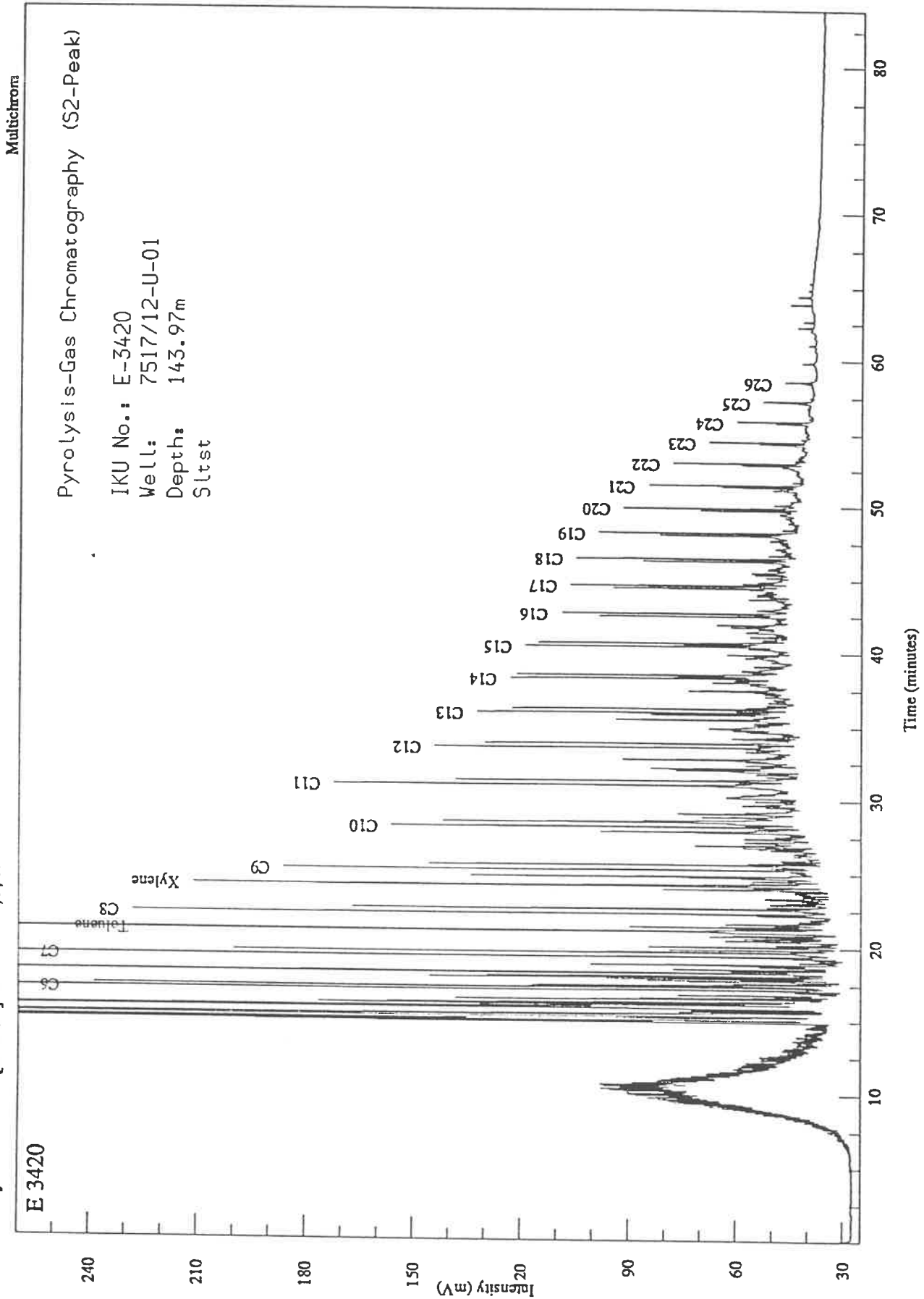
Analysis Name : [62208] 21 IKUA,4,1.

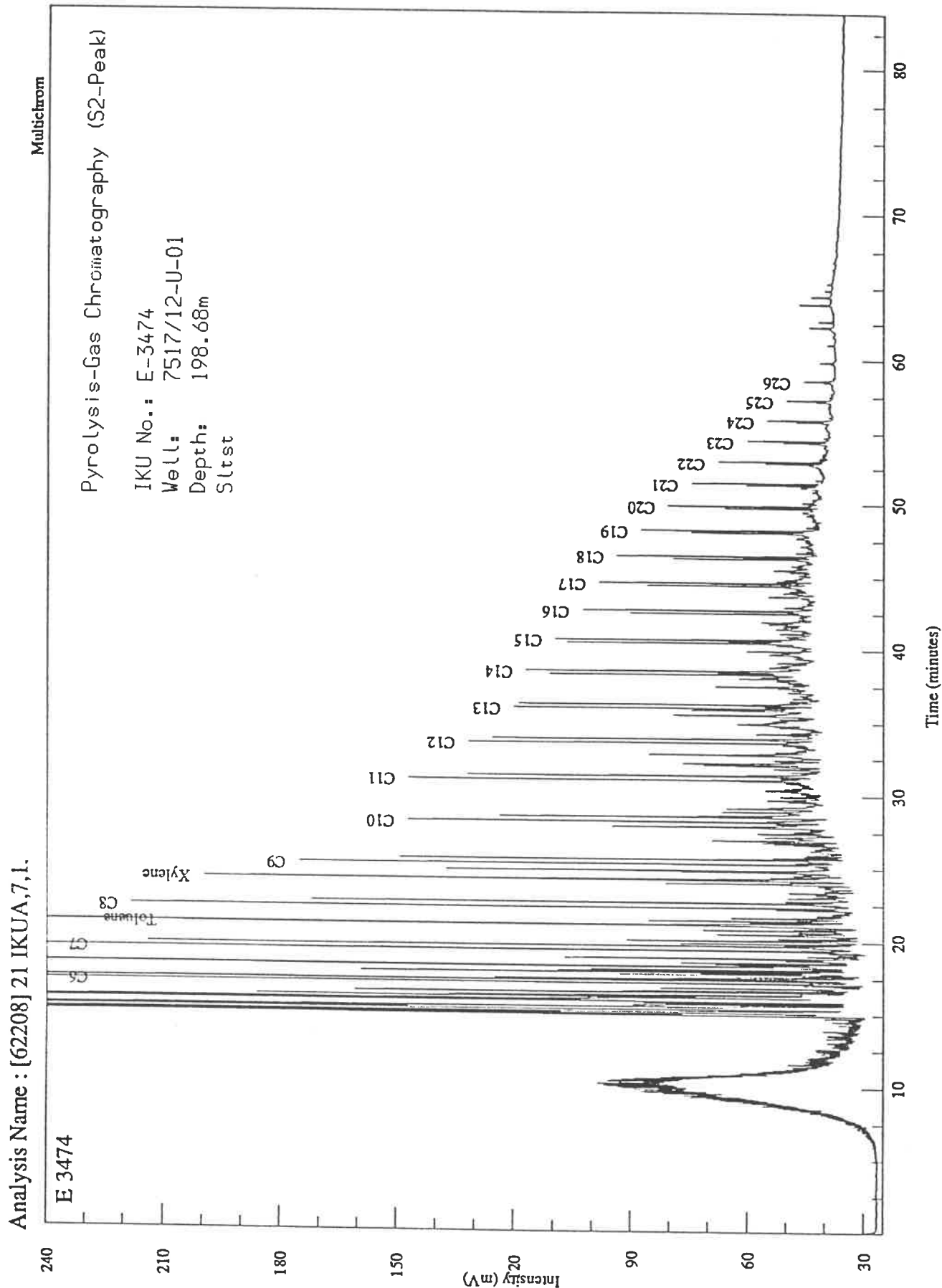


Analysis Name : [62208] 21 IKUA,5,1.

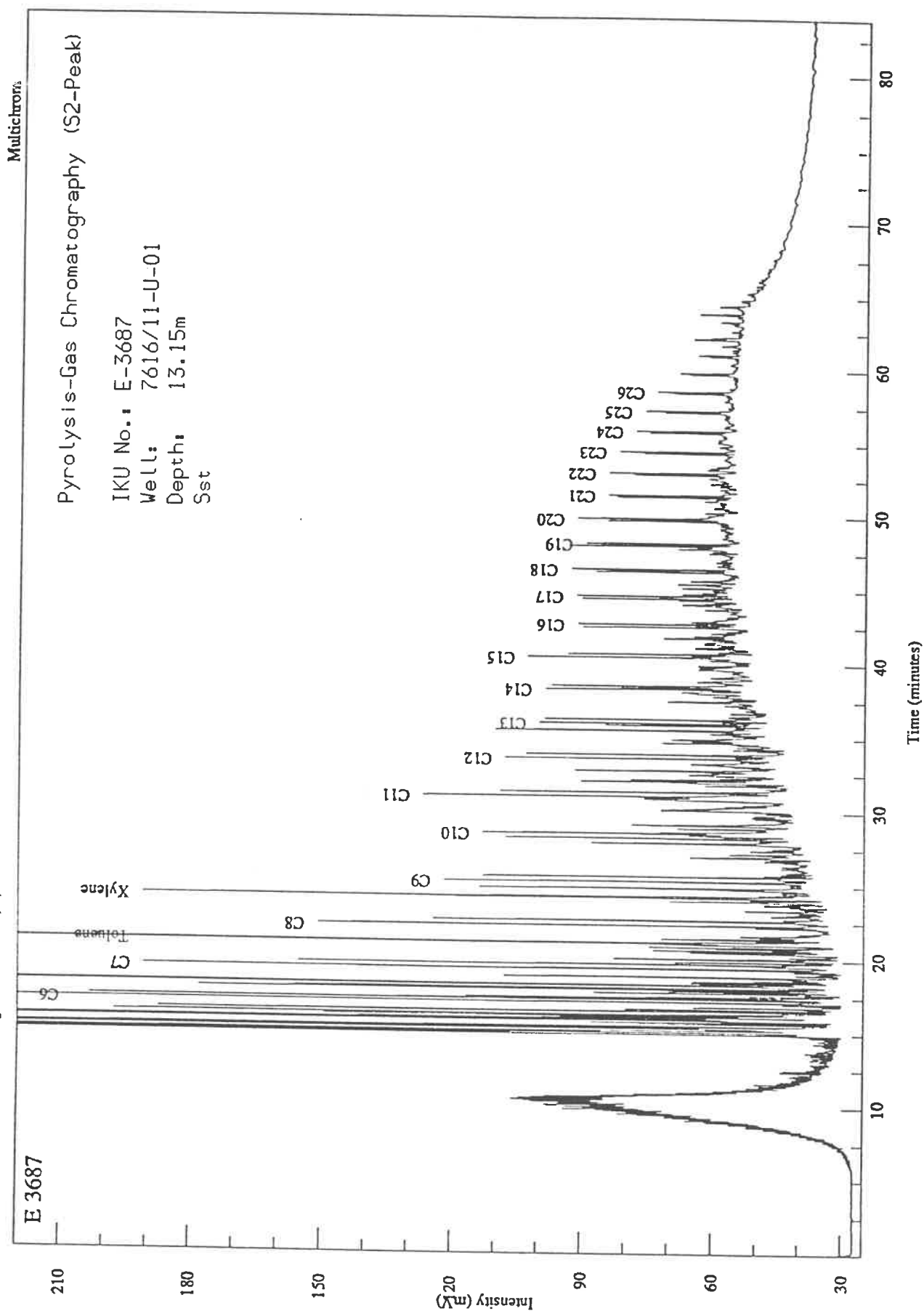


Analysis Name : [62208] 21 IKUA,6,1.

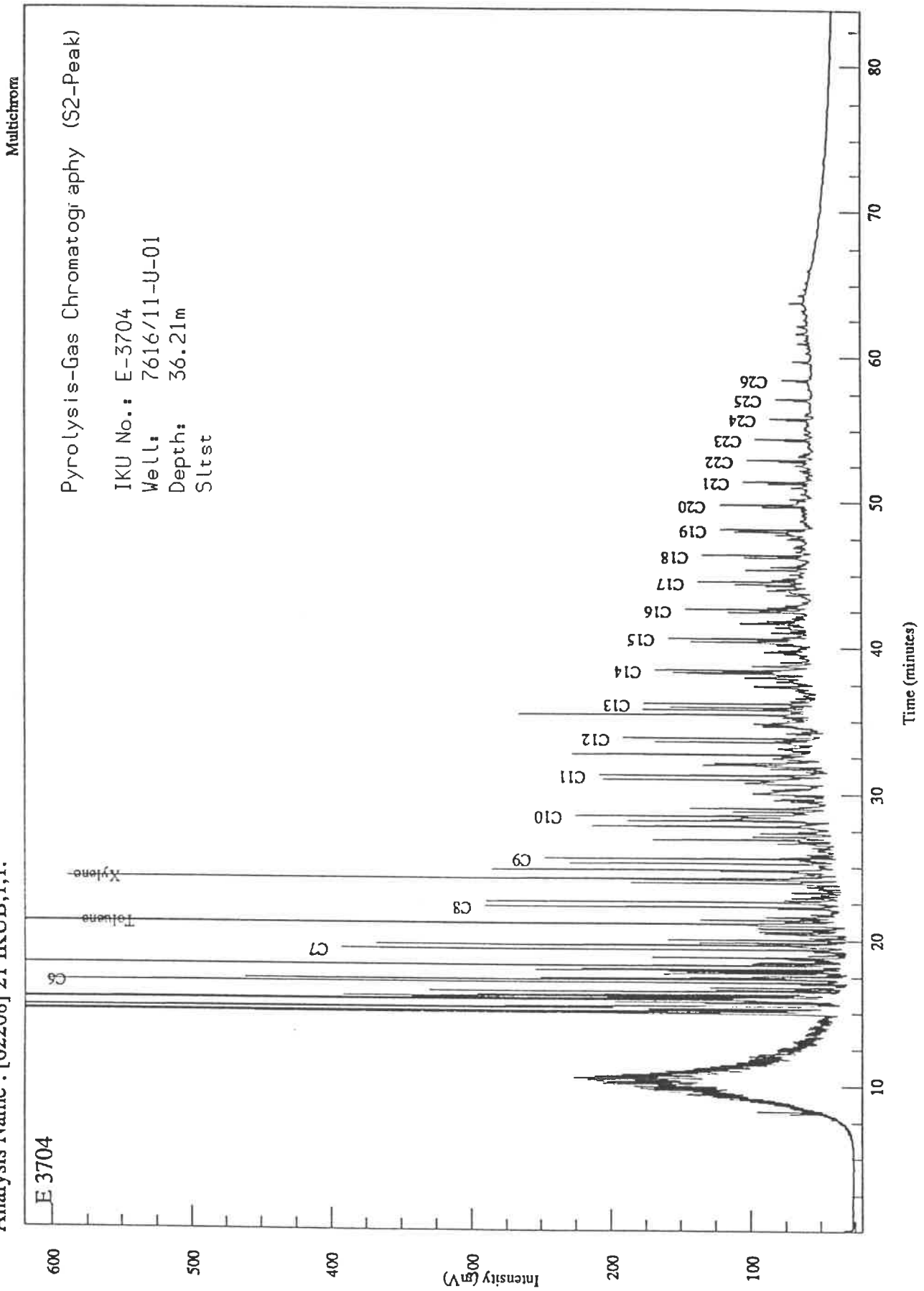




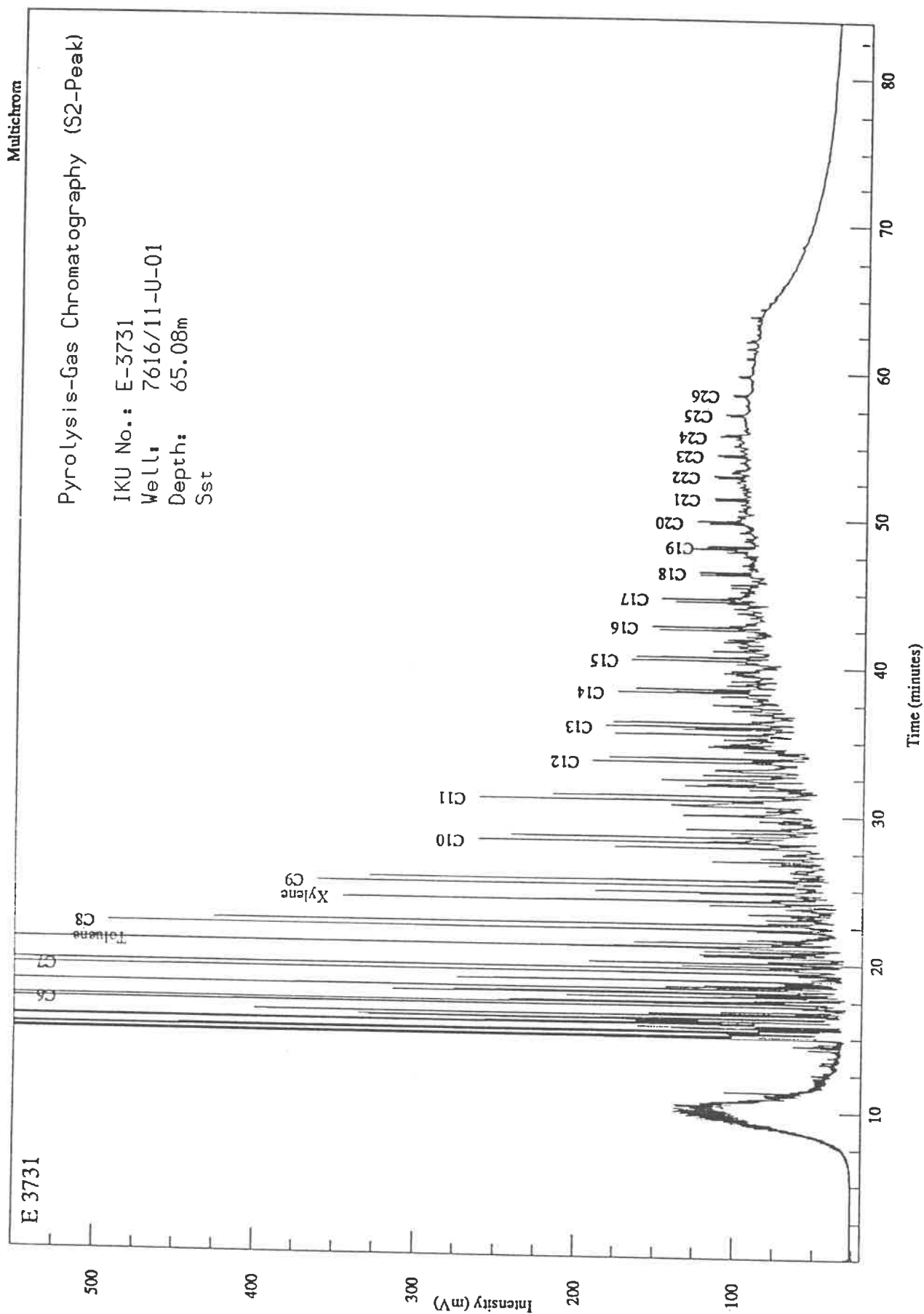
Analysis Name : [62208] 21 IKUA,8,1.



Analysis Name : [62208] 21 IKUB,1,1.



Analysis Name : [62208] 21 ...00A,10,1.



Analysis Name : [62208] 21 IKUA,11,1.

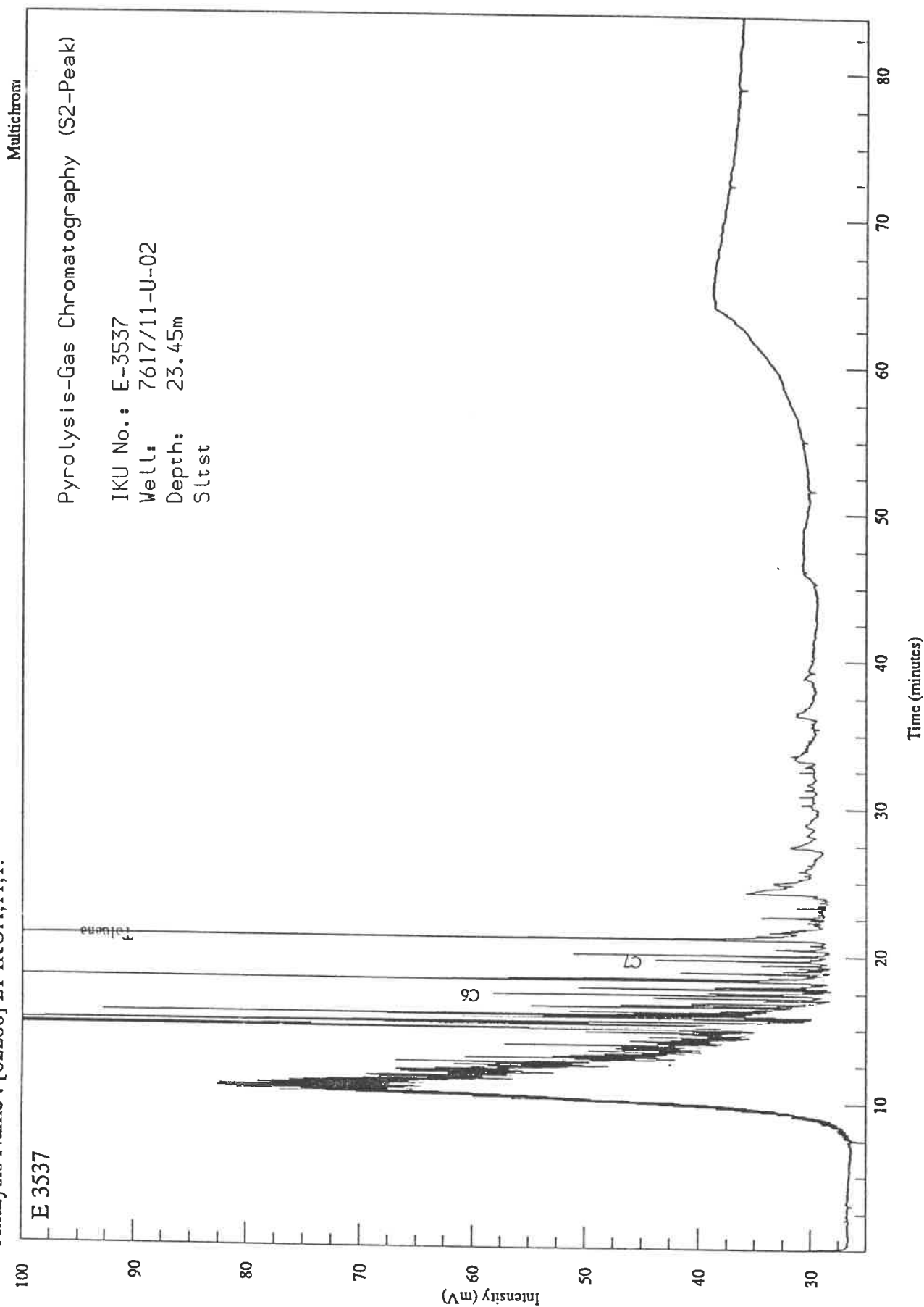
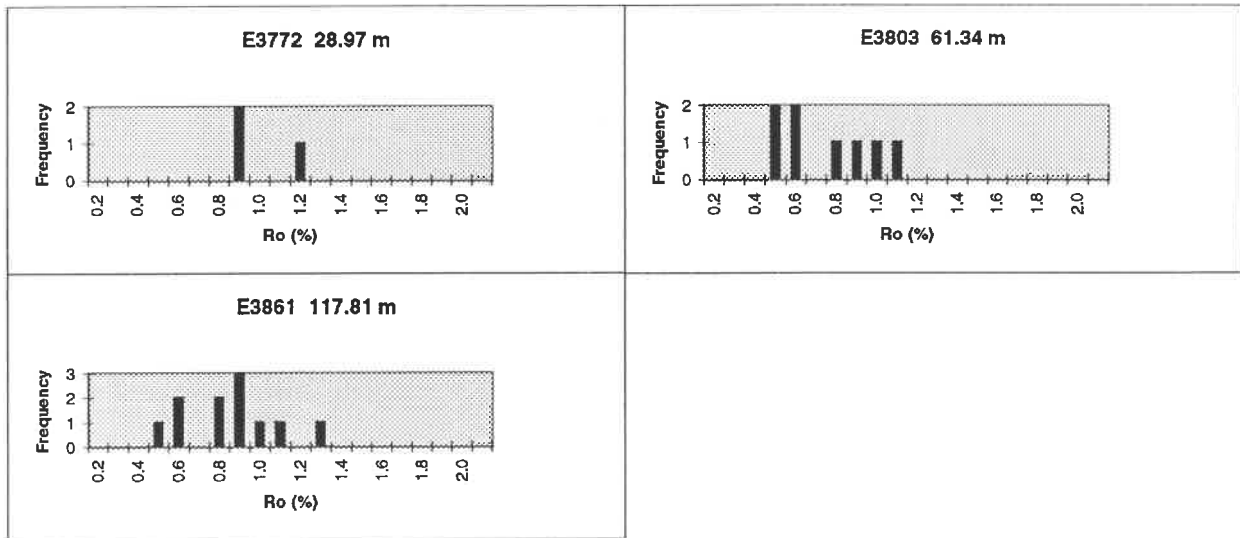


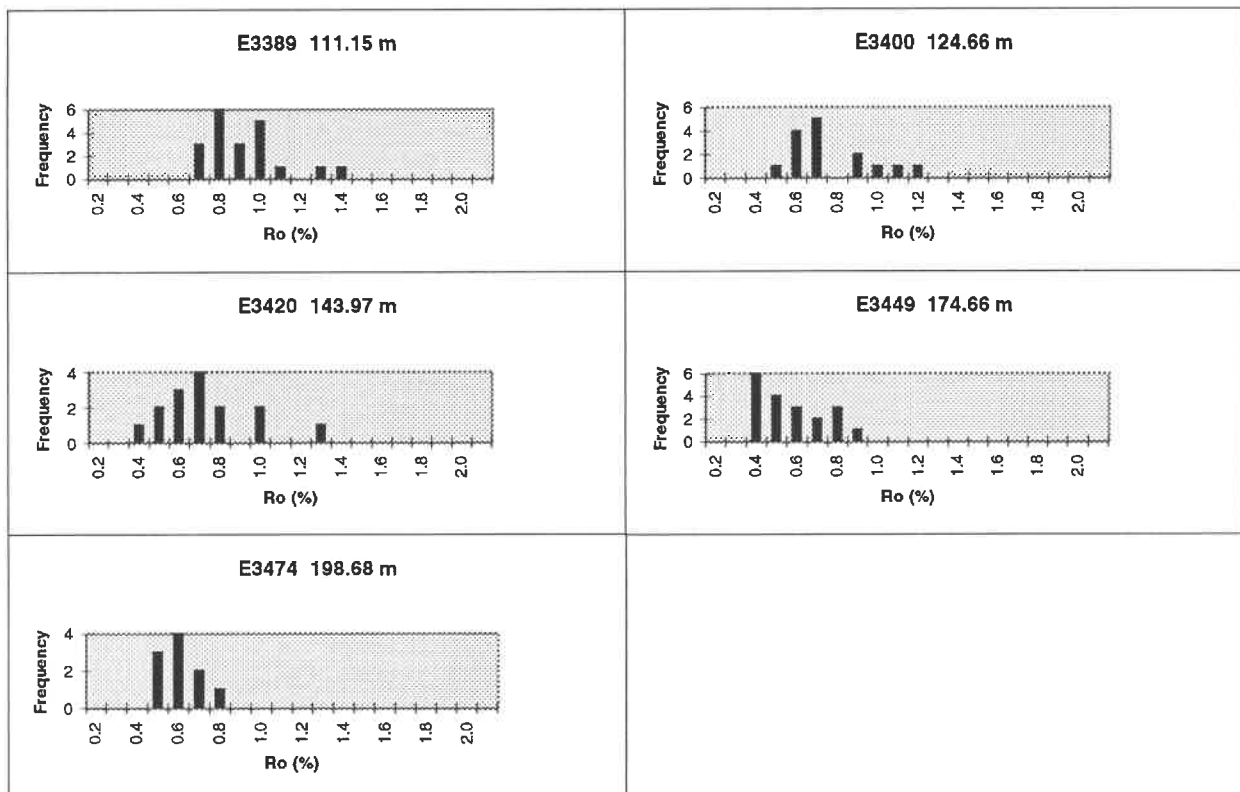
Figure A.2

Vitrinite reflectance histograms

7418/01-U-01



7517/12-U-01



7616/11-U-01

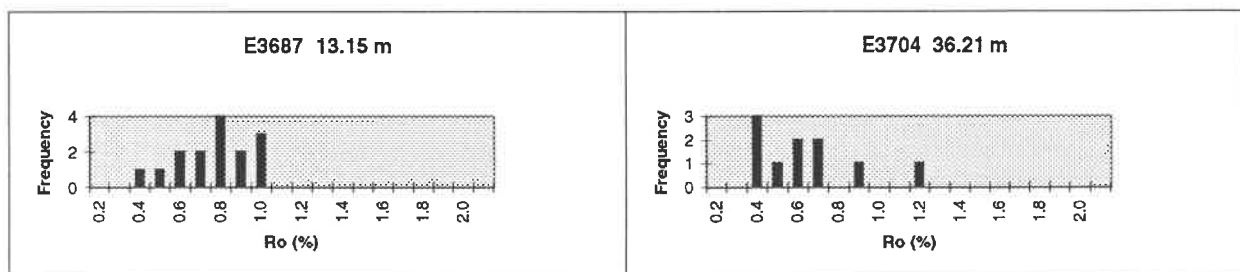
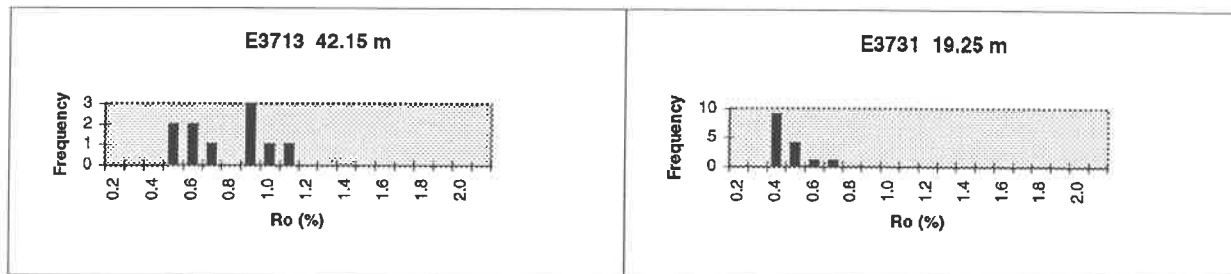
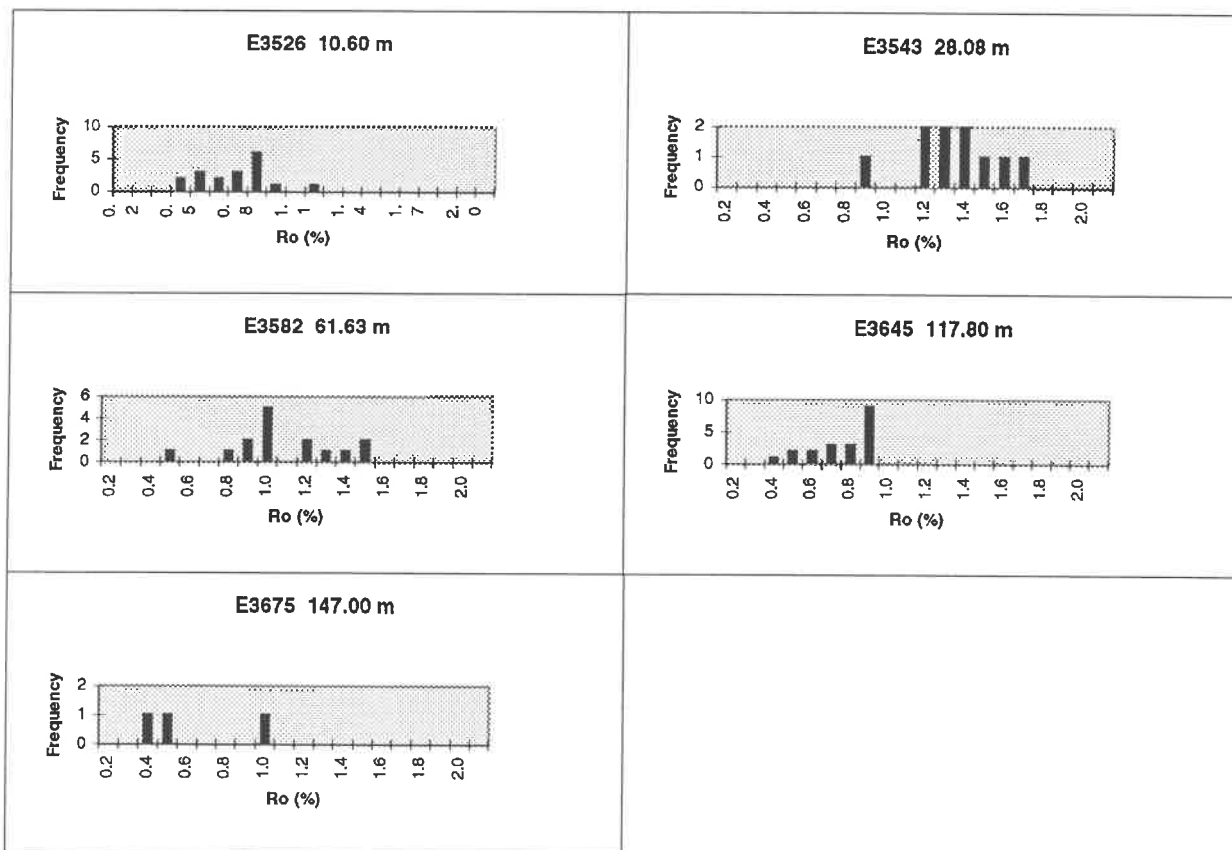


Figure ____: Vitrinite reflectance histograms

7616/11-U-01 (continued)



7617/11-U-02



7618/10-U-01

7618/10-U-03

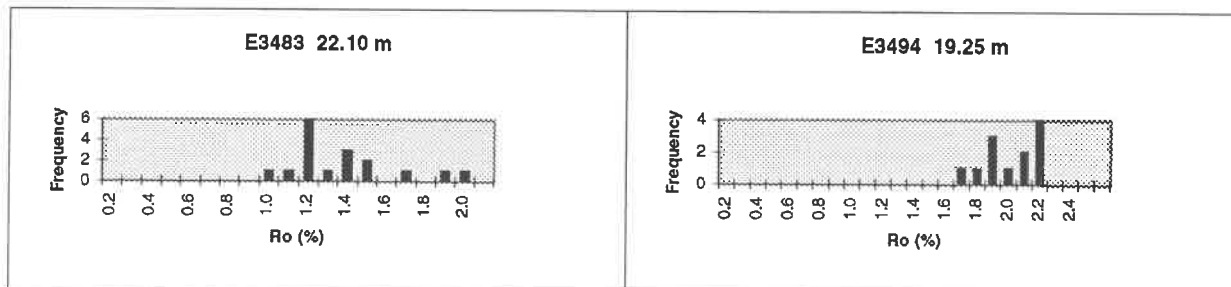


Figure ____: Vitrinite reflectance histograms (continued)

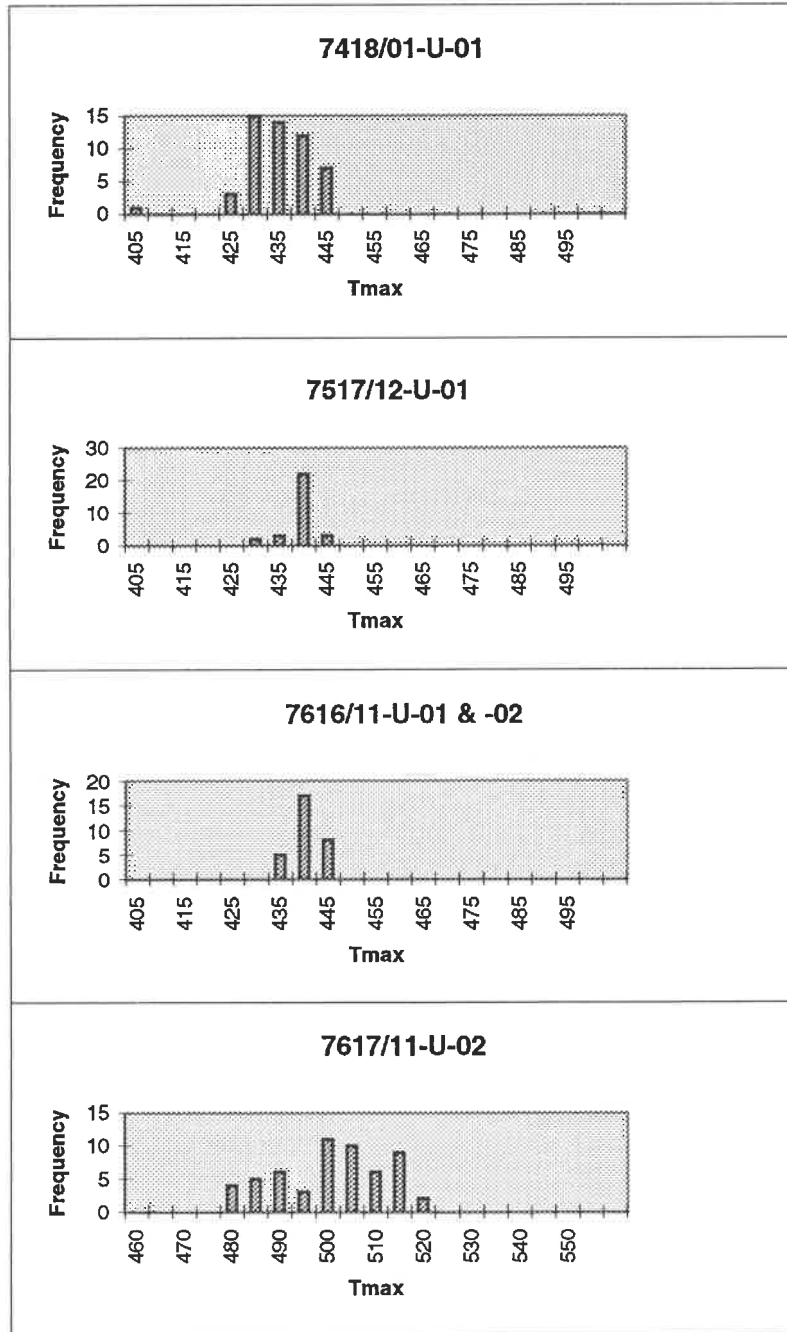
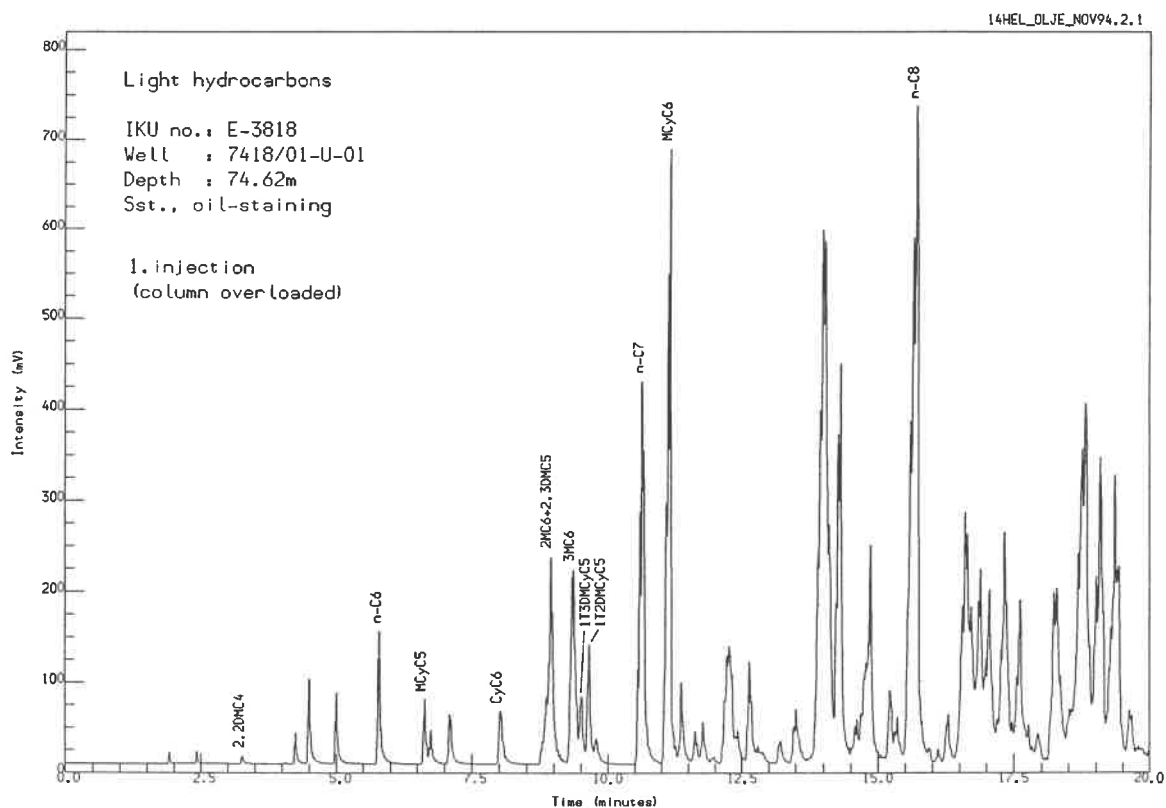
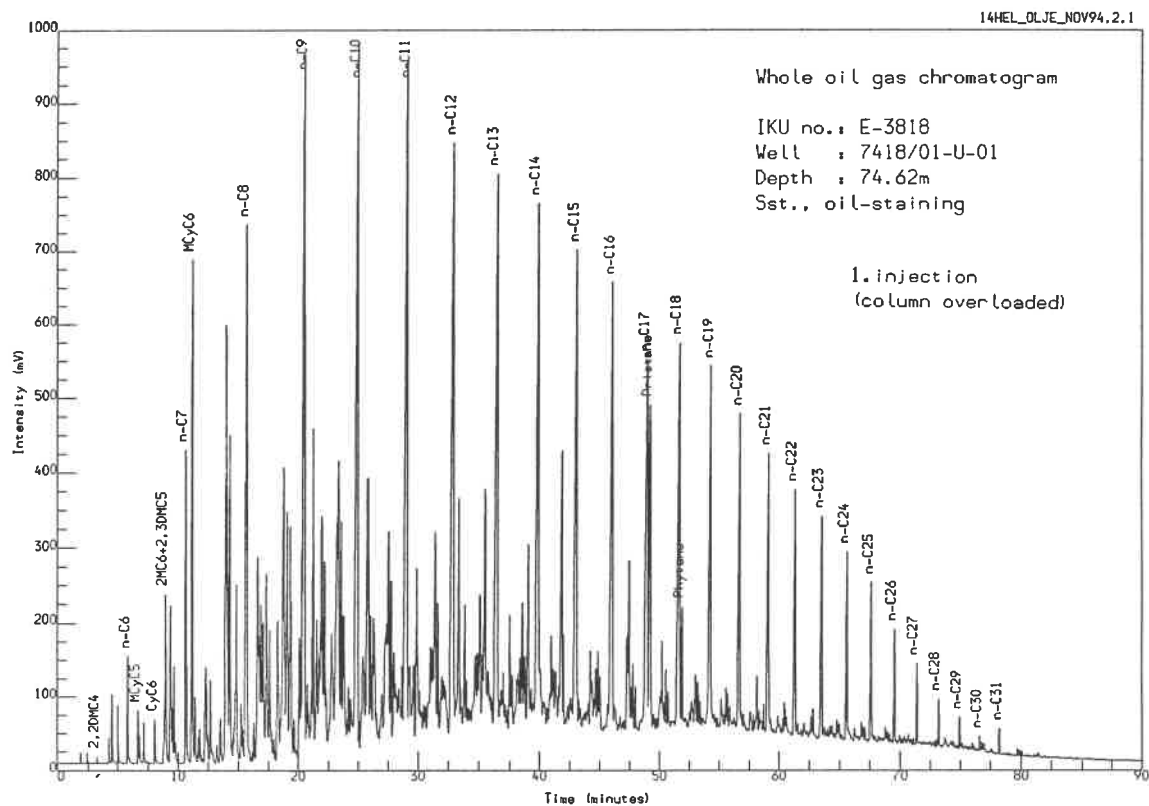


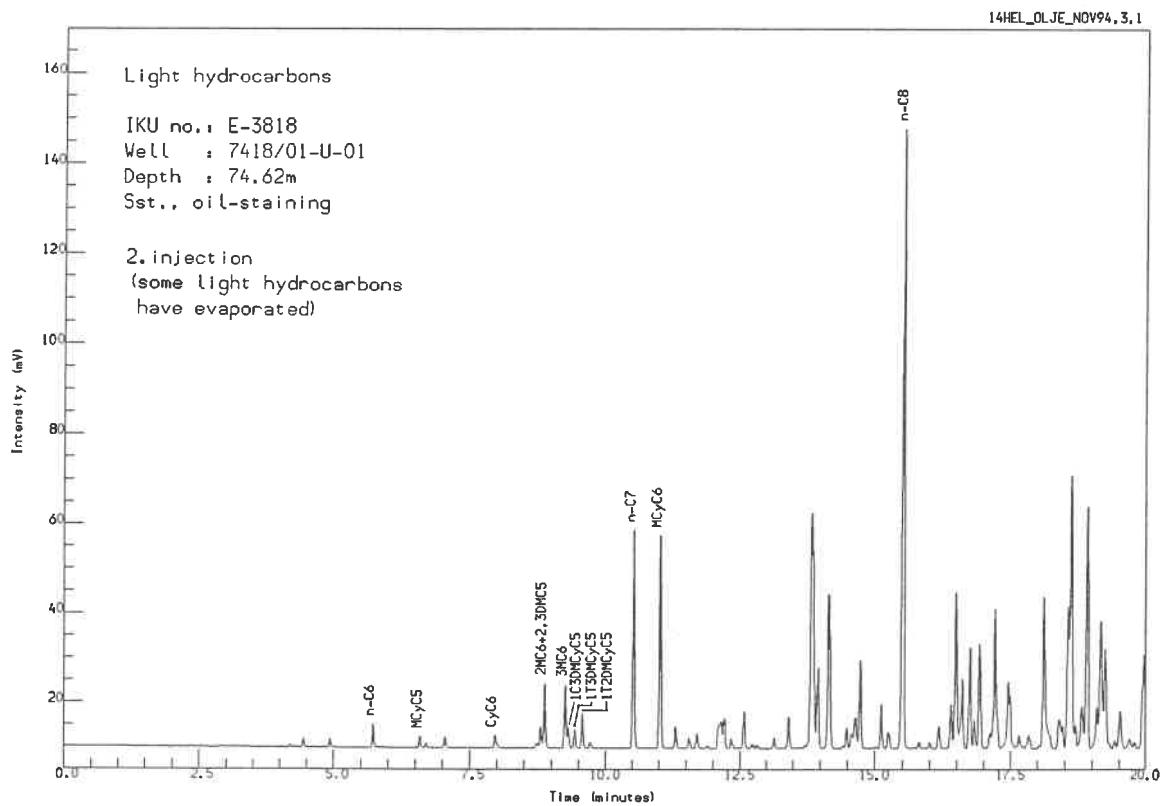
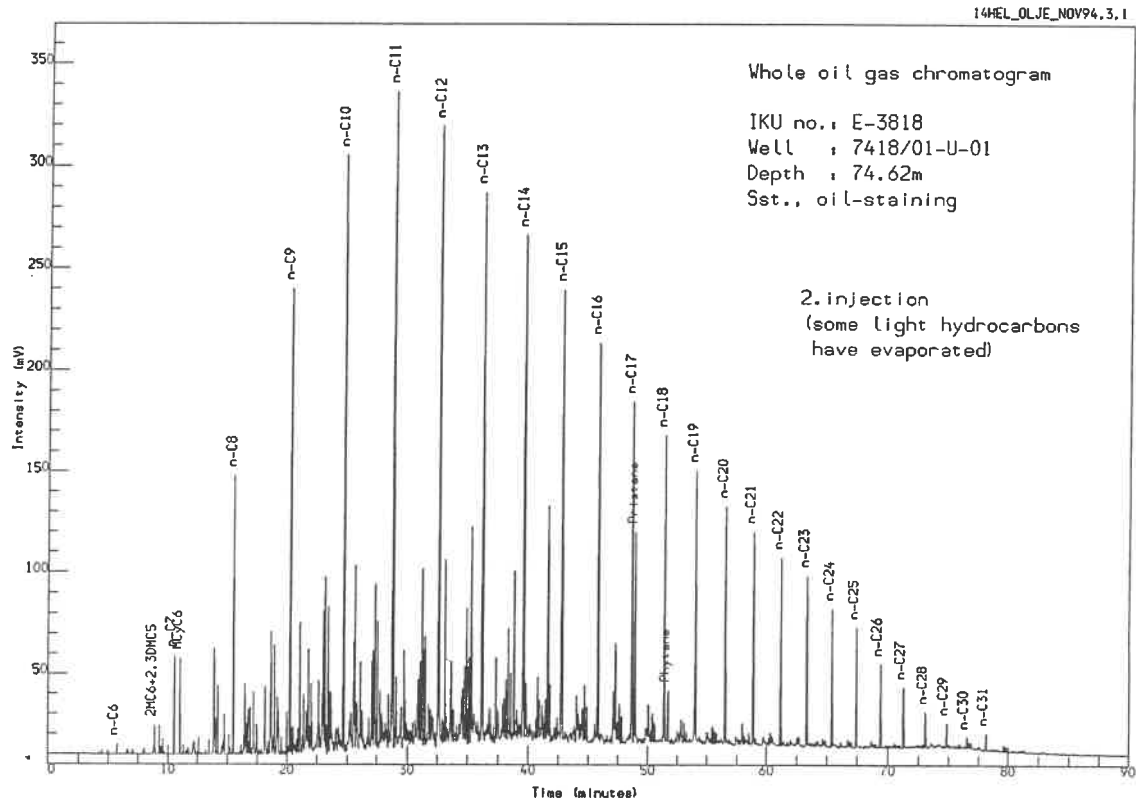
Figure A.3

**Gas Chromatograms
of
Whole oil and Light Hydrocarbons**

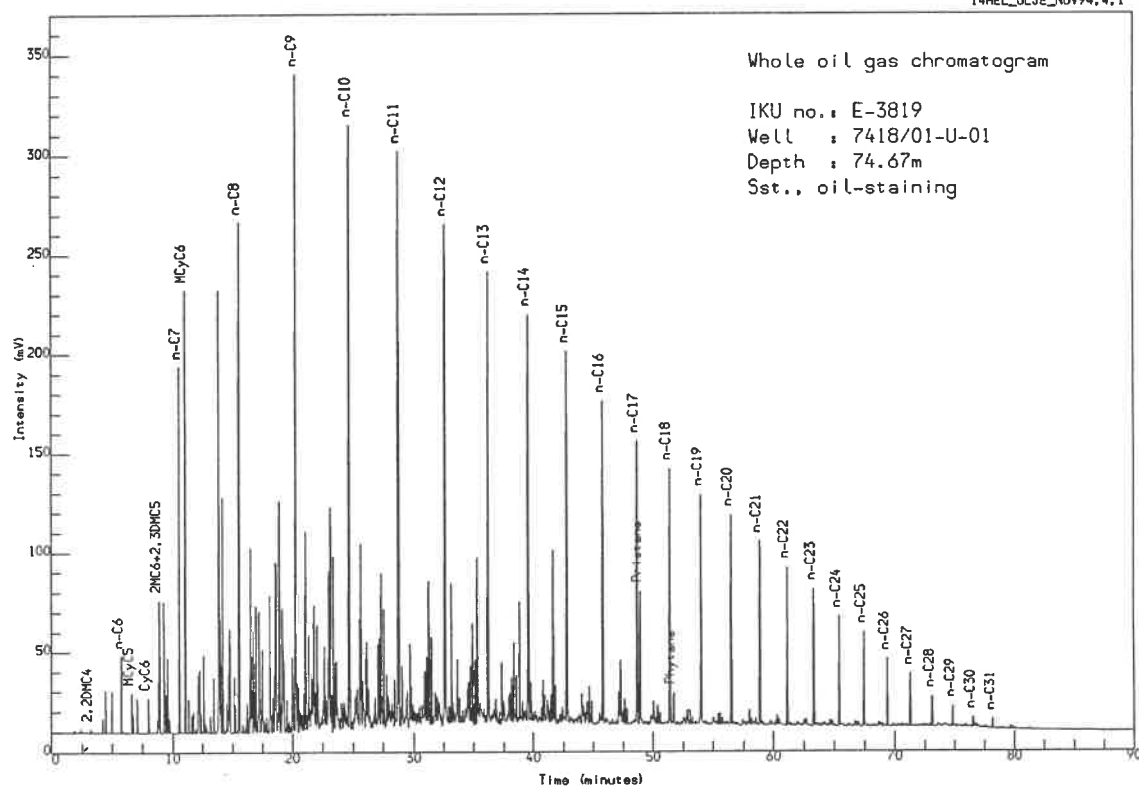
Peak code	Peak identity
n-C ₁₅	n-alkanes
2,2 DMC ₄	2,2 - dimethylbutane
M CyC ₅	methylcyclopentane
CyC ₆	cyclohexane
2 MC ₆	2 - methylhexane
2,3 DMC ₅	2,3 - dimethylpentane
3MC ₆	3 - methylhexane
1C3DMCyC ₅	1-cis-3-dimethylcyclopentane
1T3DMCyC ₅	1-trans-3-dimethylcyclopentane
1T2DMCyC ₅	1-trans-2-dimethylcyclopentane
MCyC ₆	methylcyclohexane

Sample E-3818, 74.62 m was injected two times. The oil was reanalysed because of column during the first injection. Both chromatograms are presented.

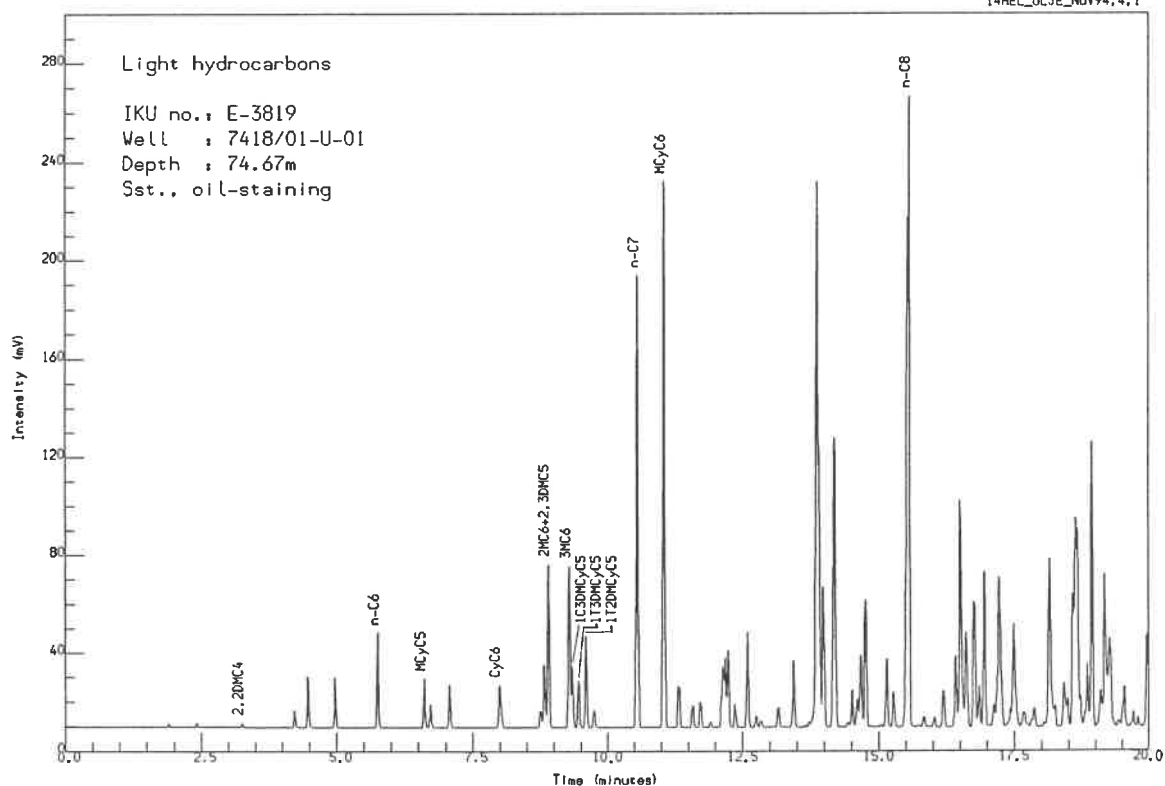


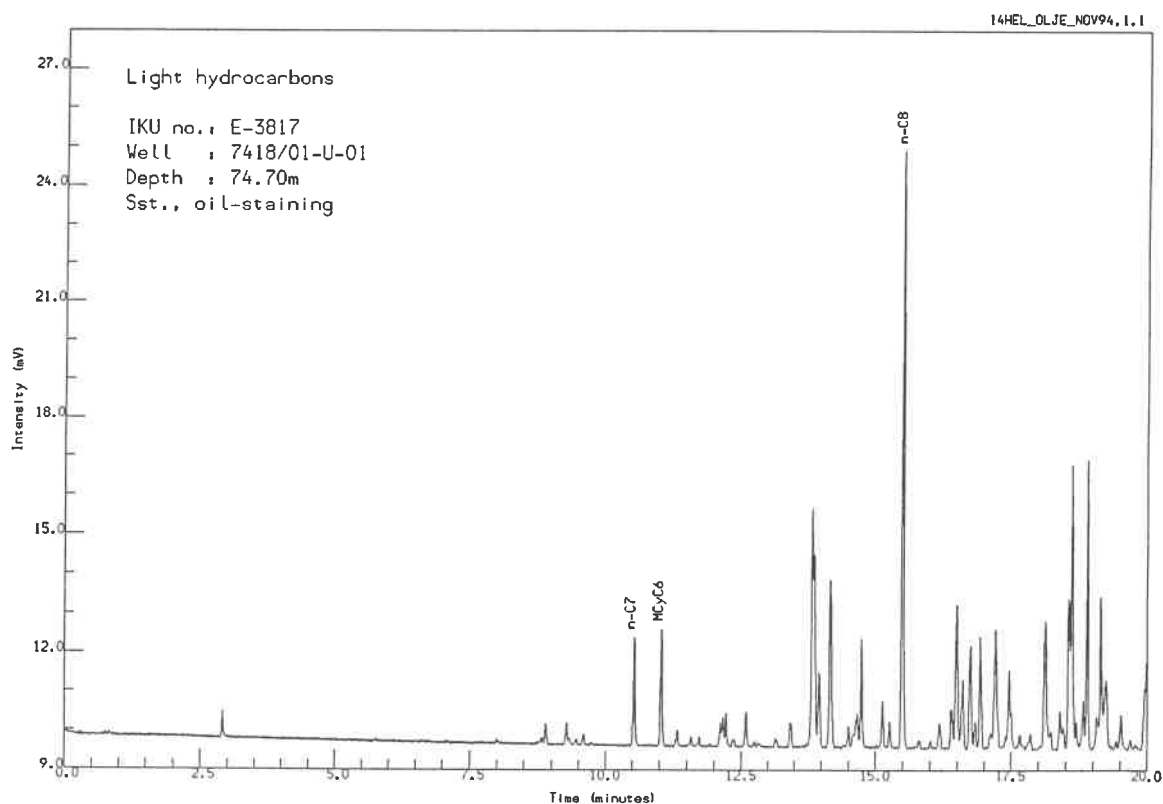
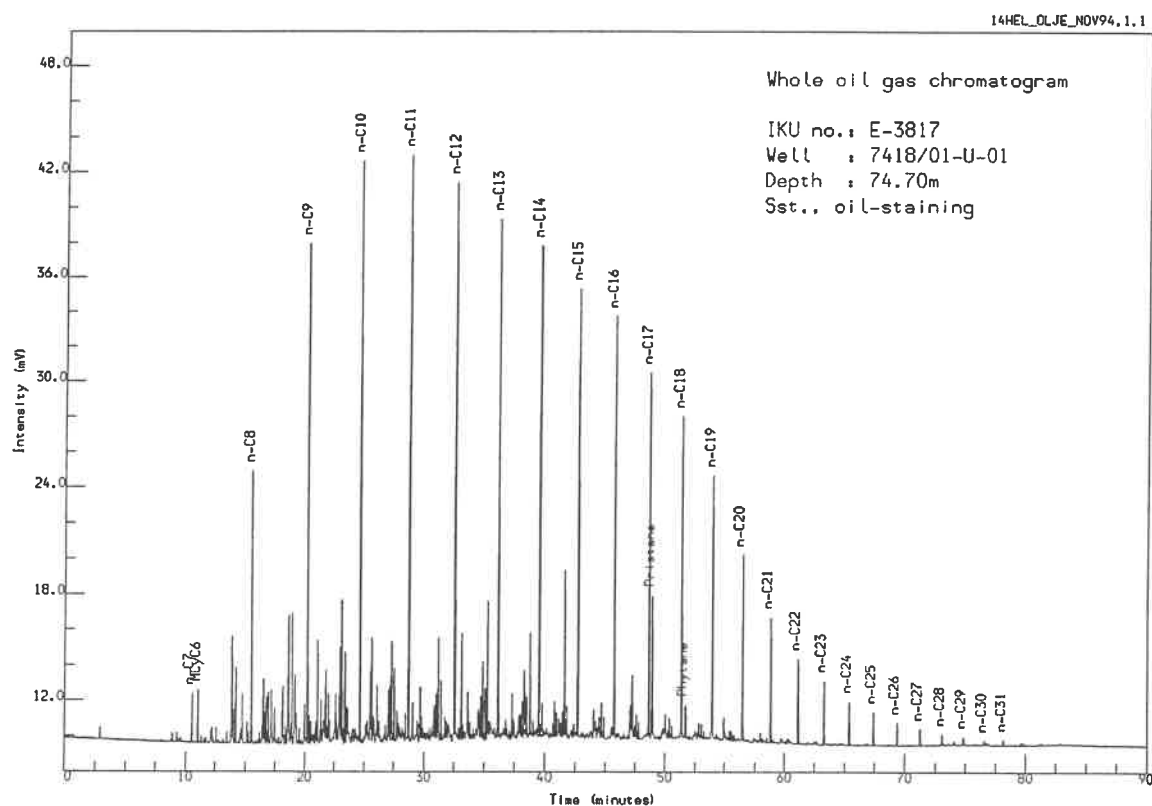


14HEL_OLJE_NOV94.4.1



14HEL_OLJE_NOV94.4.1





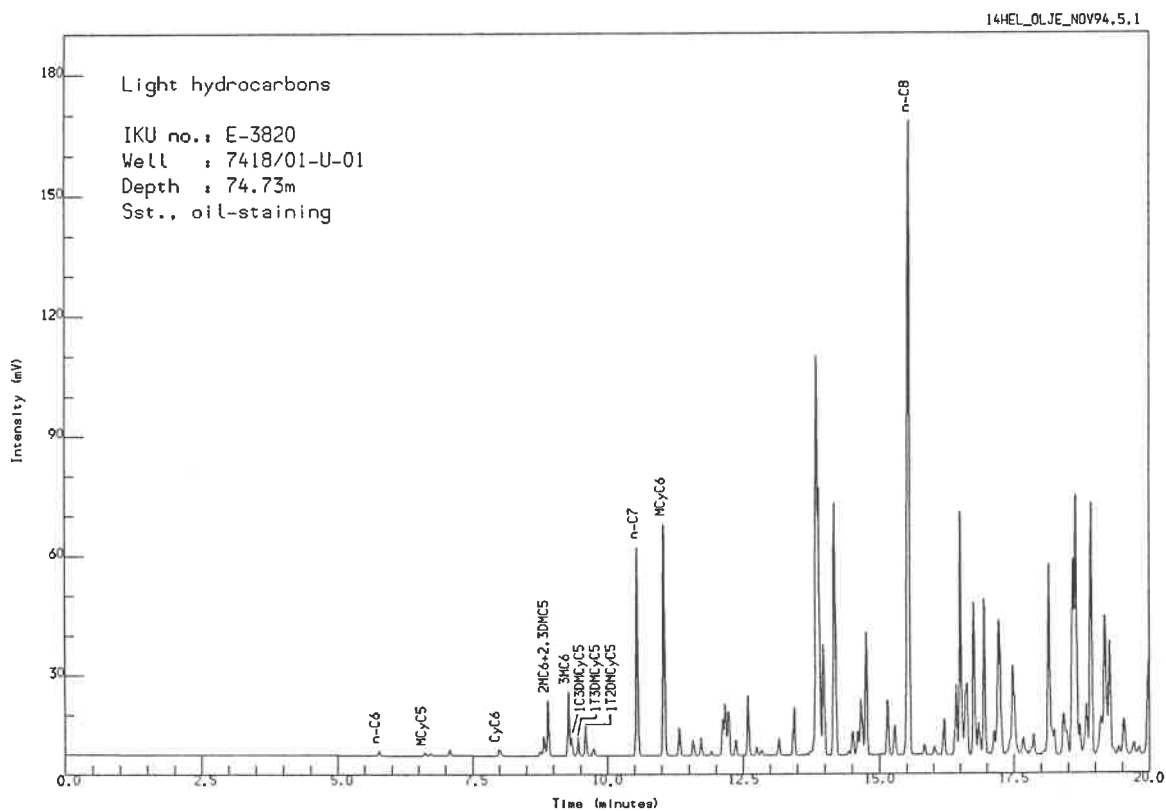
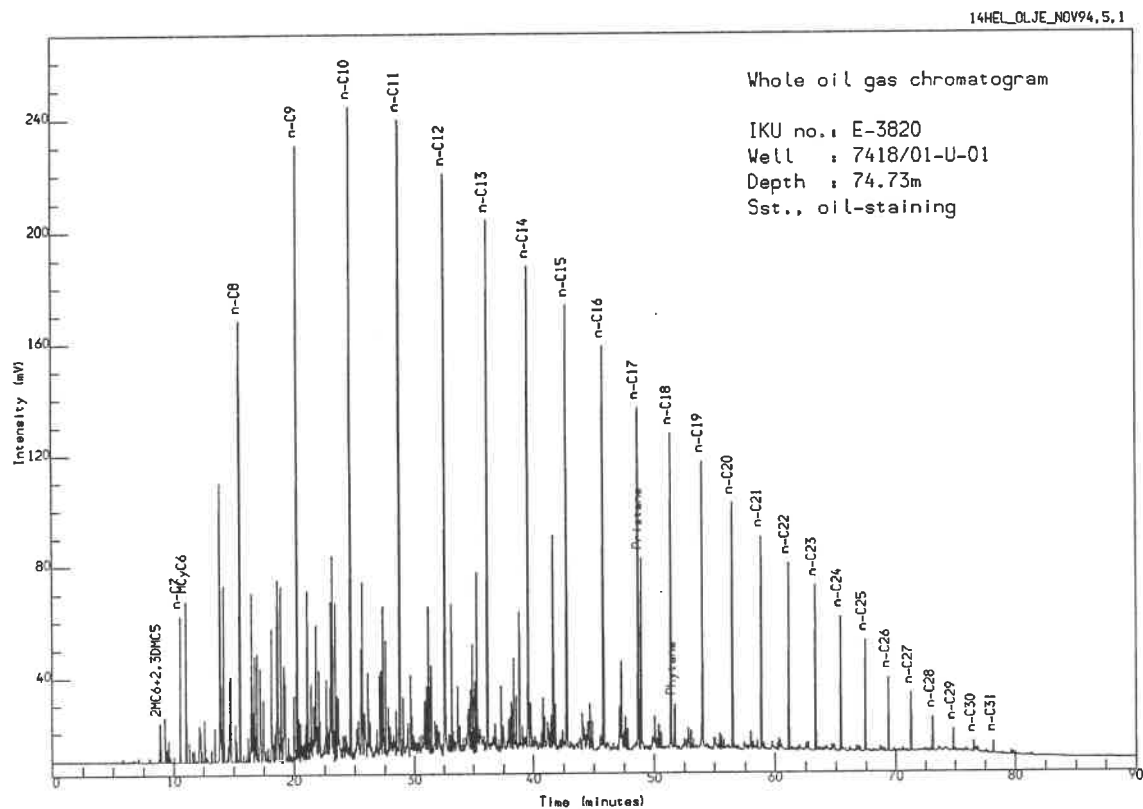
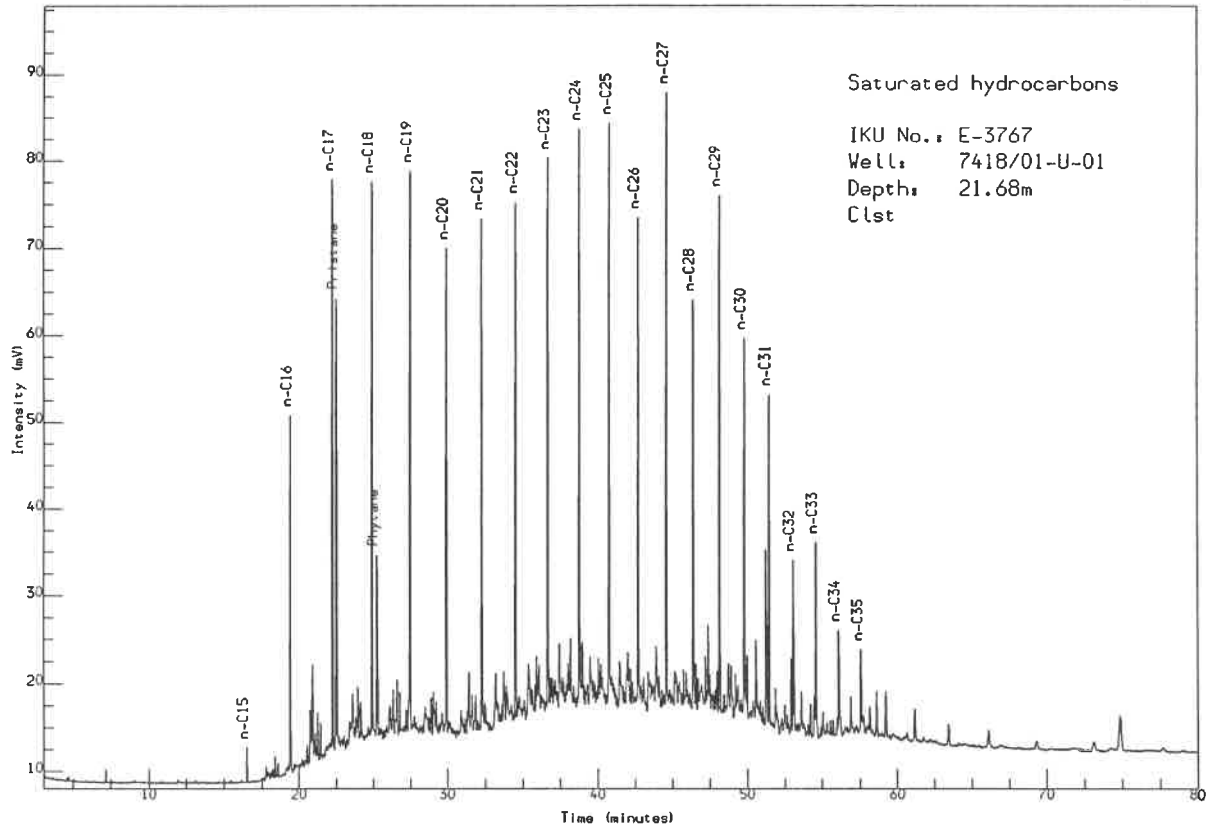


Figure A.4

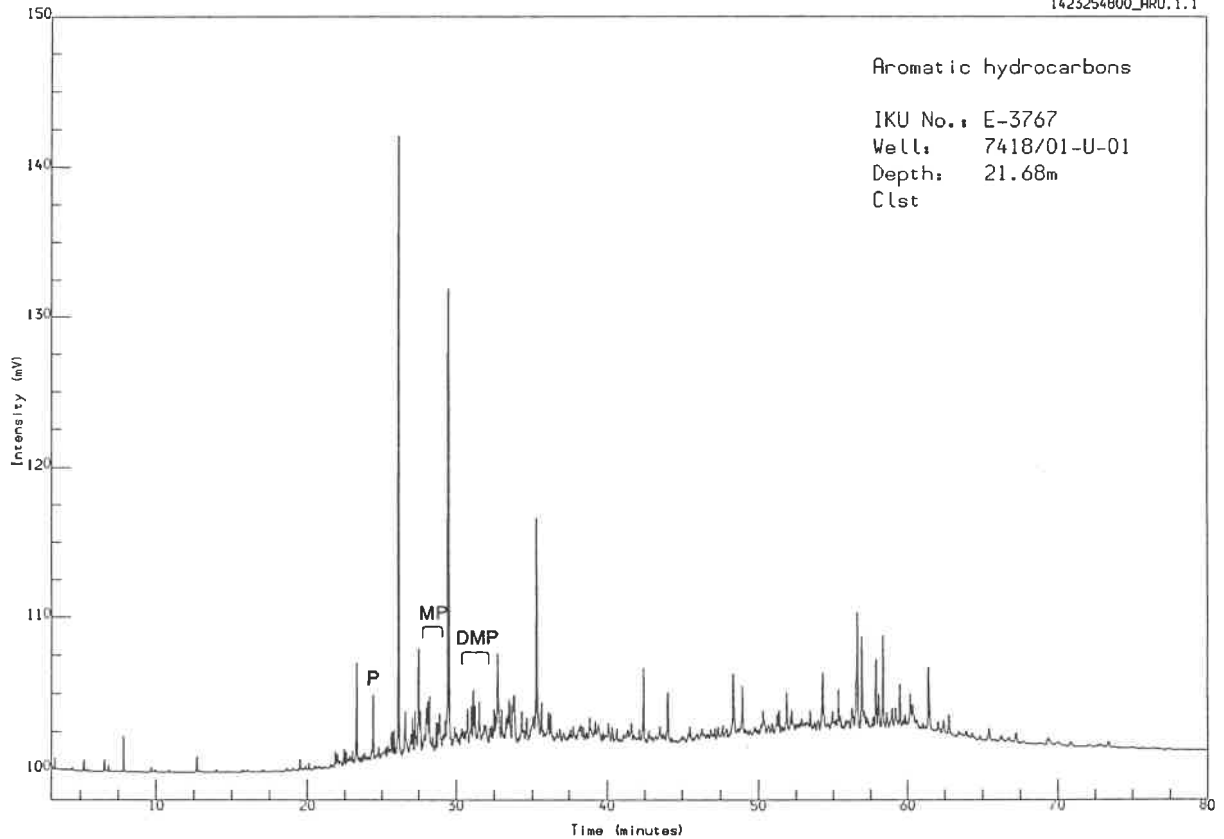
Gas Chromatograms of Saturated and Aromatic Hydrocarbons

Peak code	Peak identity
n-C ₁₅	n-alkanes
MN	Methyl-naphthalene
DMN	Dimethyl-naphthalene
TMN	Trimethyl-naphthalene
P	Phenanthrene
MP	Methyl-phenanthrene
DMP	Dimethyl-phenanthrene

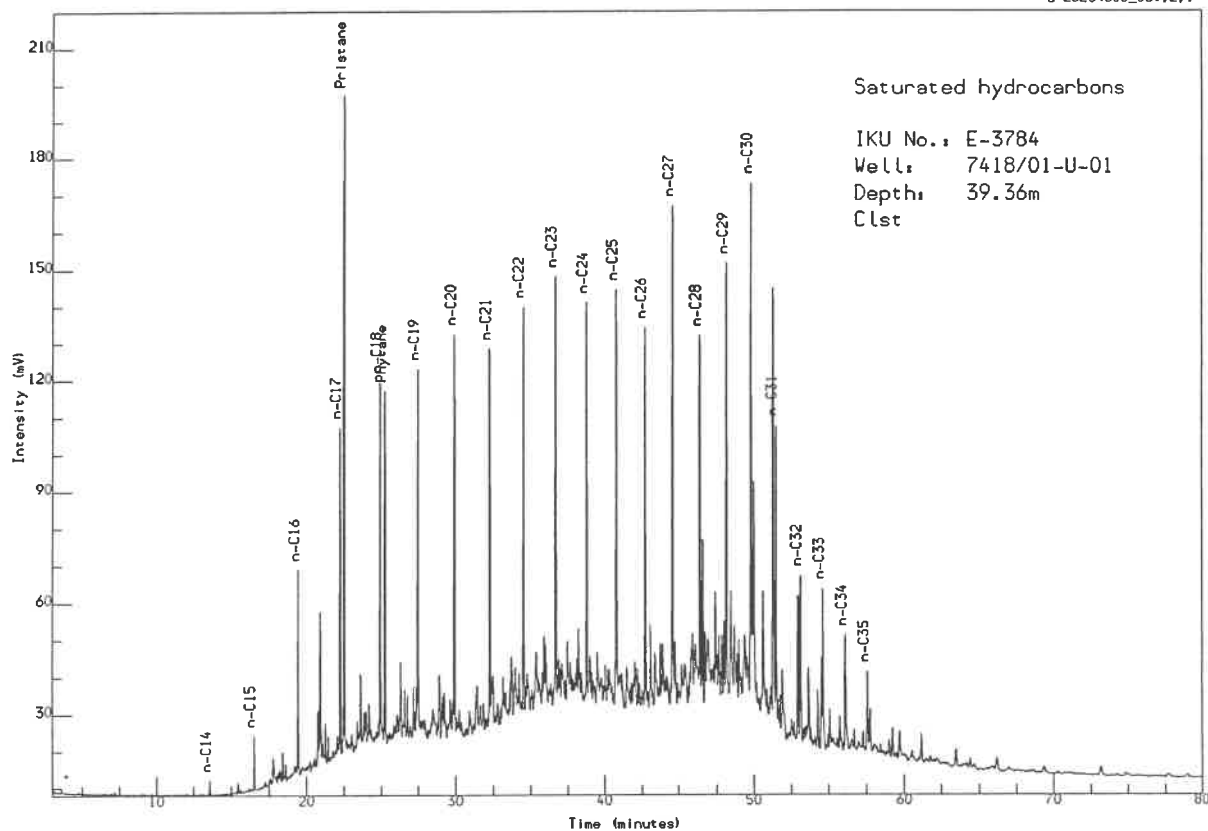
6 23254800_sat.8.1



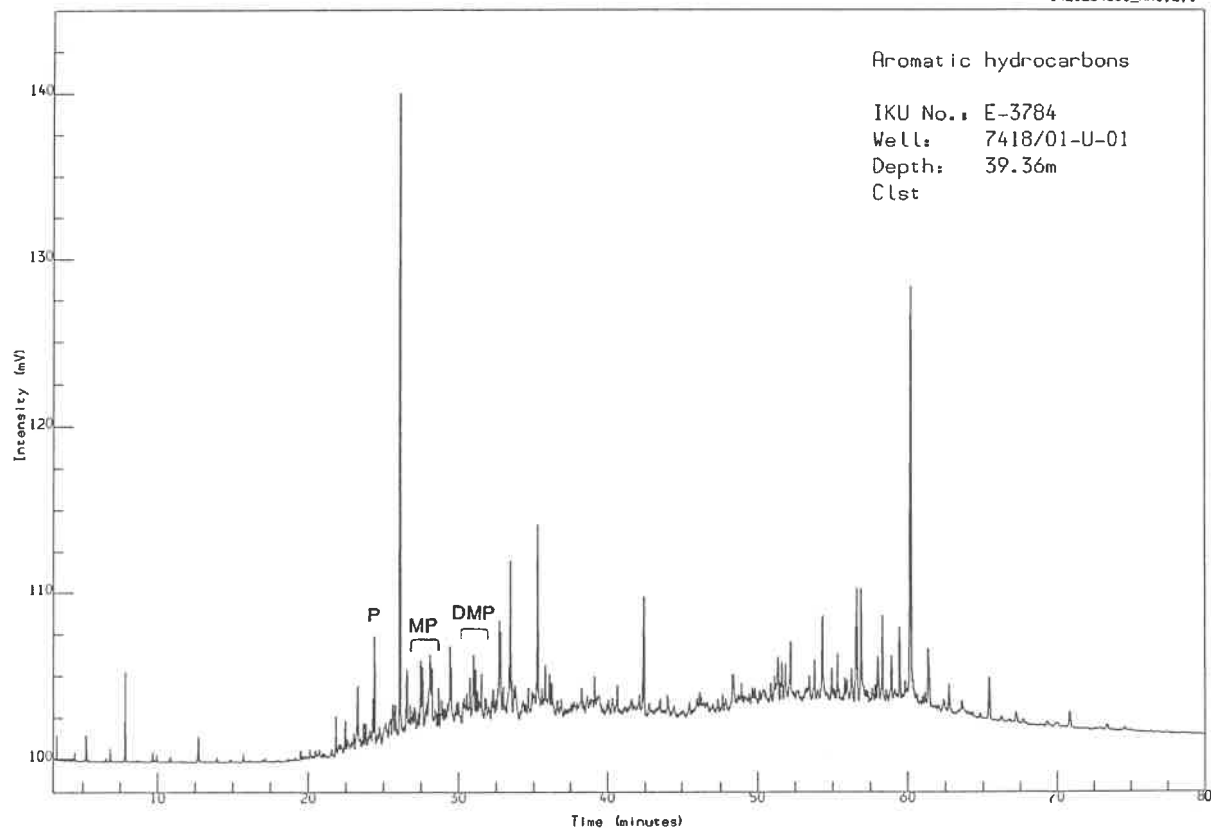
1423254800_ARO.1.1

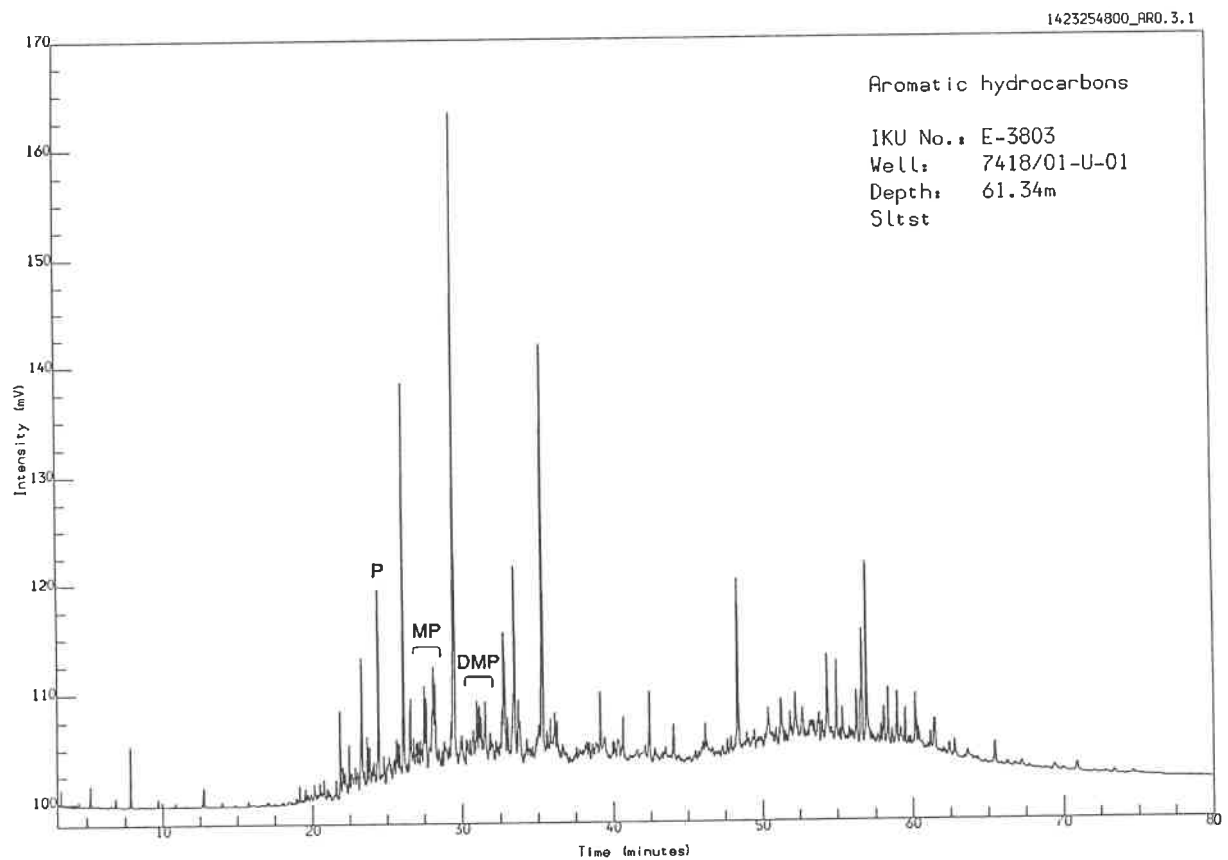
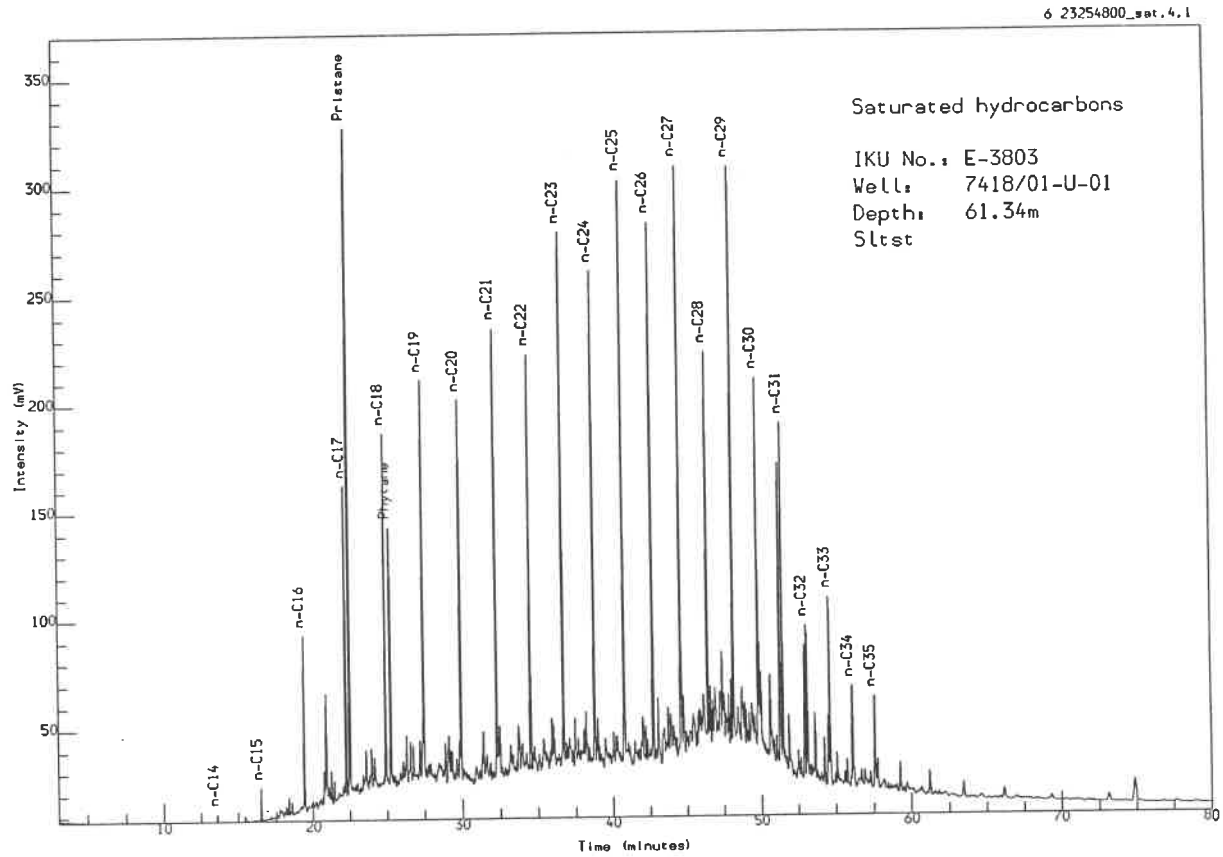


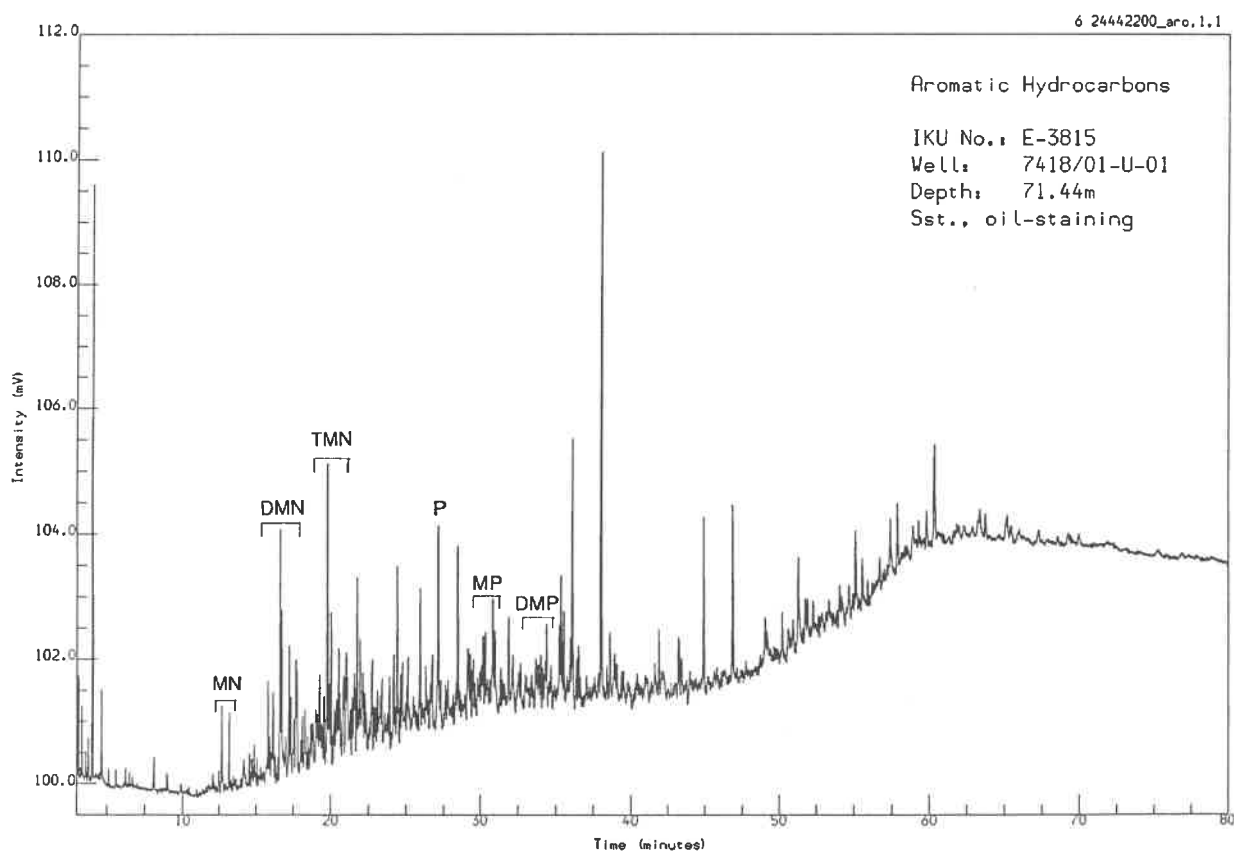
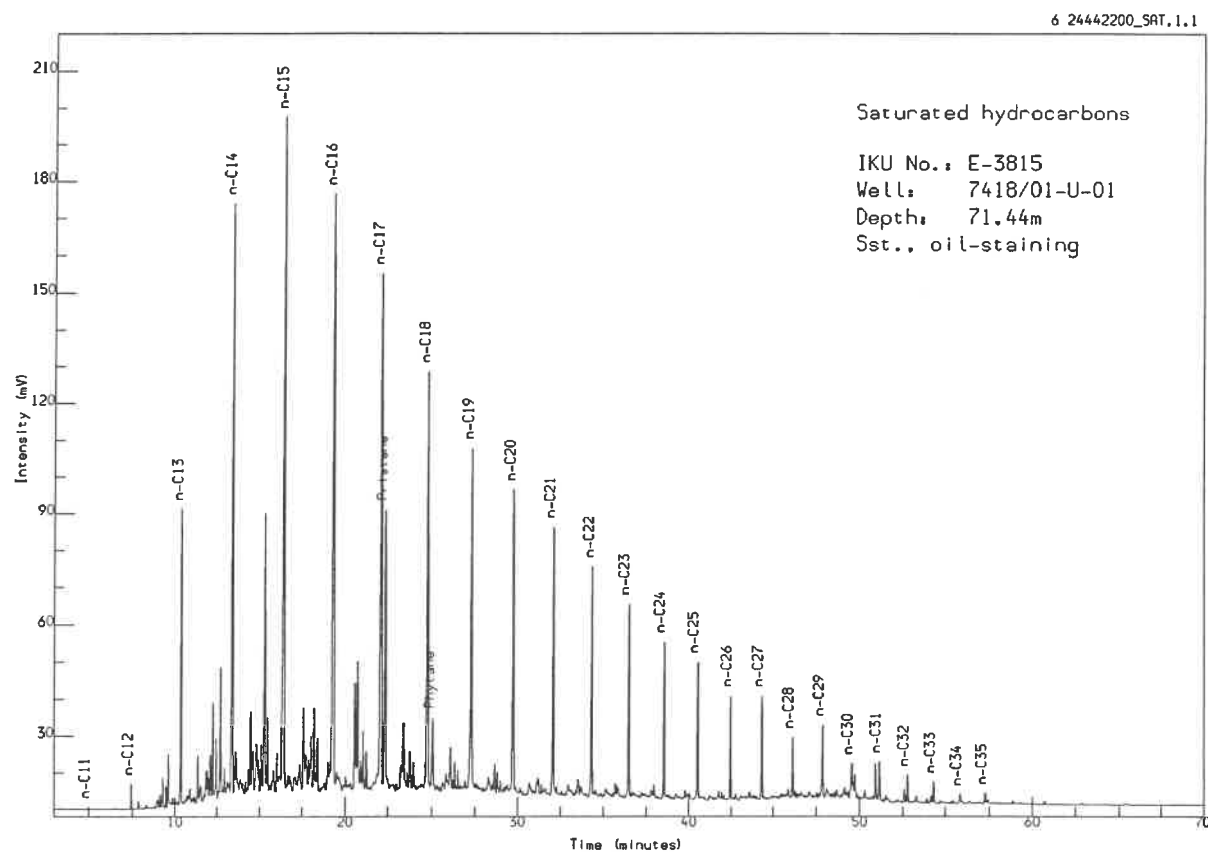
6 23254800_sat.2,1

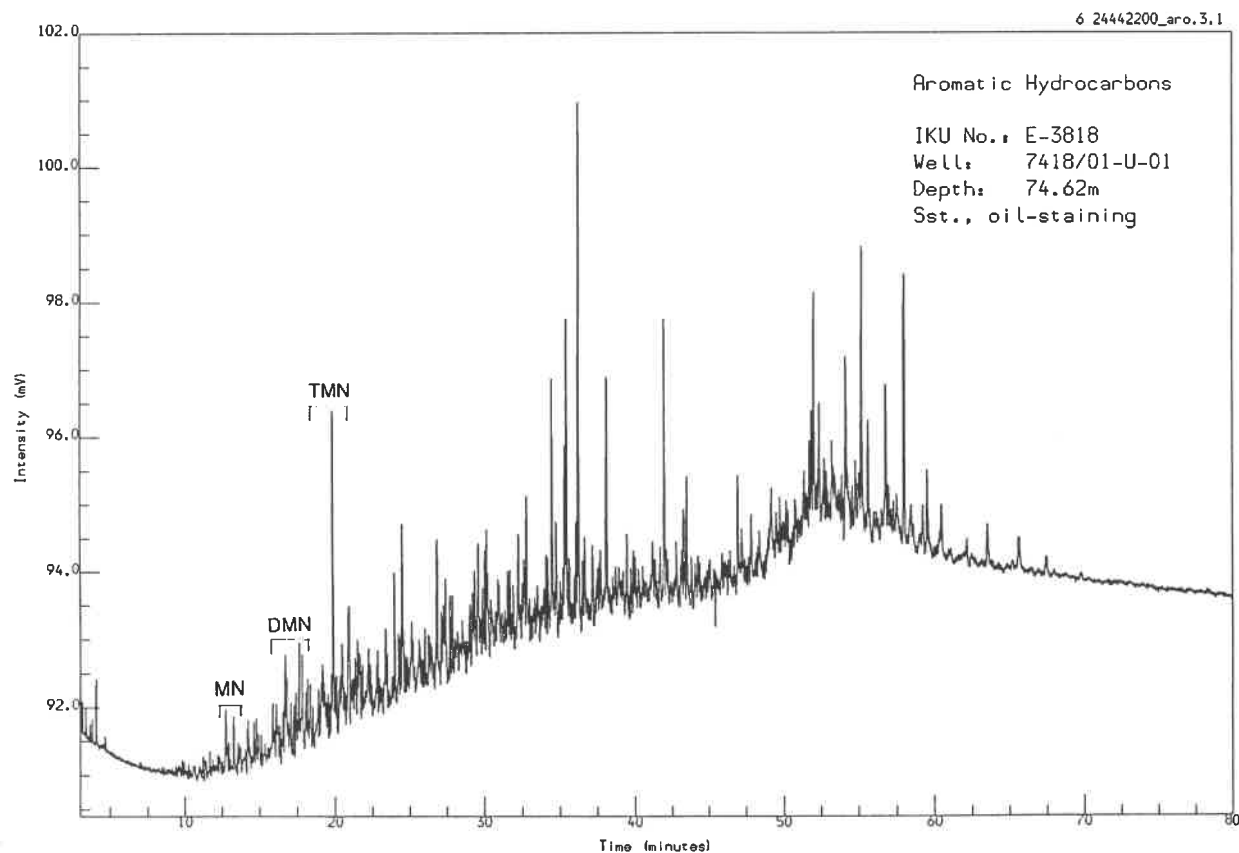
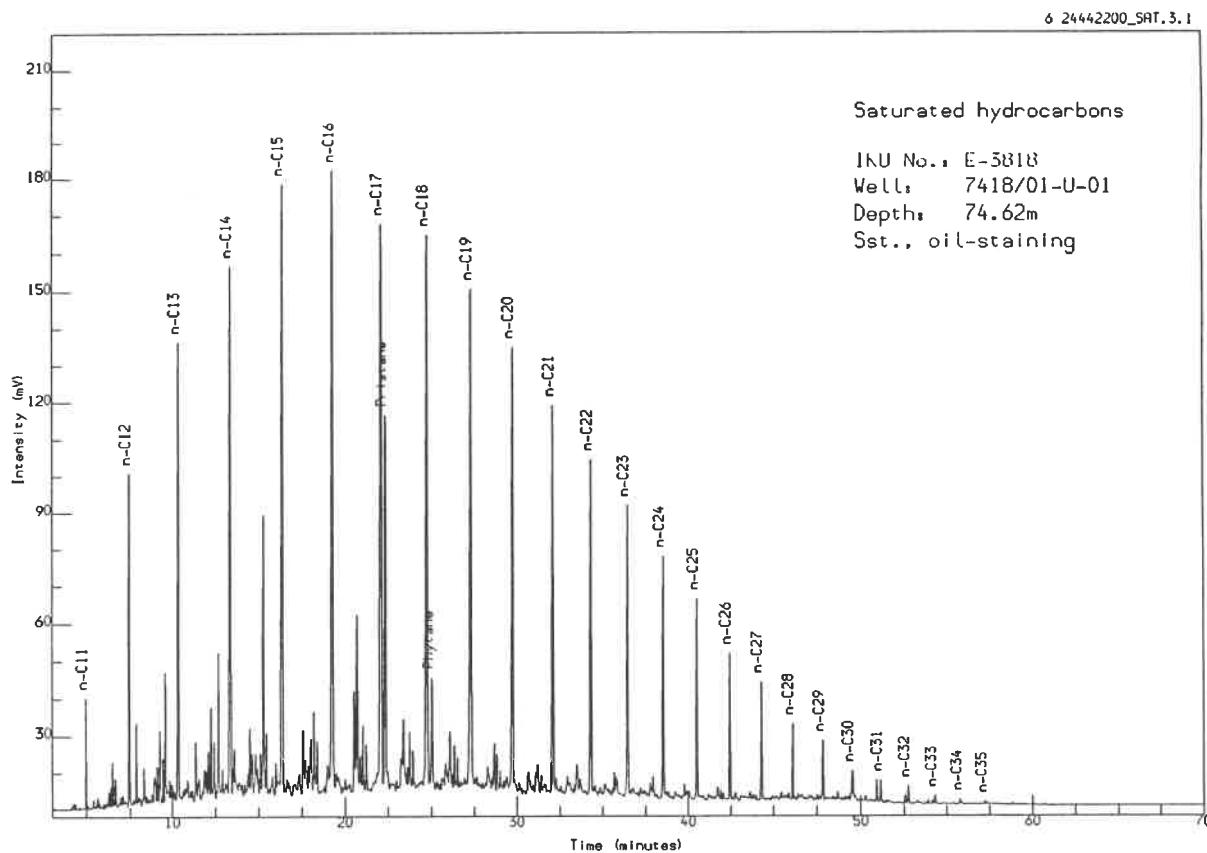


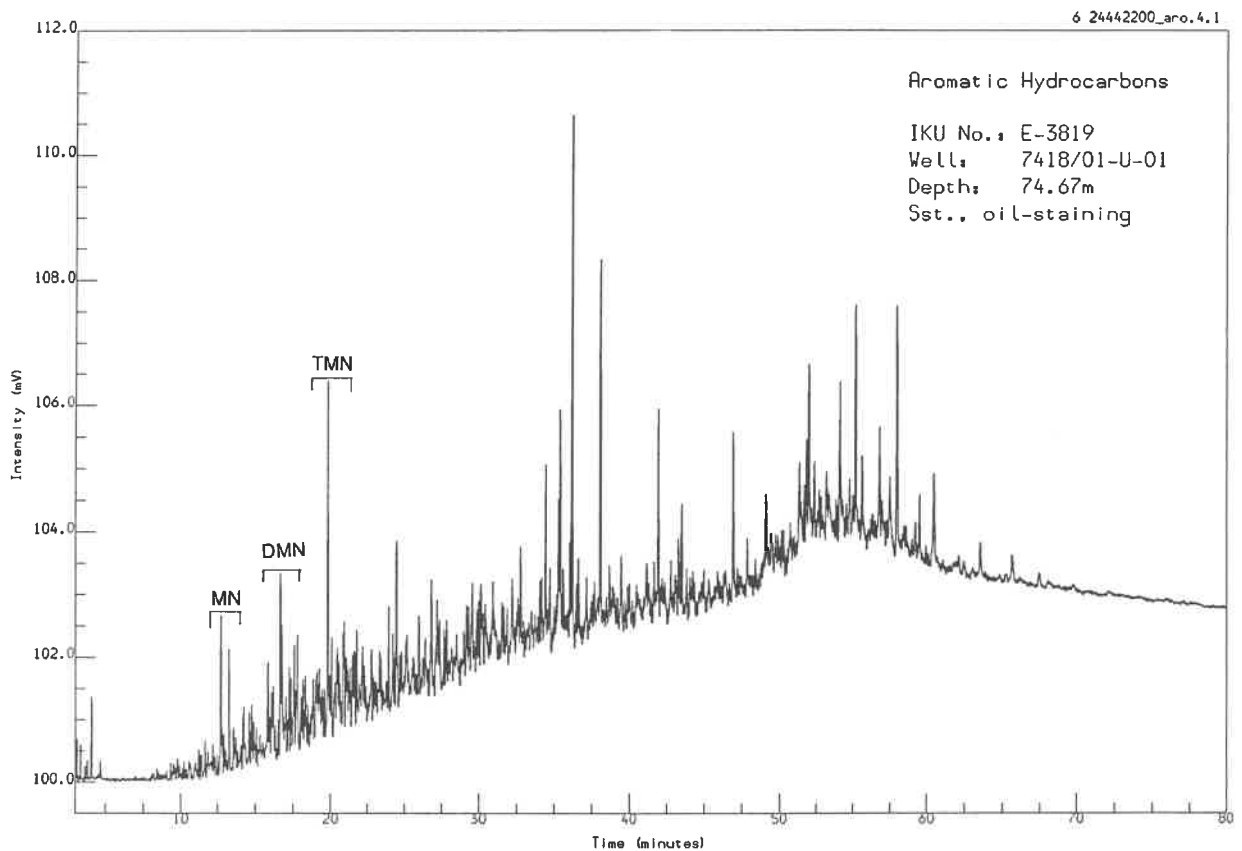
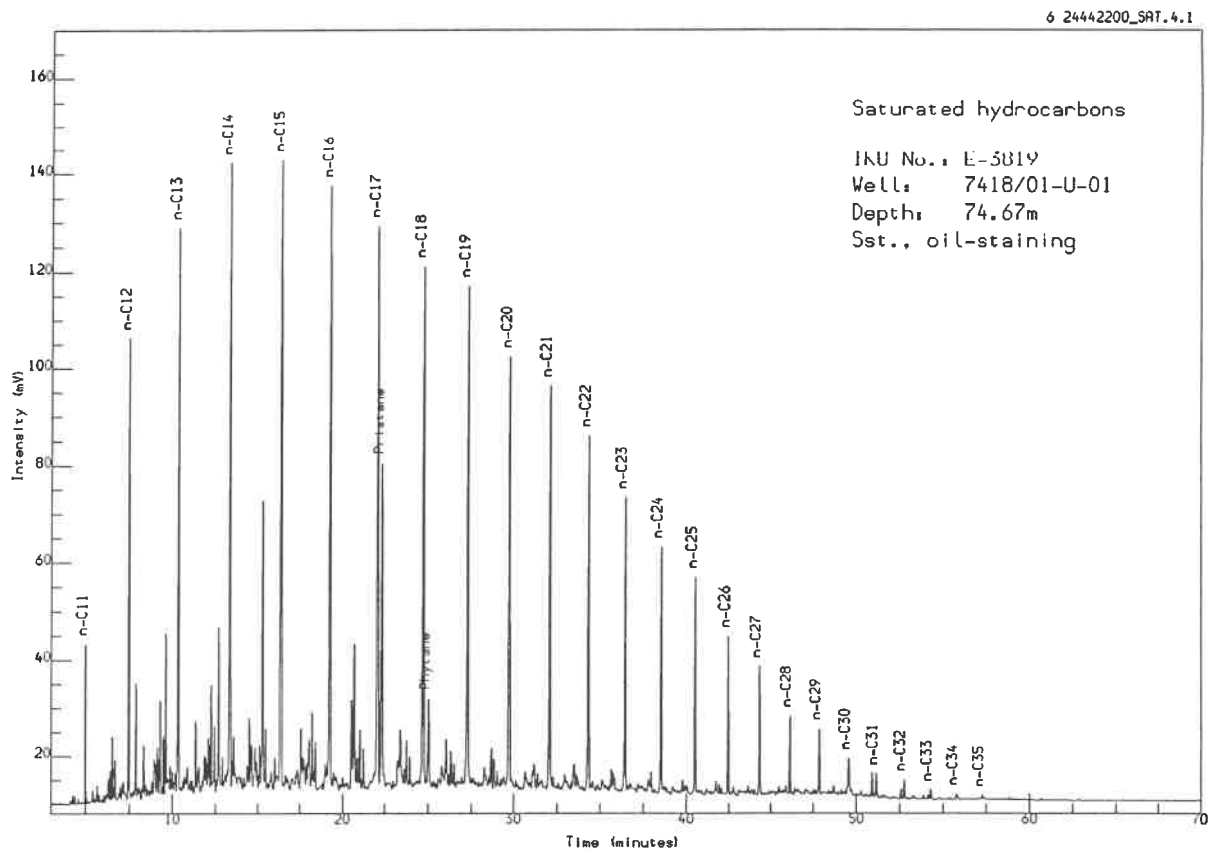
1423254800_ARO.2,1



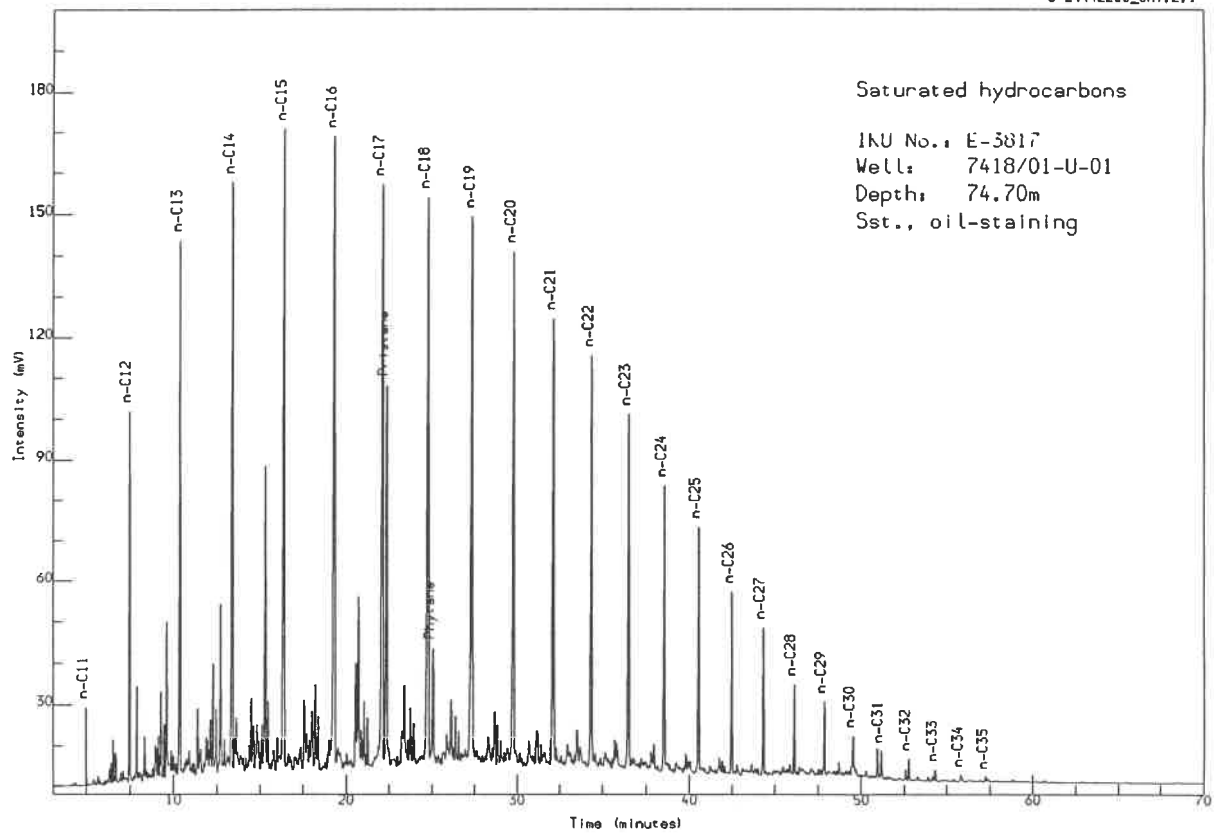




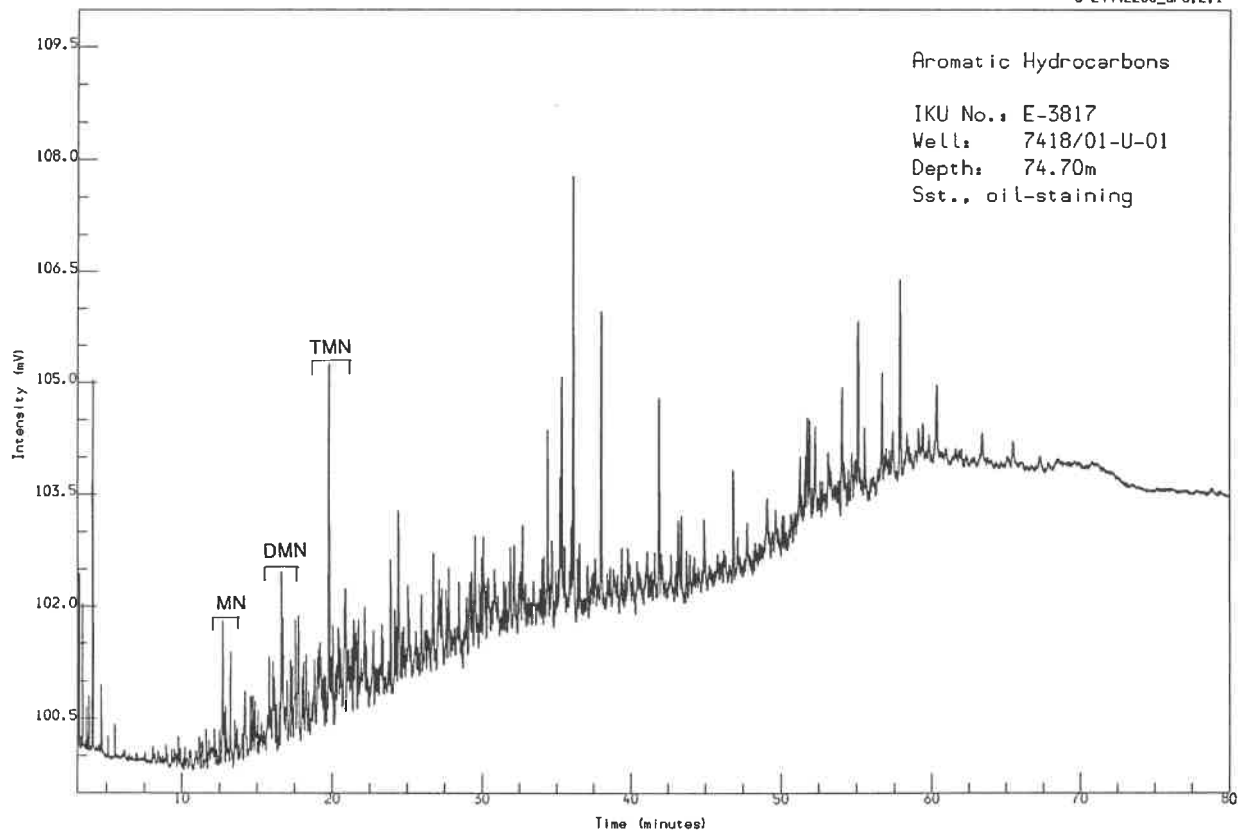




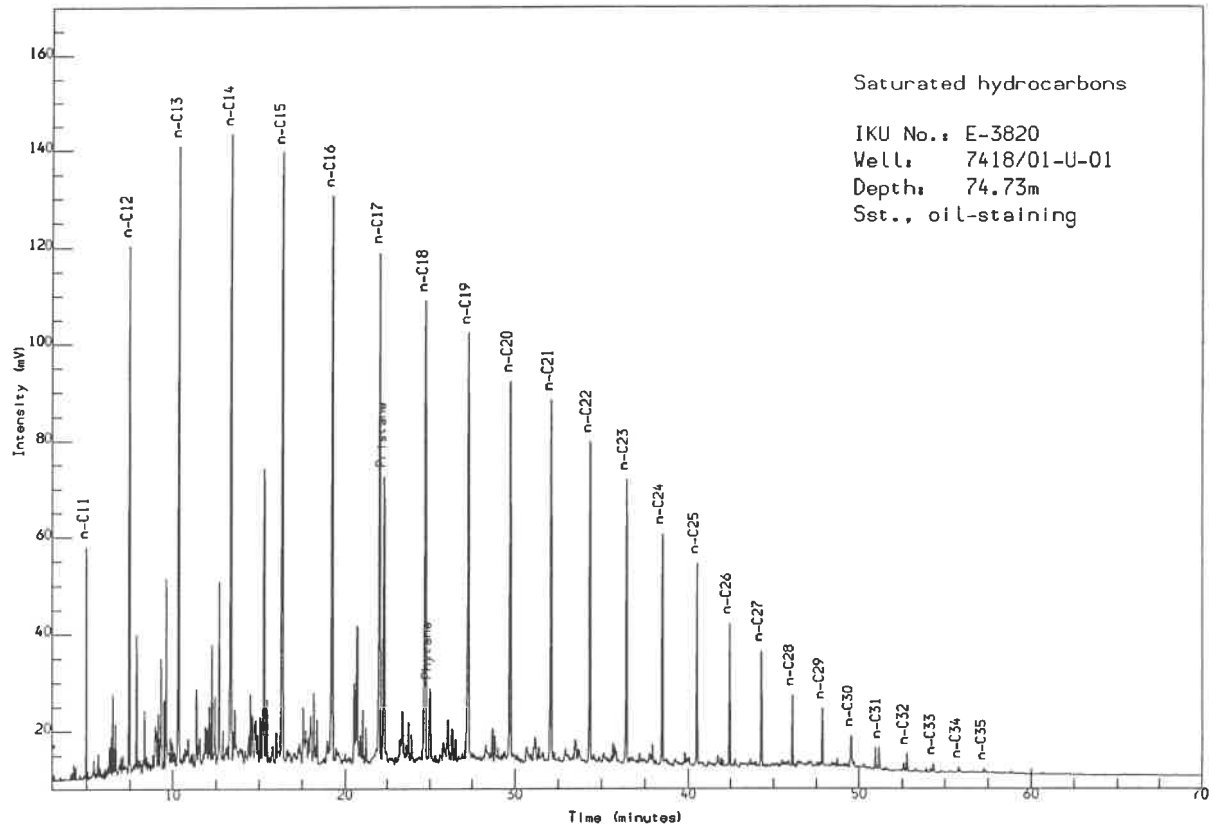
6 24442200_SAT.2.1



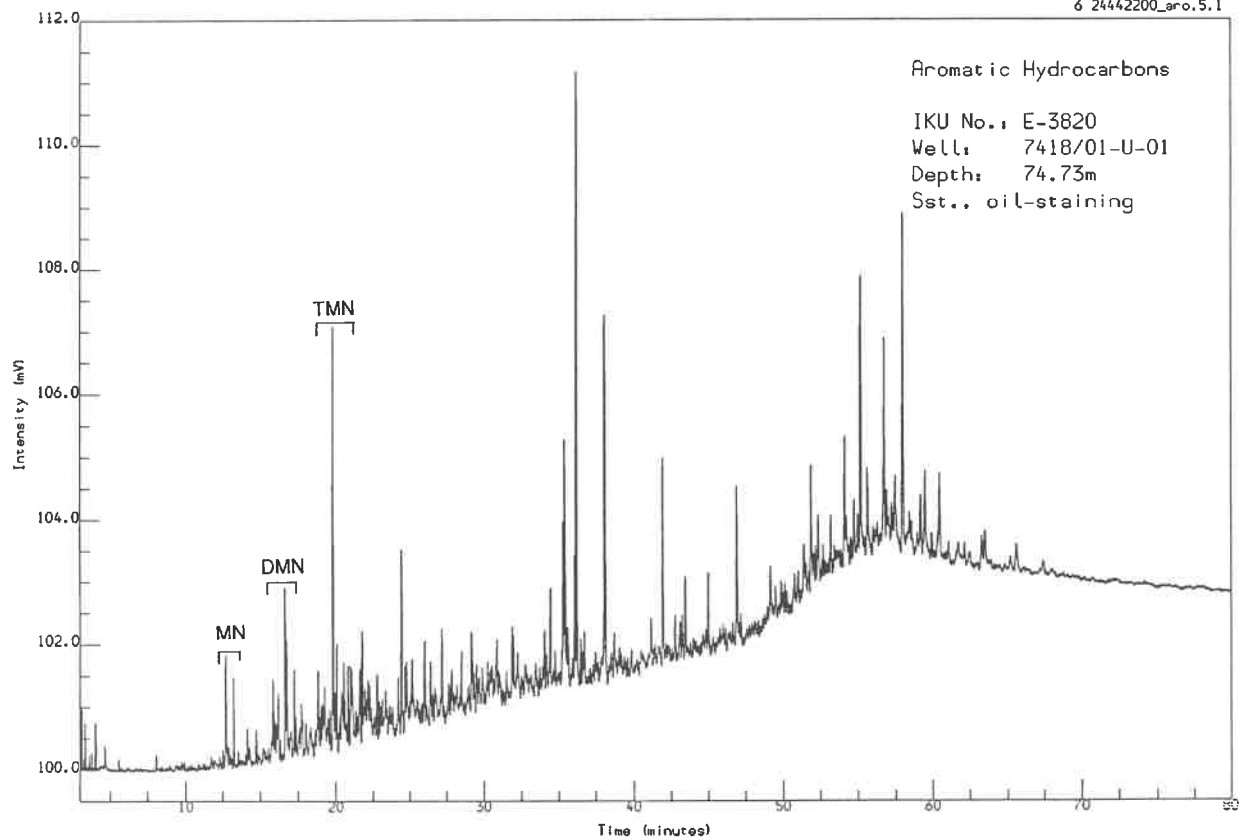
6 24442200_aro.2.1

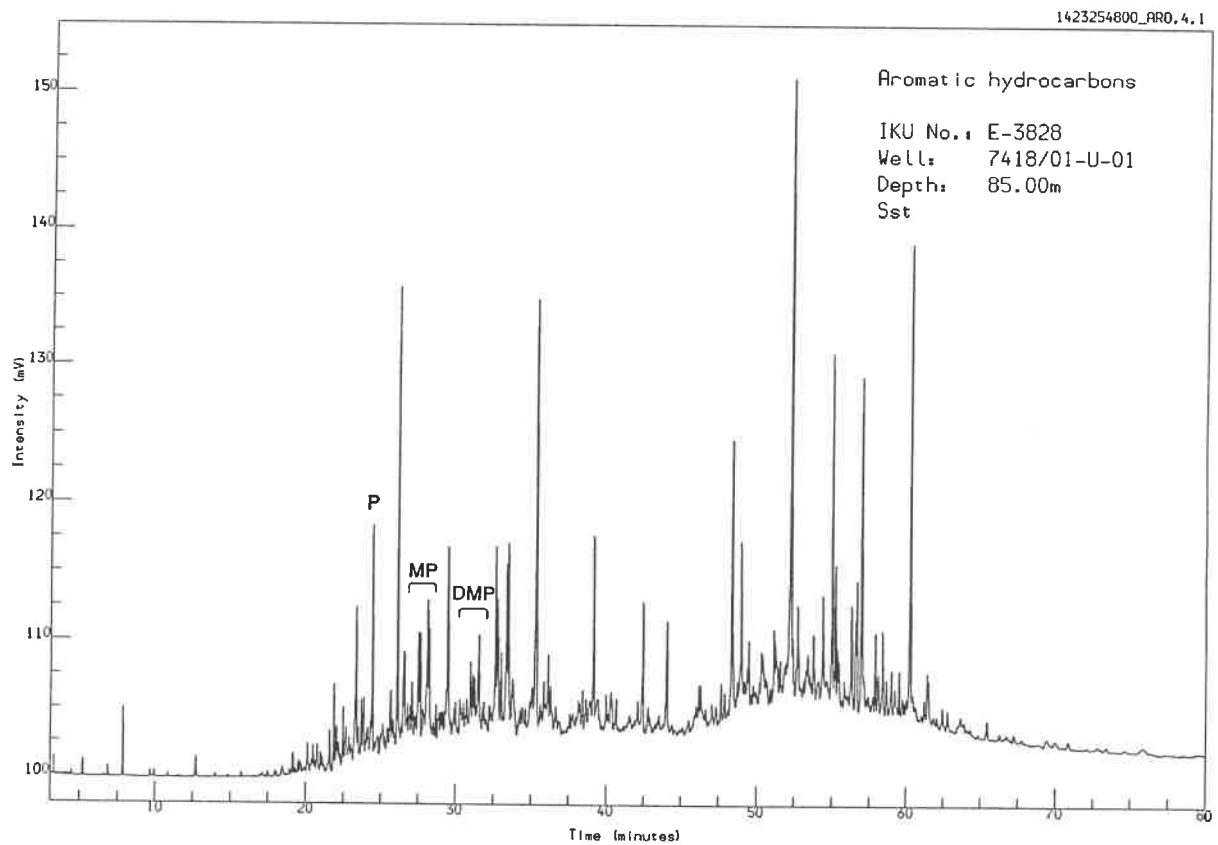
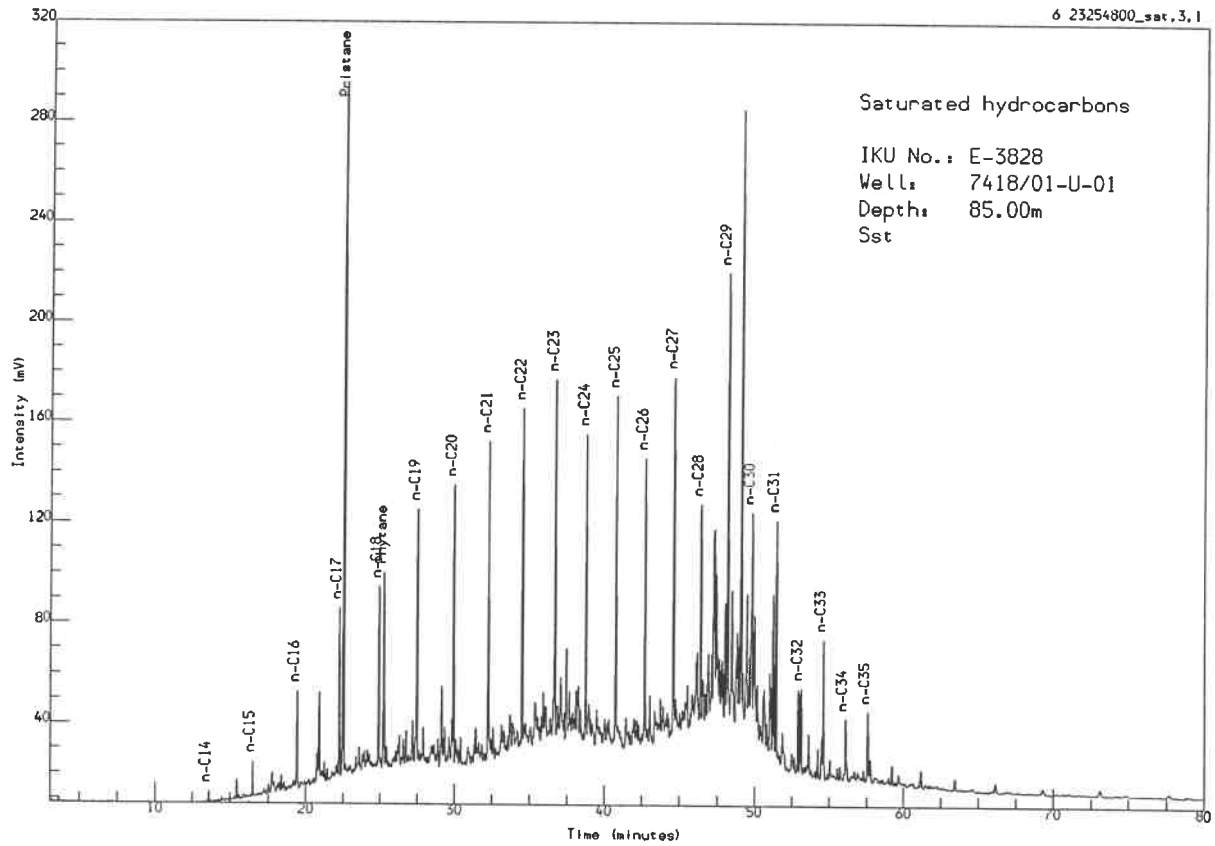


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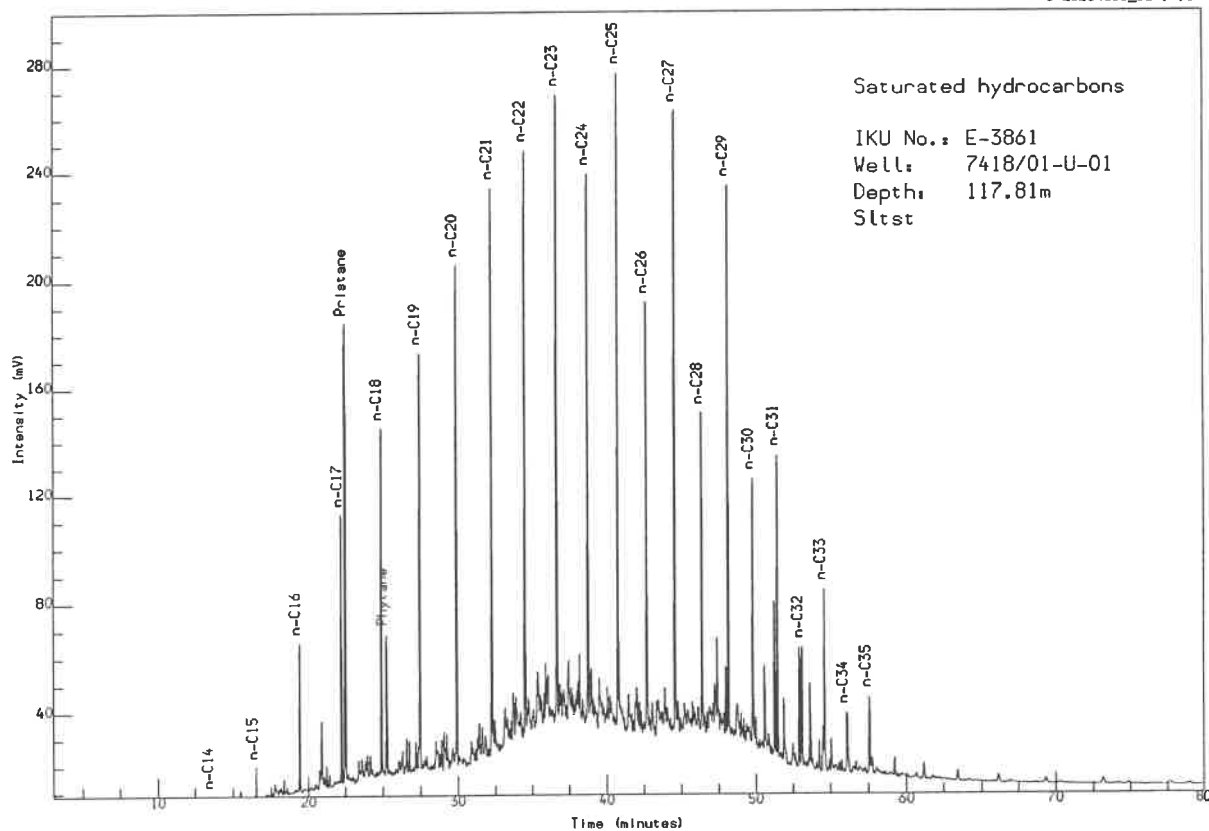


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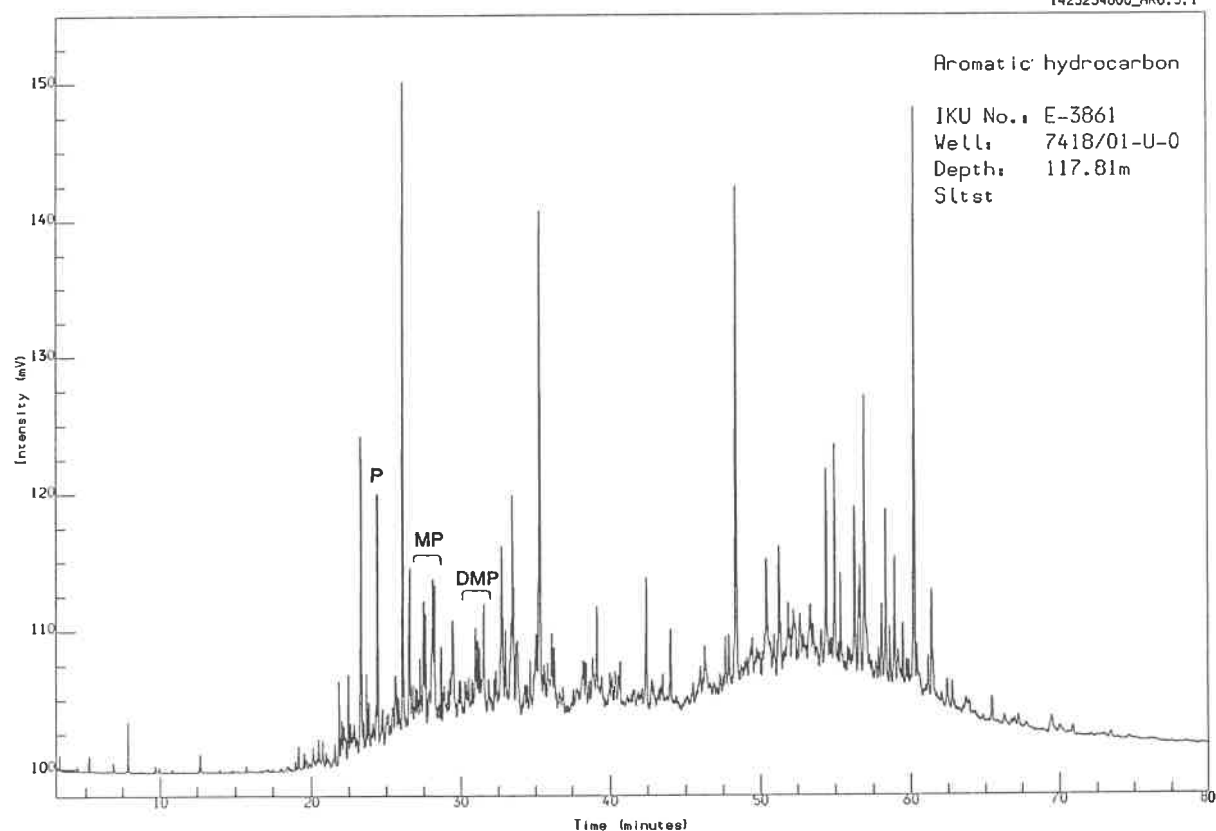


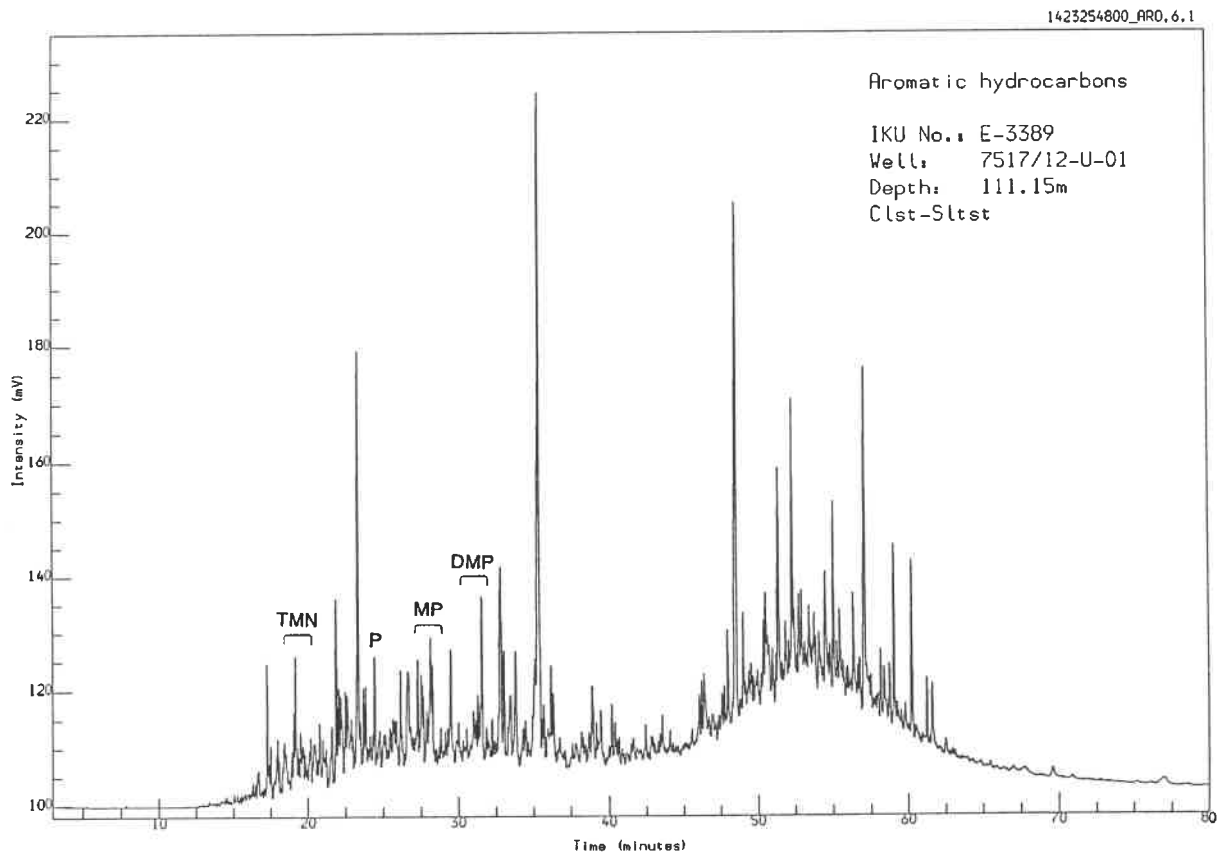
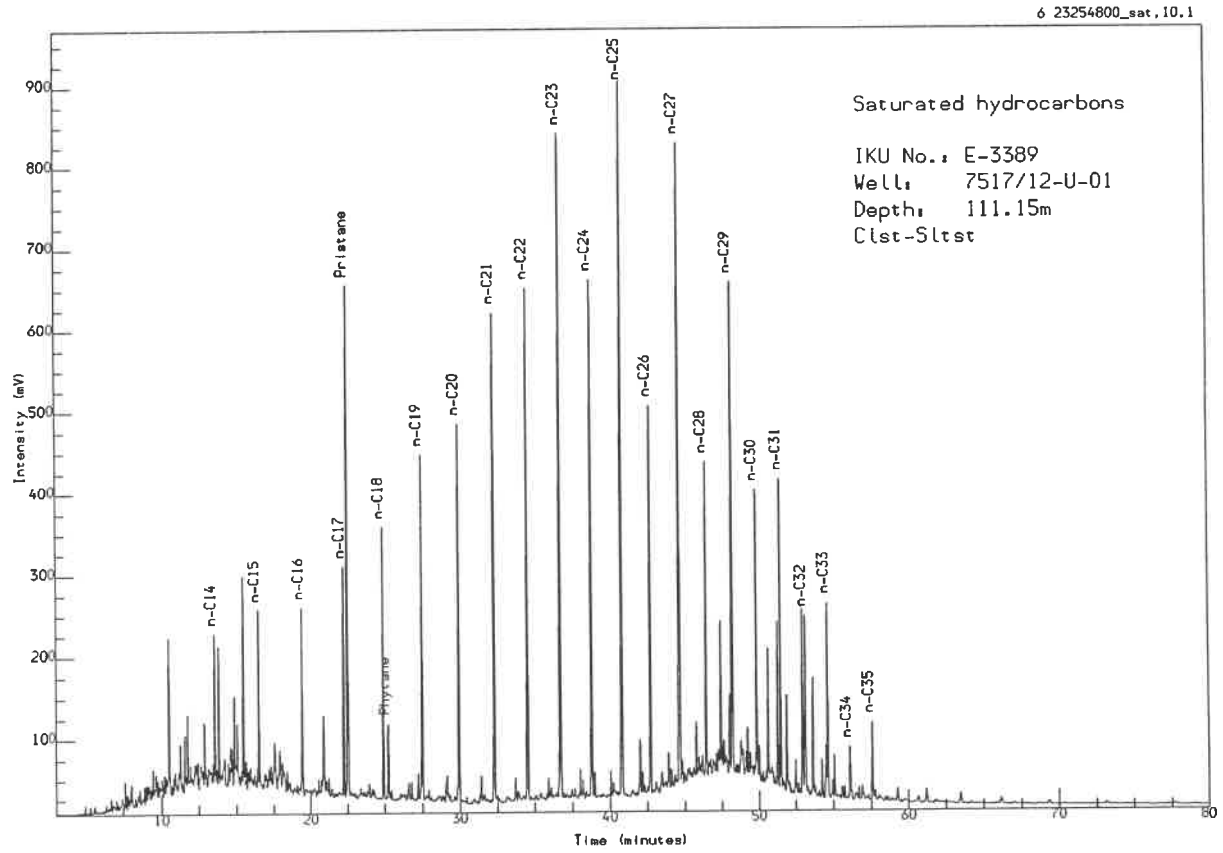


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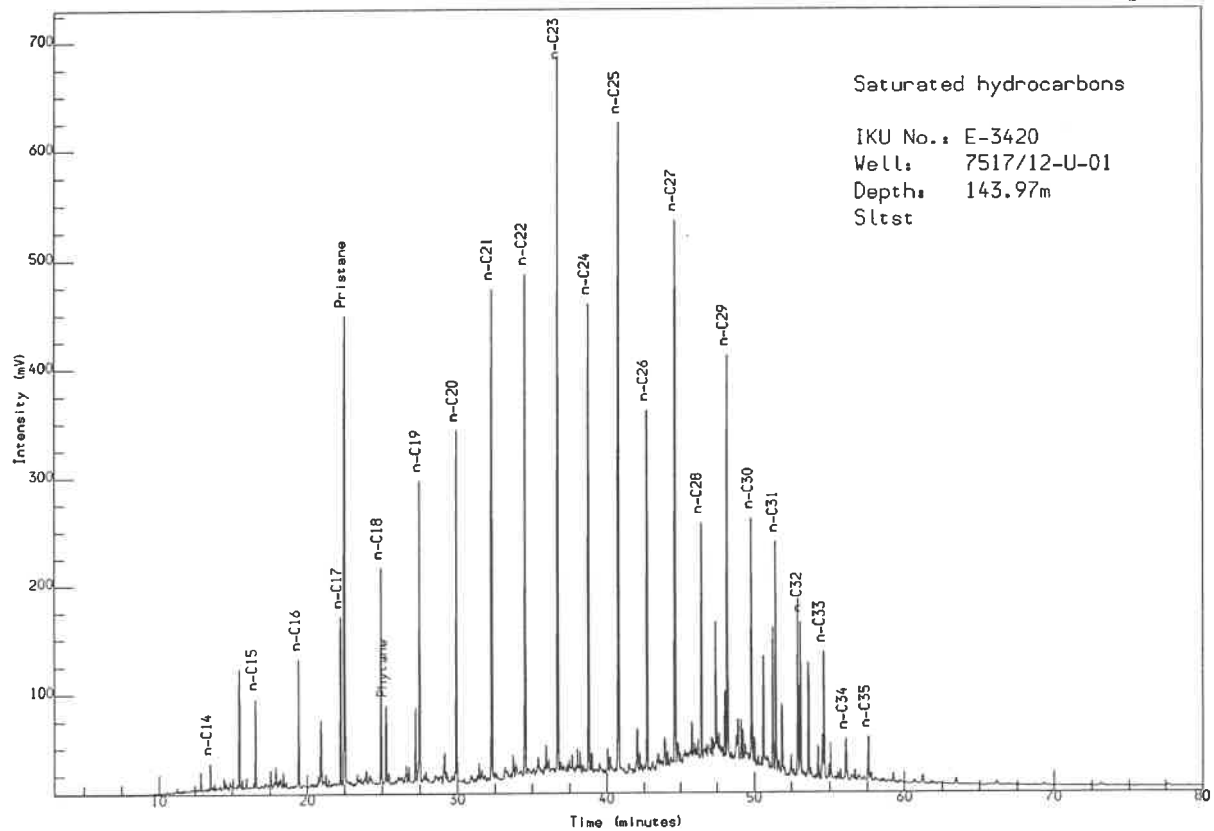


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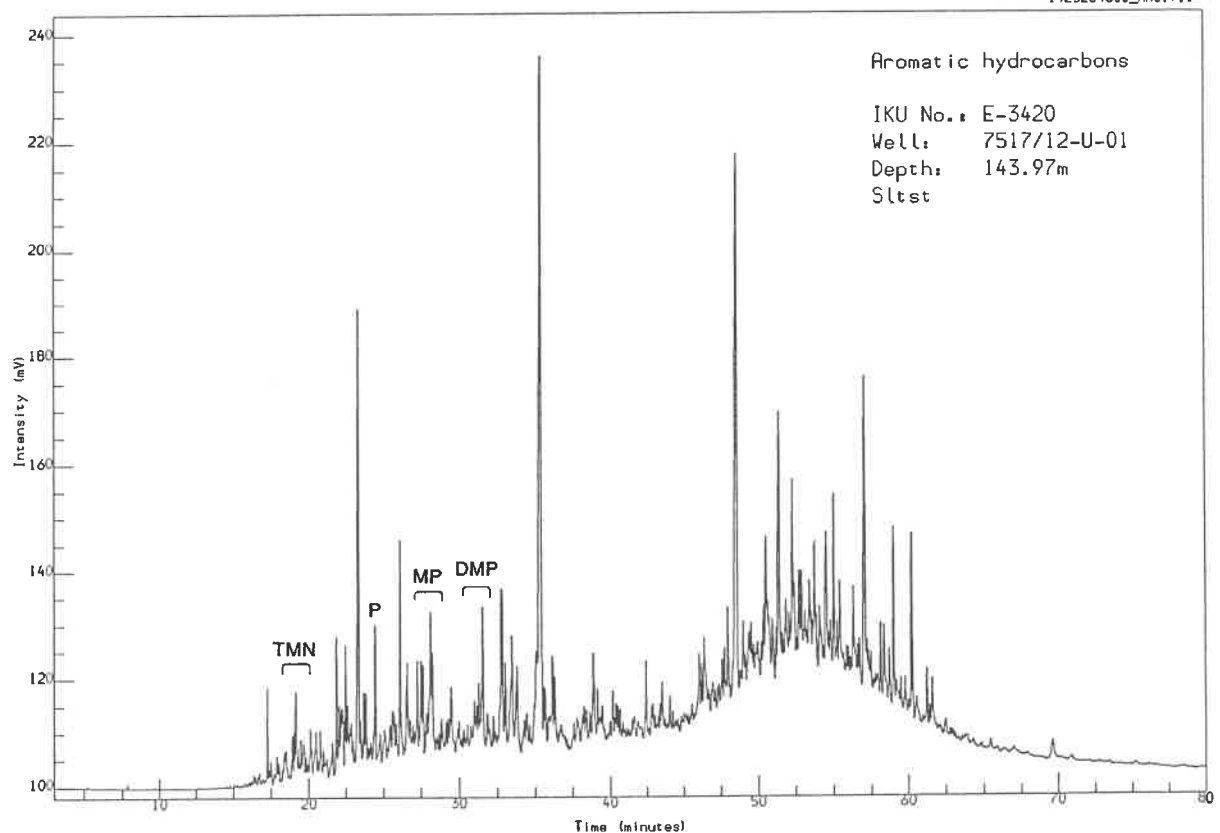




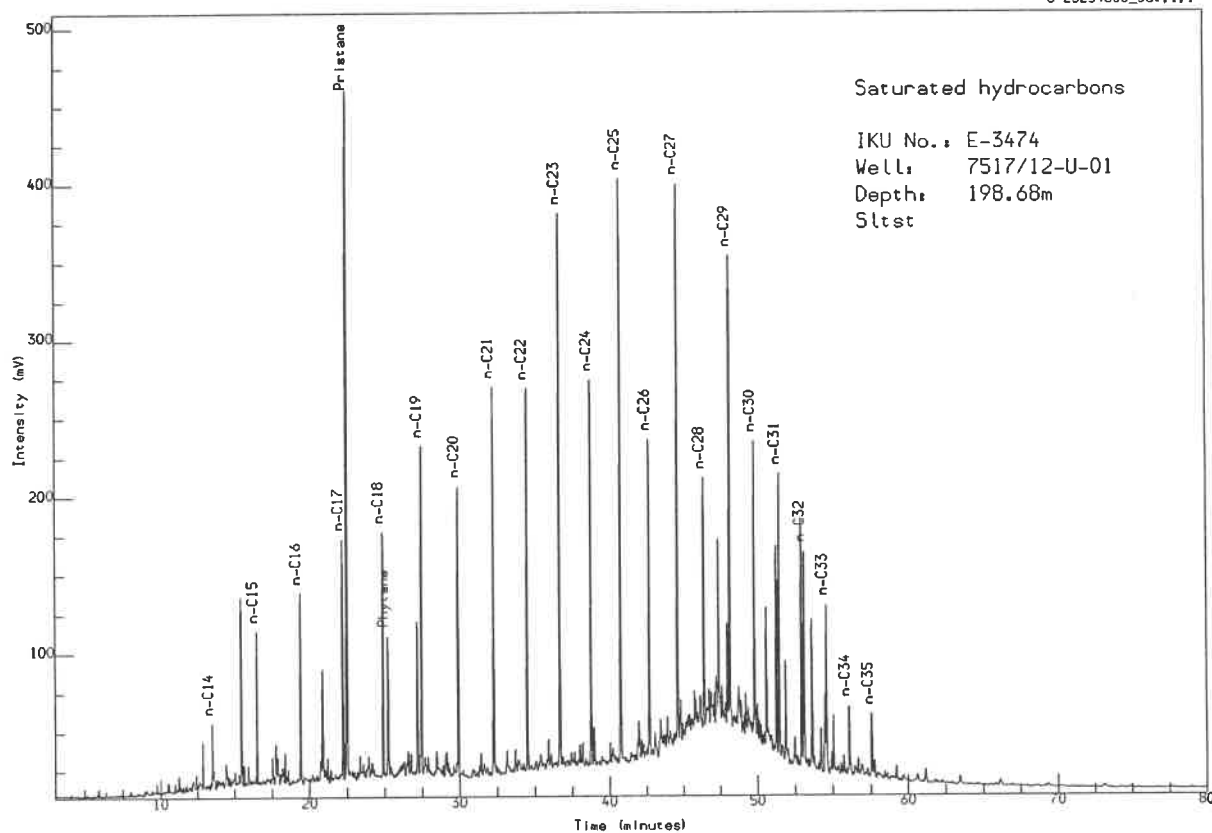
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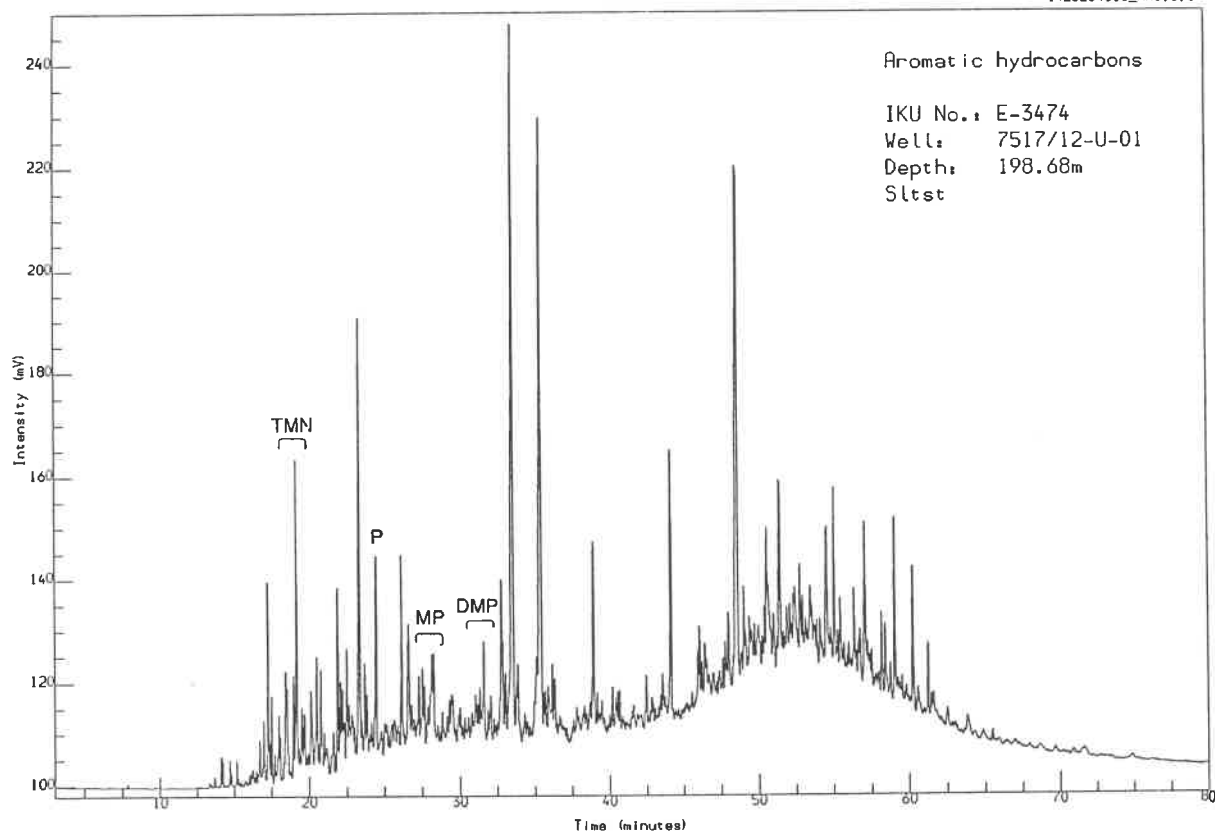
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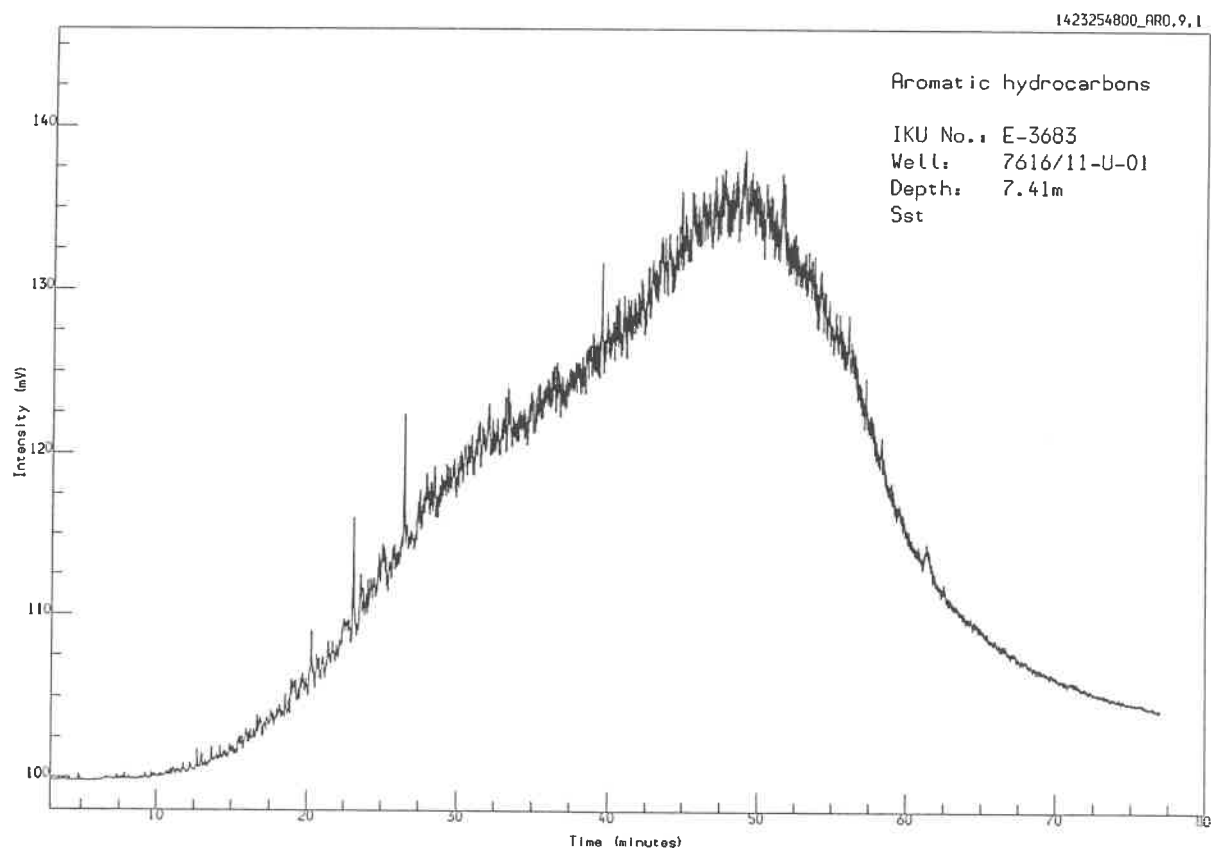
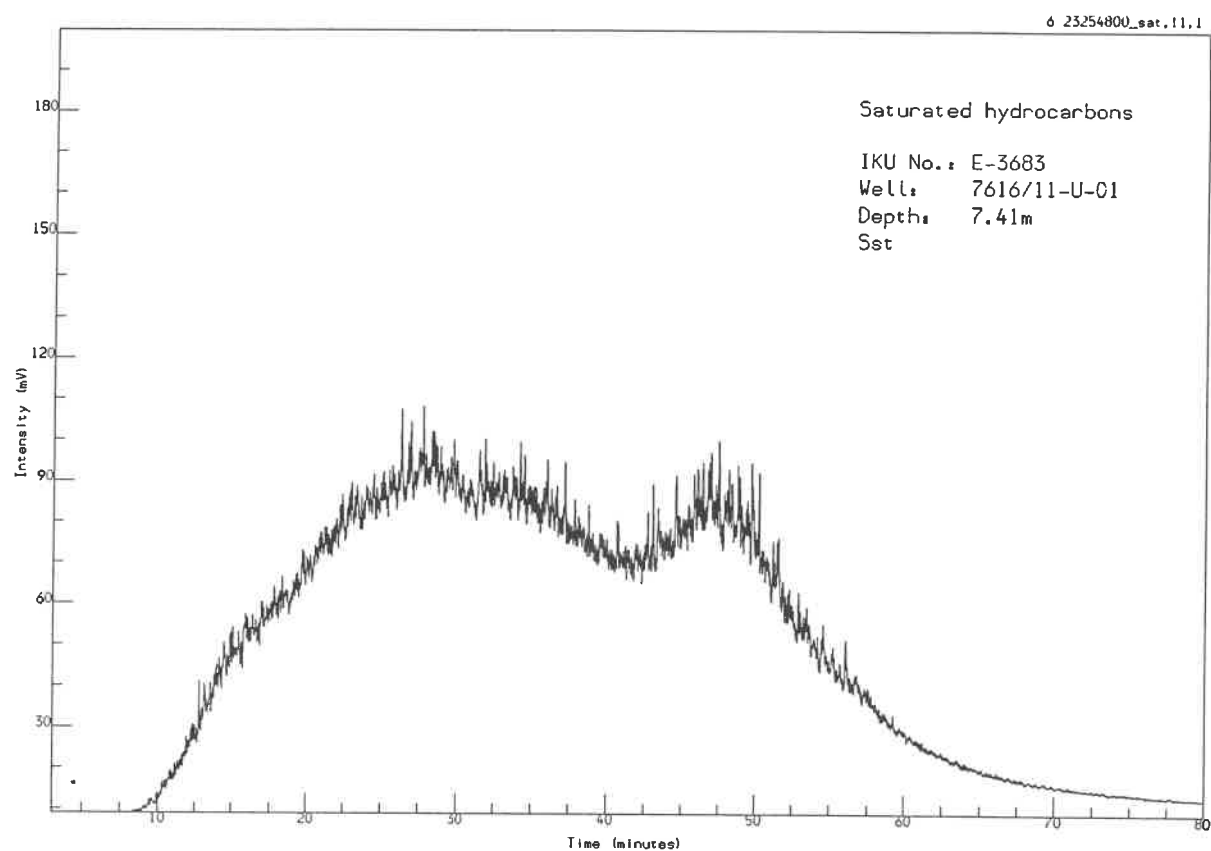


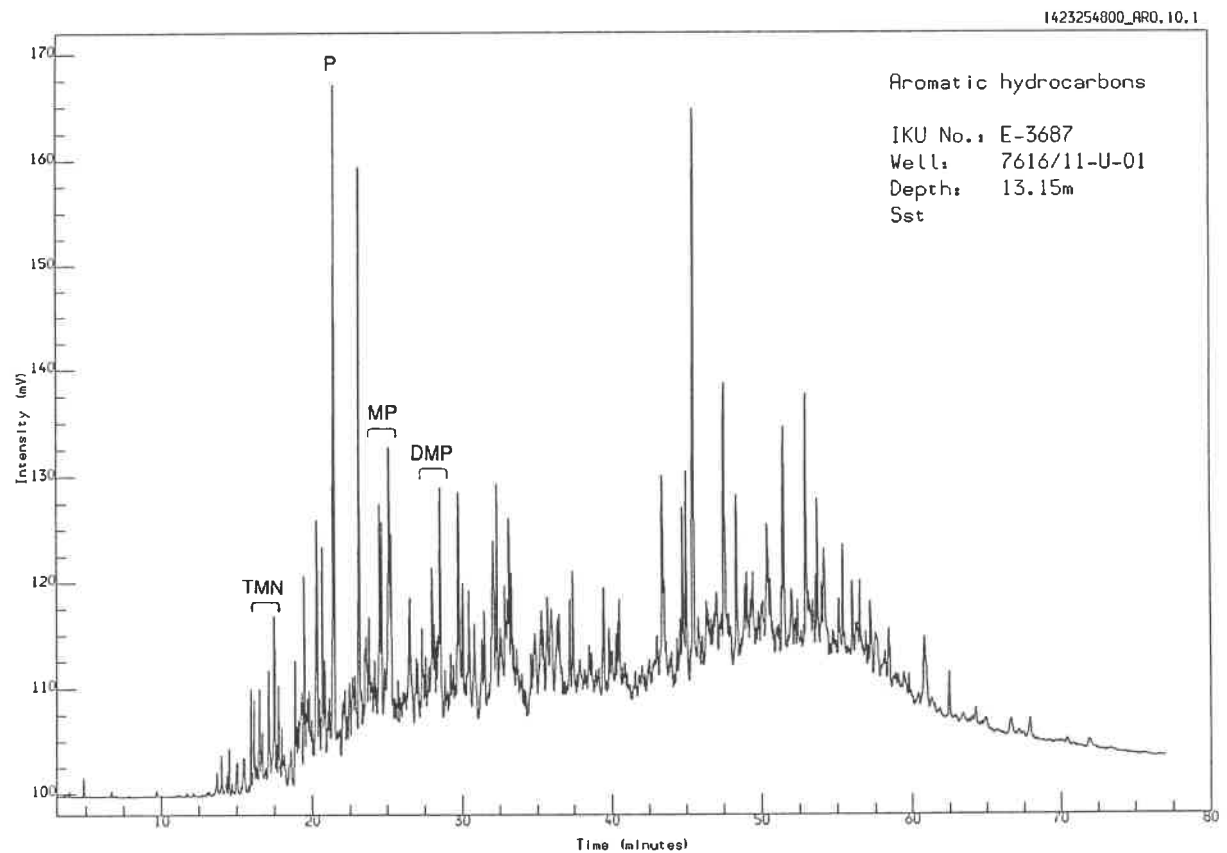
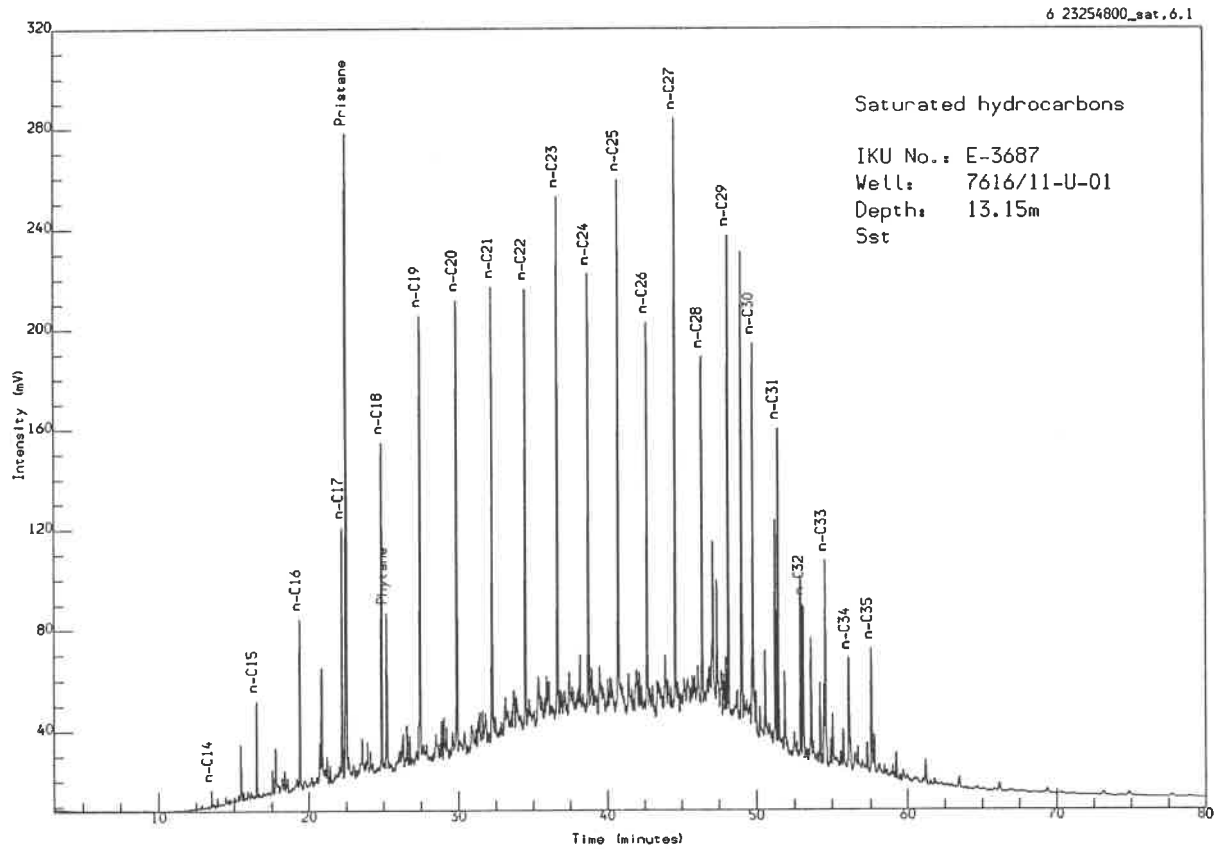
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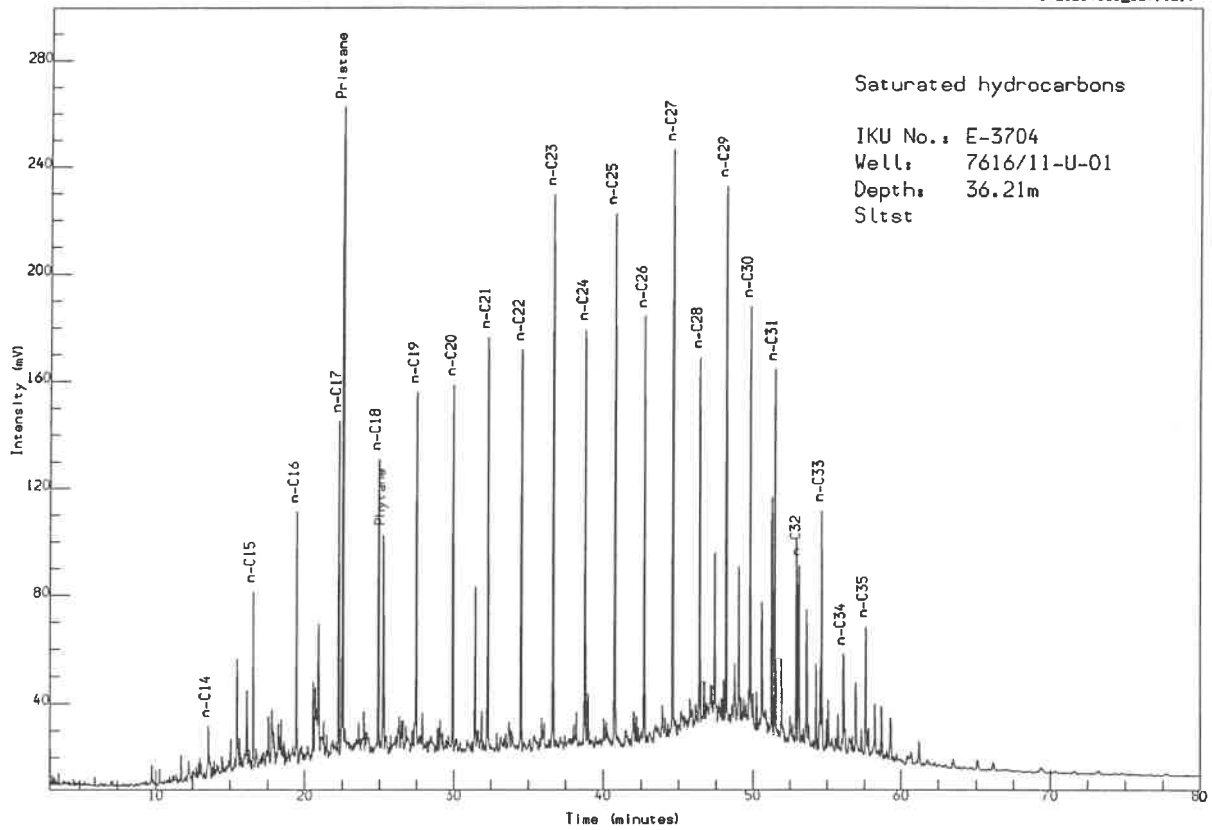
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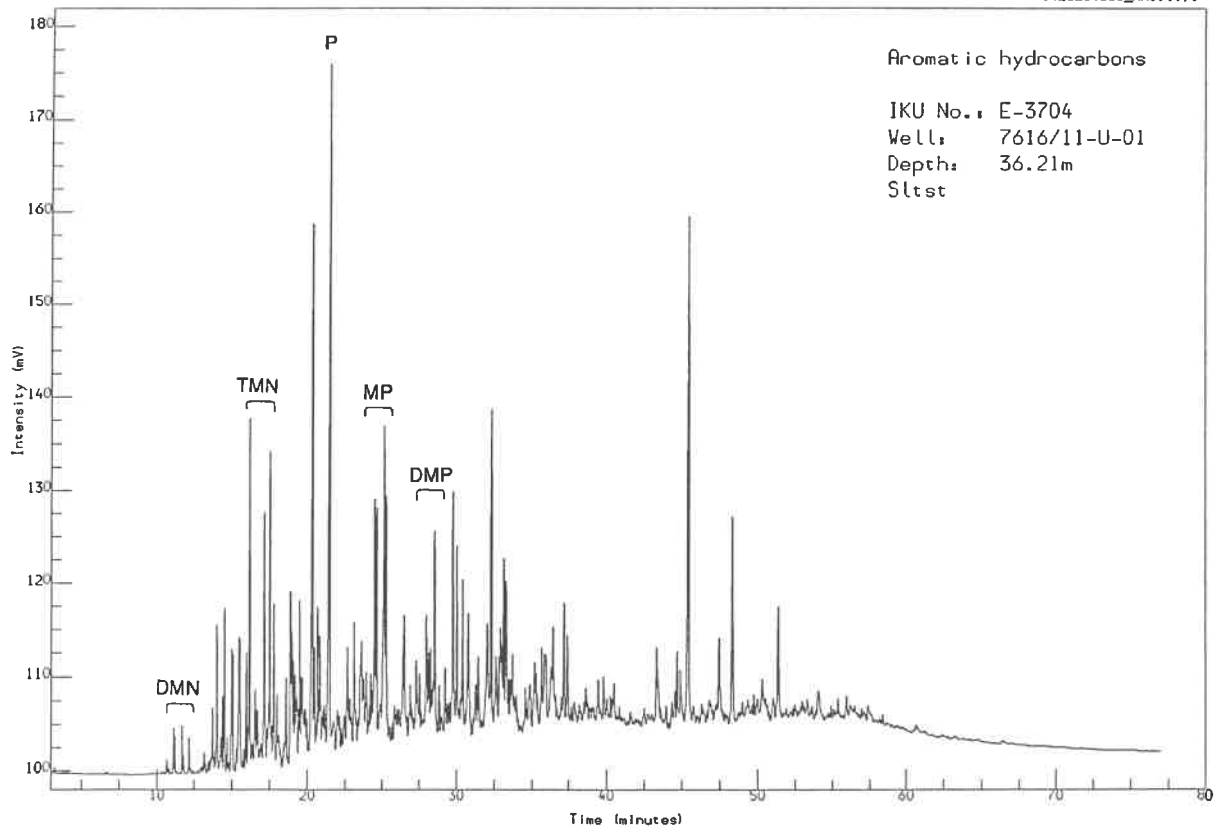


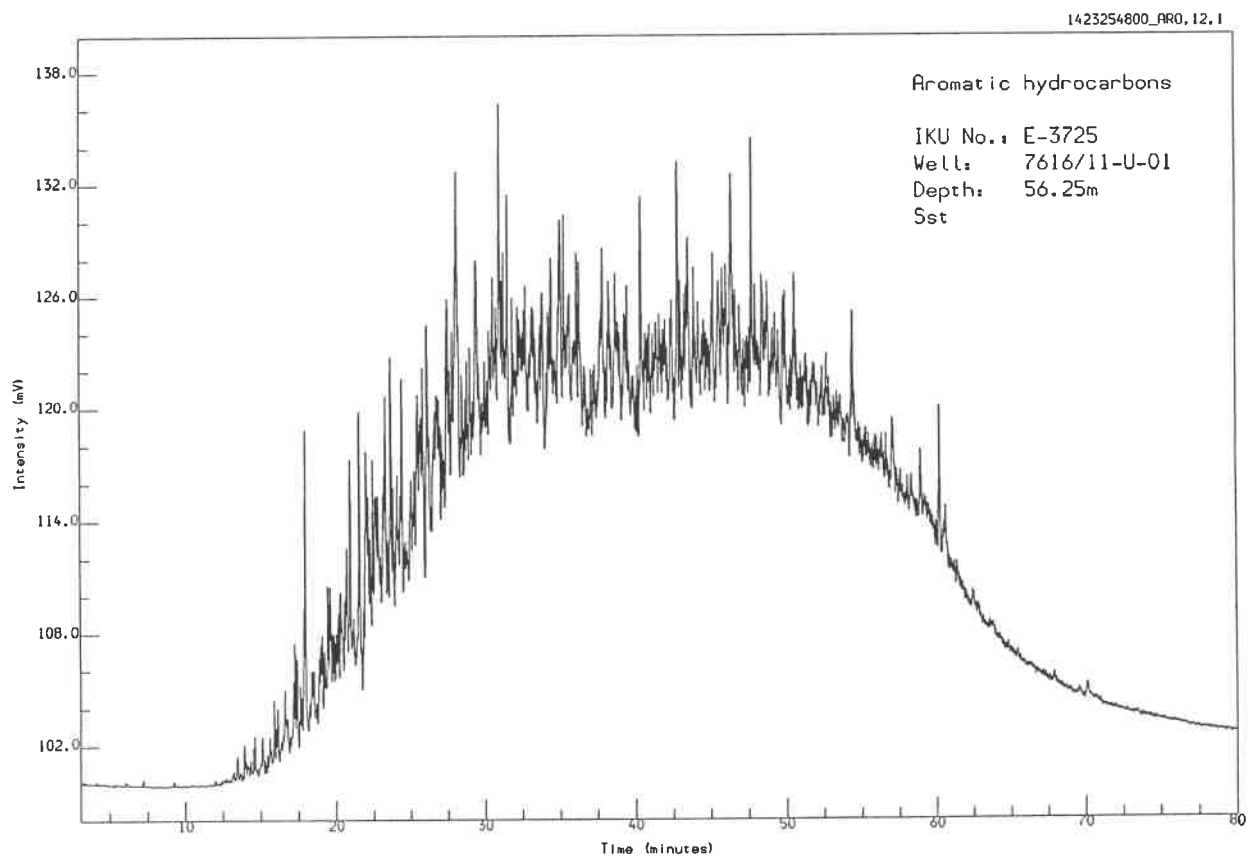
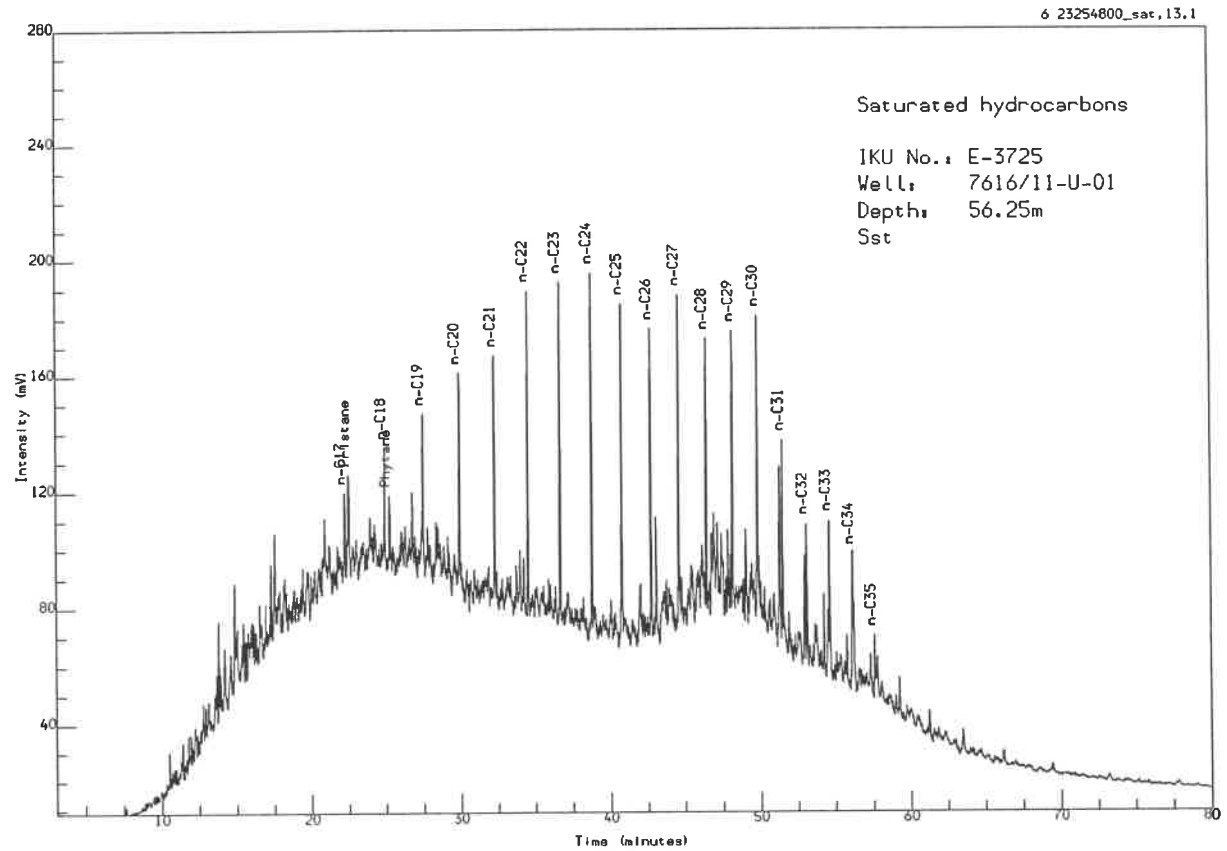


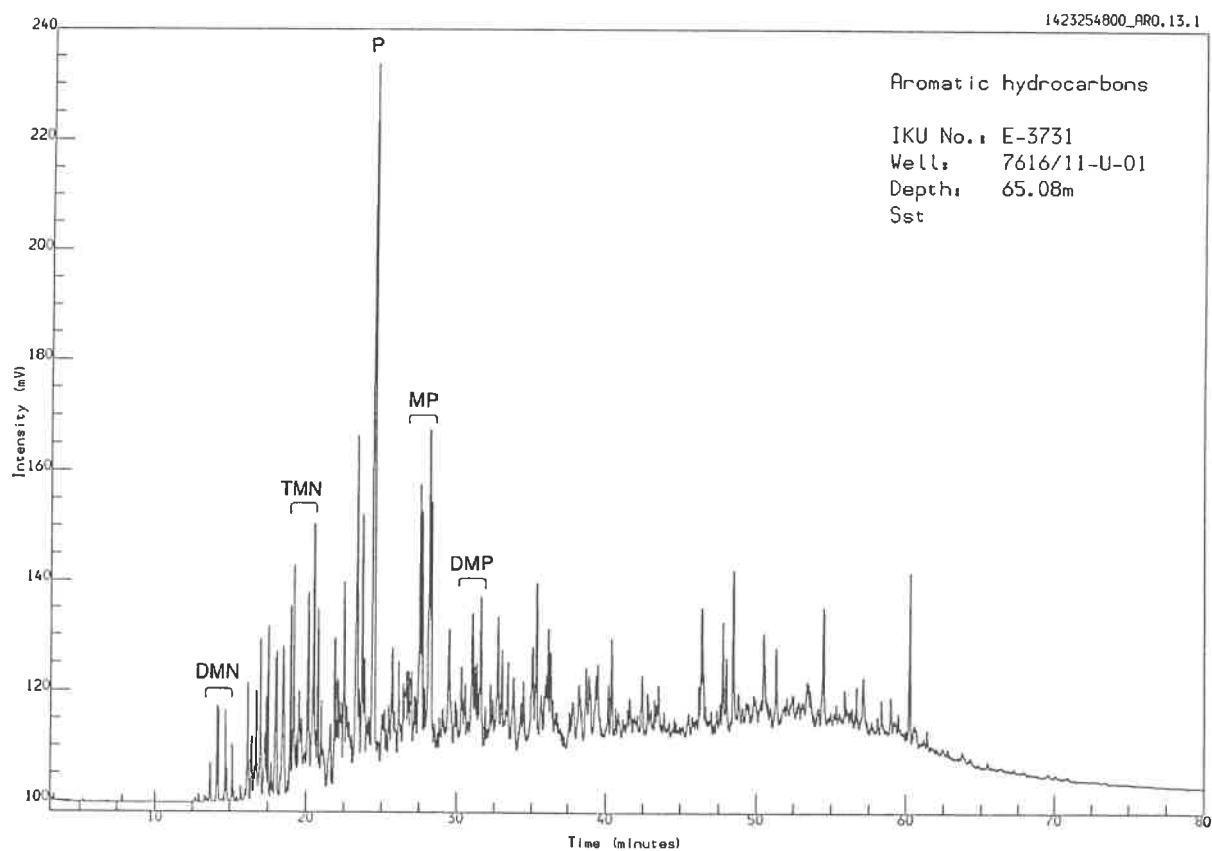
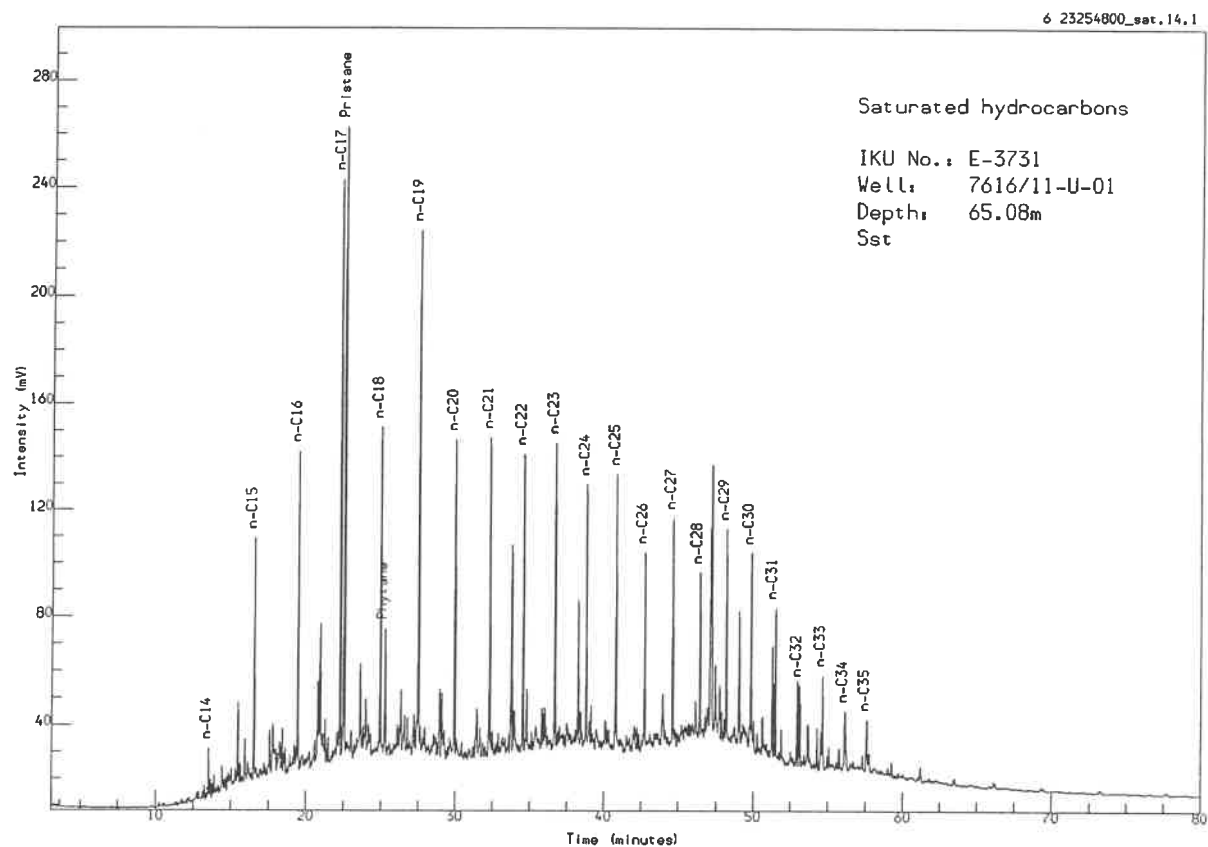
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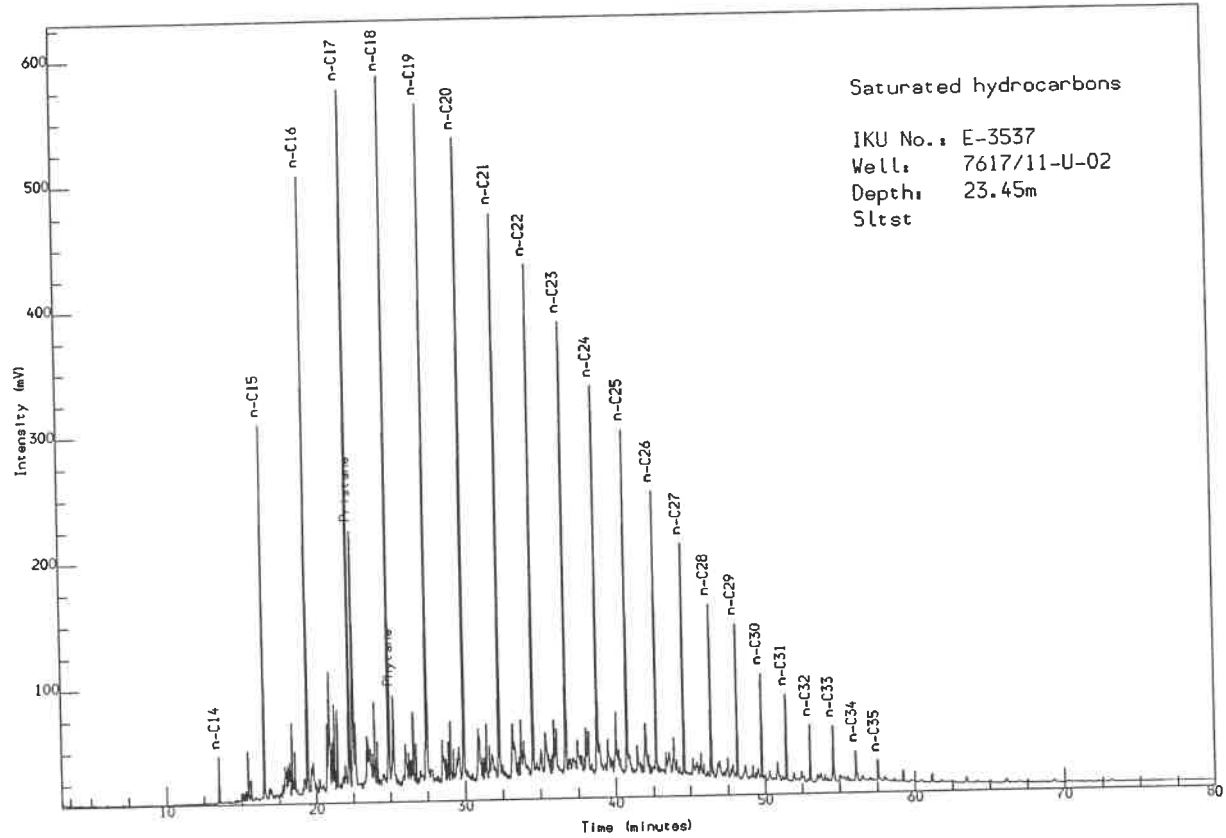
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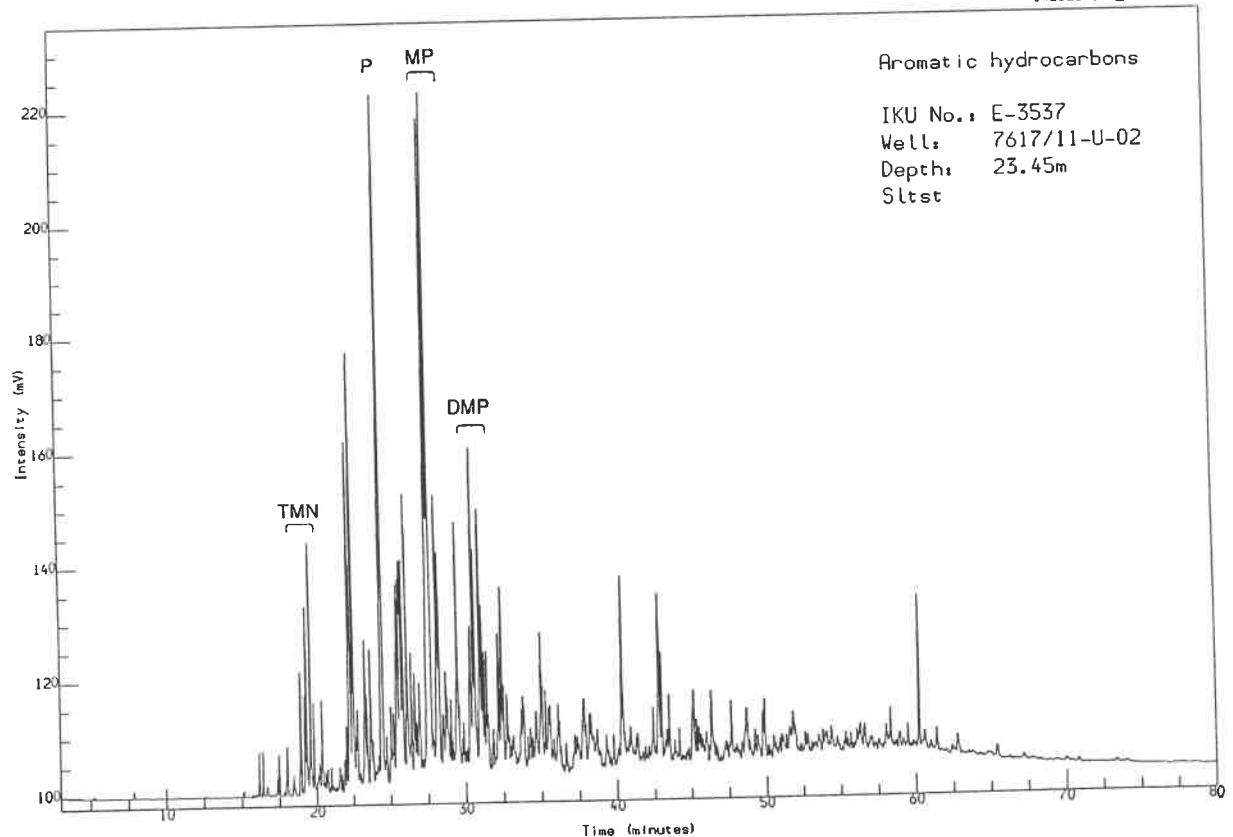




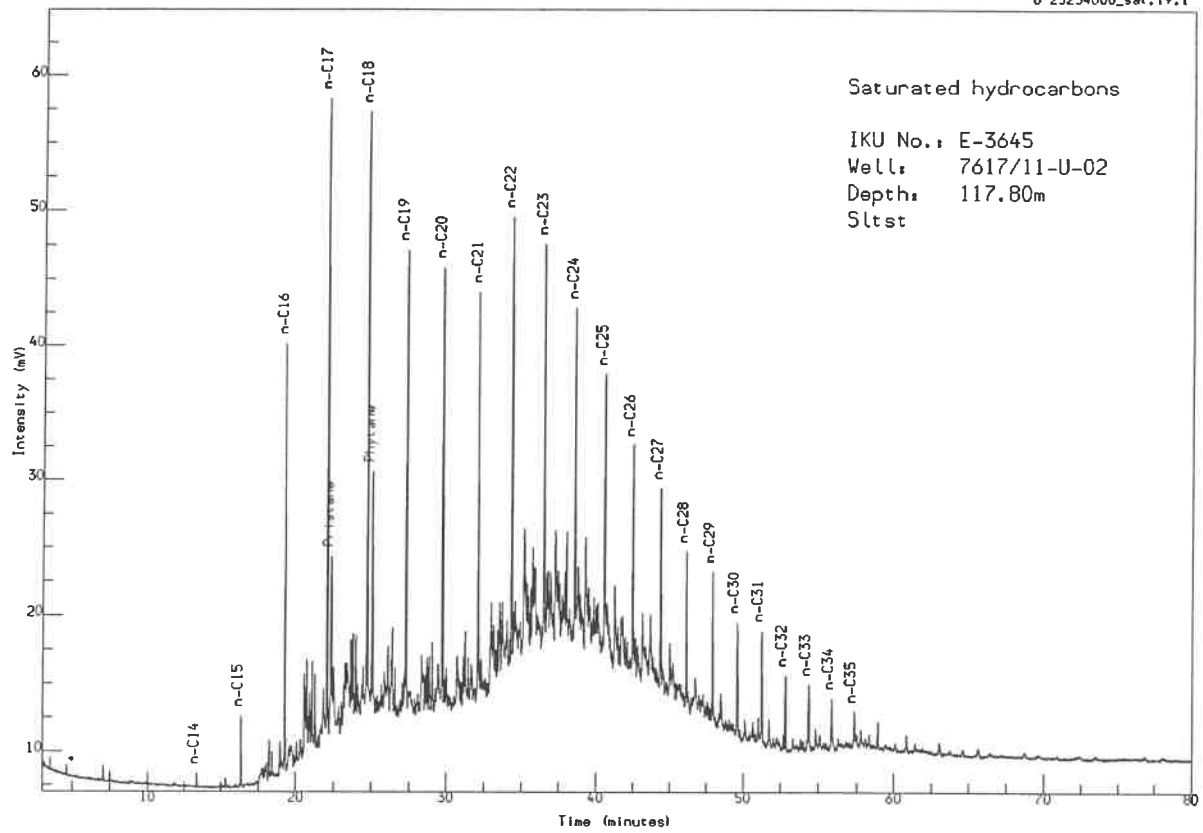
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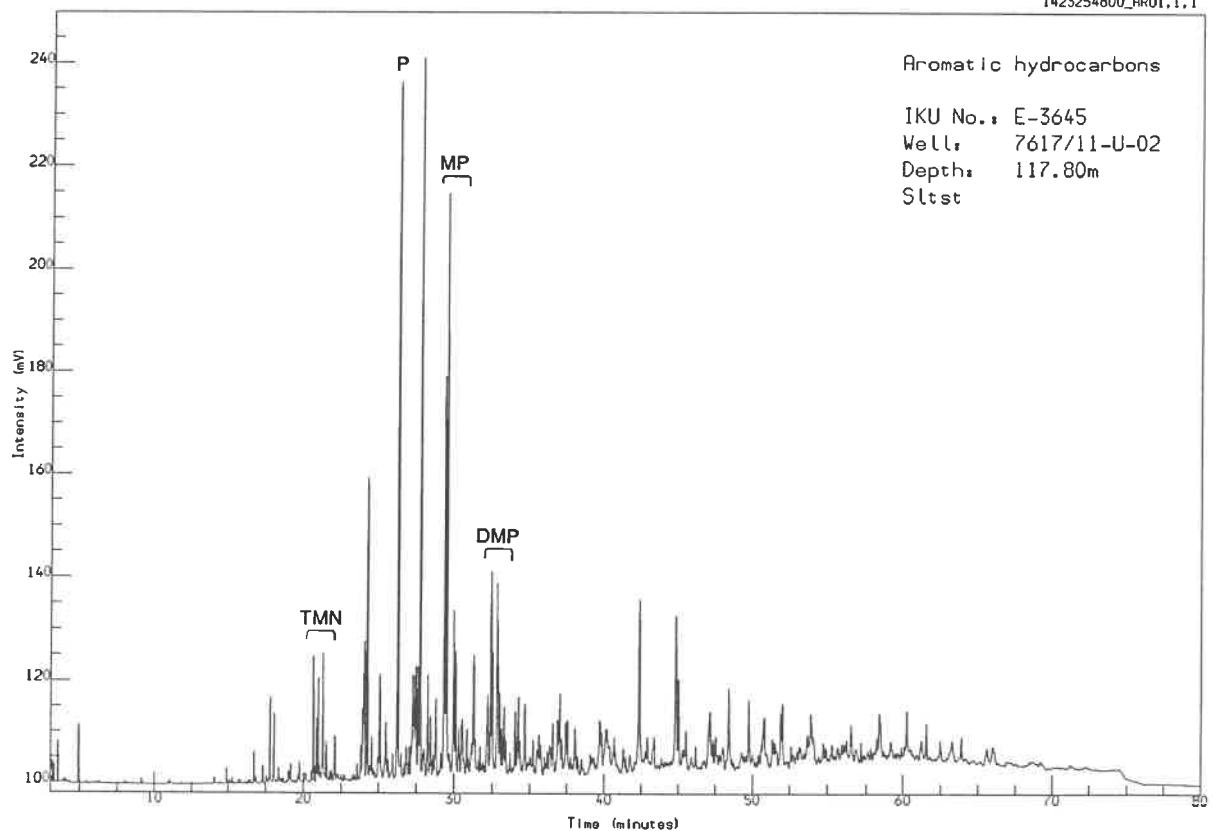
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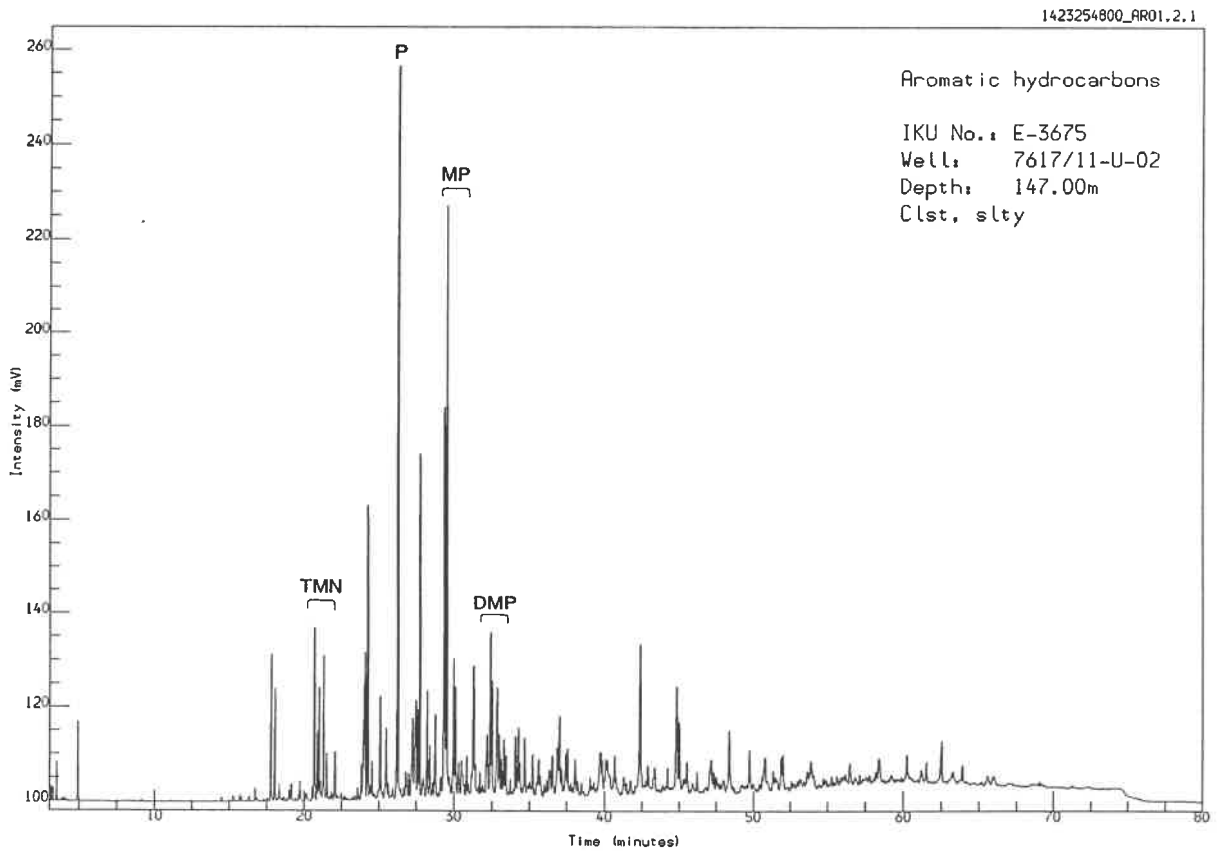
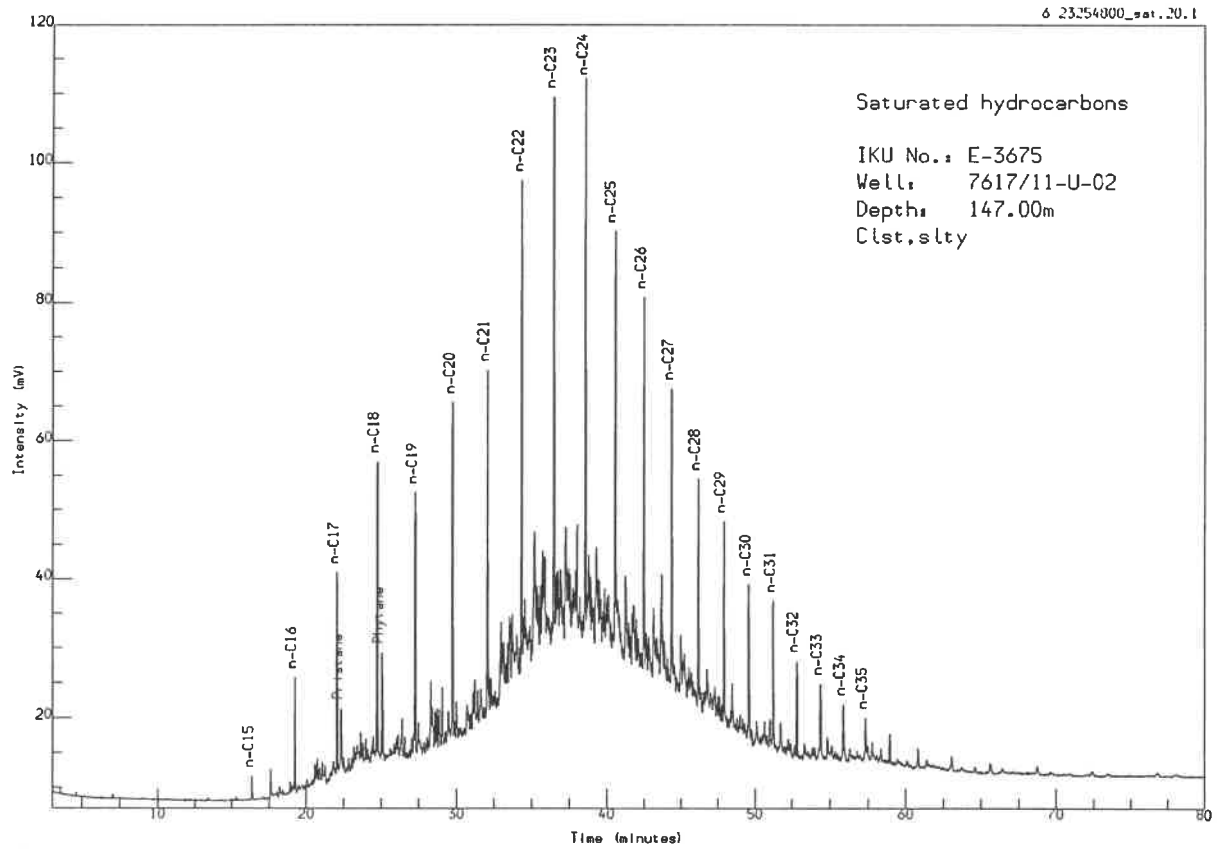


Figure A.5
GC-MS Fragmentograms
of
Saturated Hydrocarbons
(m/z 177, 191, 205, 217, 218, 231, 259)

Key for m/z 191 and m/z 177 (terpanes):

Peak code	Identification
23/3	C ₂₃ tricyclic terpane
24/3	C ₂₄ tricyclic terpane
25/3	C ₂₅ tricyclic terpane (17R, 17S)
24/4	C ₂₄ tetracyclic terpane
26/3	C ₂₆ tricyclic terpane (17R, 17S)
27T _s	18α(H)-22, 29, 30-trisnorneohopane, Ts
27T _m	17α(H)-22, 29, 30-trisnorhopane, Tm
28αβ	17α(H), 21β(H)-28, 30-bisnorhopane
29αβ	17α(H), 21β(H)-30-norhopane
29Ts	18α(H)-30-norneohopane
4	17β(H), -22, 29, 30-trisnorhopane
30d	15α-methyl-17α(H)-27-norhopane (TtX)
29βα	17β(H), 21α(H)-30-norhopane (=normoretane)
30αβ	17α(H), 21β(H)-30-hopane
30βα	17β(H), 21α(H)-30-hopane (=moretane)
31αβS	17α(H), 21β(H)-30-homohopane (22S)
31αβR	17α(H), 21β(H)-30-homohopane (22R)
32αβS	17α(H), 21β(H)-bishomohopane (22S)
32αβR	17α(H), 21β(H)-bishomohopane (22R)
33αβS	17α(H), 21β(H)-trishomohopane (22S)
33αβR	17α(H), 21β(H)-trishomohopane (22R)
34αβS	17α(H), 21β(H)-tetrakishomohopane (22S)
34αβR	17α(H), 21β(H)-tetrakishomohopane (22R)
35αβS	17α(H), 21β(H)-pentakishomohopane (22S)
35αβR	17α(H), 21β(H)-pentakishomohopane (22R)

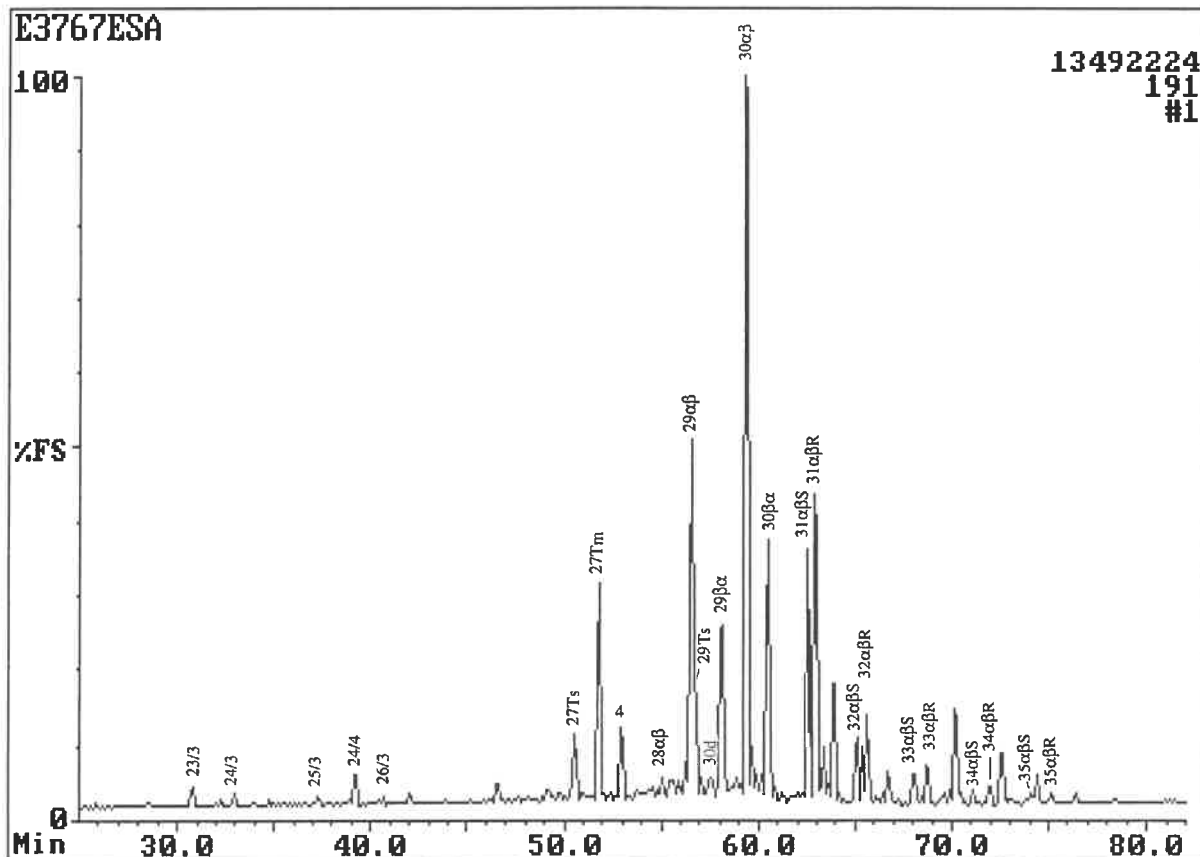
Key for m/z 217 and m/z 218 (steranes):

Peak code	Identification
27dβS	13β(H), 17α(H)-diasterane (20S)
27dβR	13β(H), 17α(H)-diasterane (20R)
27dαS	13α(H), 17β(H)-diasterane (20S)
27dαR	13α(H), 17β(H)-diasterane (20R)
28dβR	13β(H), 17α(H)-diasterane (20R)
28dαS	13α(H), 17β(H)-diasterane (20S)
27ααS	14α(H), 17α(H)-sterane (20S)
29dβS	13β(H), 17α(H)-diasterane (20S)
27ββR	14β(H), 17β(H)-sterane (20R)
27ββS	14β(H), 17β(H)-sterane (20S)
28dαR	13α(H), 17β(H)-diasterane (20R)
27ααR	14α(H), 17α(H)-sterane (20R)
29dβR	13β(H), 17α(H)-diasterane (20R)
29dαR	13α(H), 17β(H)-diasterane (20R)
28ββR	14β(H), 17β(H)-sterane (20R)
28ββS	14β(H), 17β(H)-sterane (20S)
28ααR	14α(H), 17α(H)-sterane (20R)
29ααS	14α(H), 17α(H)-sterane (20S)
29ββR	14β(H), 17β(H)-sterane (20R) + unknown sterane
29ββS	14β(H), 17β(H)-sterane (20S)
29ααR	14α(H), 17α(H)-sterane (20R)

Fisons Instruments TRIO-1000 LAB BASE Data System

7418/01-U-01(A) 21.68m Clst.

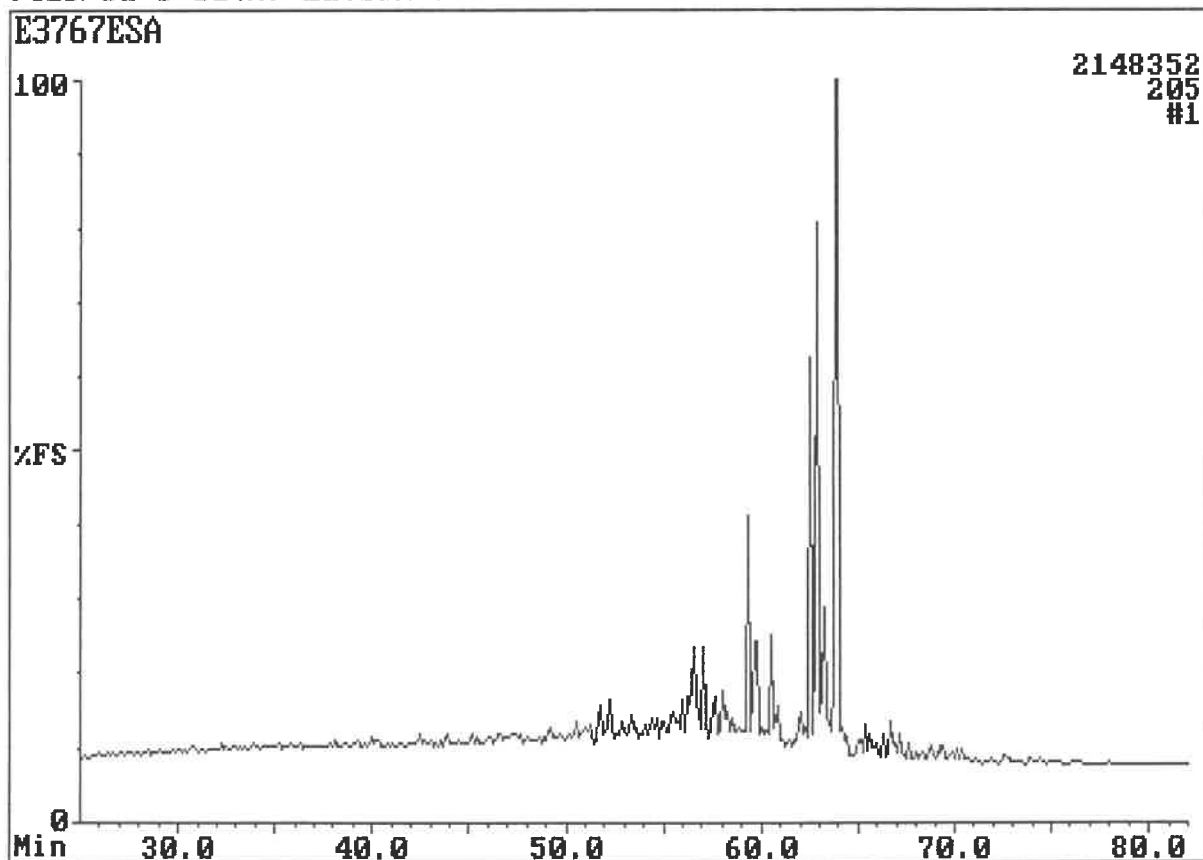
Trio-1



Fisons Instruments TRIO-1000 LAB BASE Data System

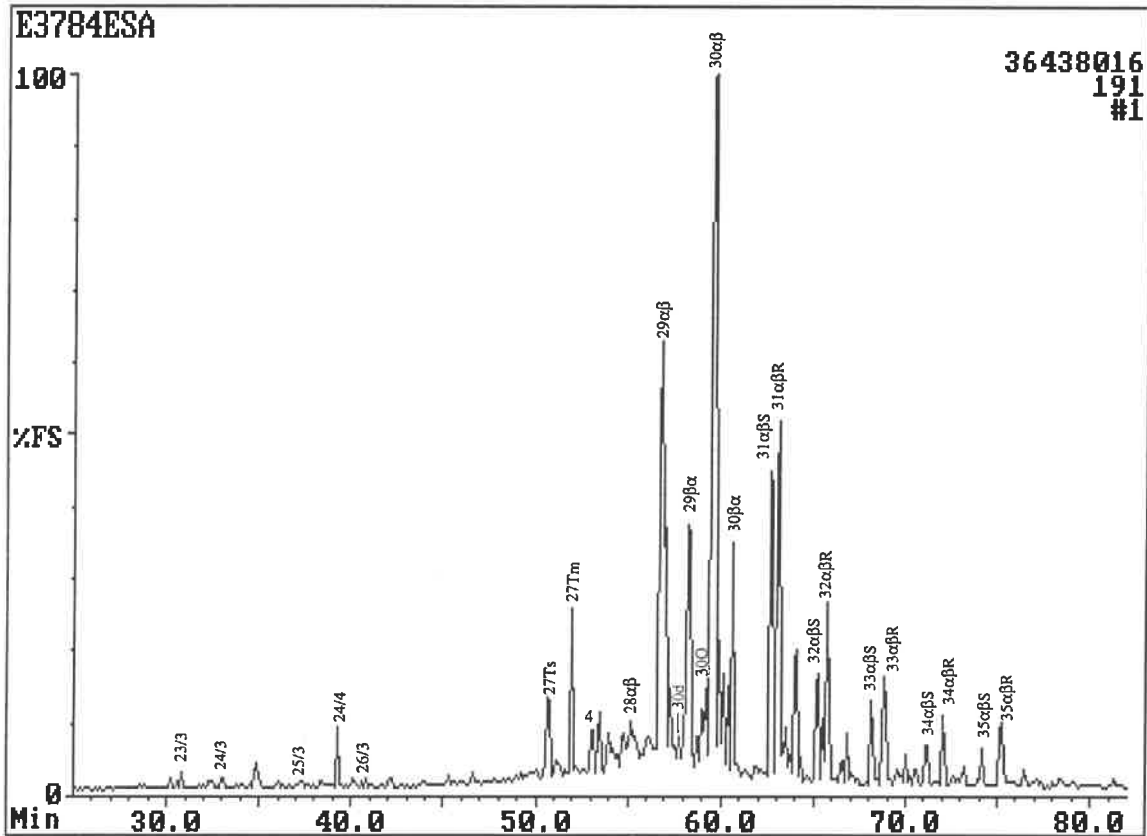
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Trio-1



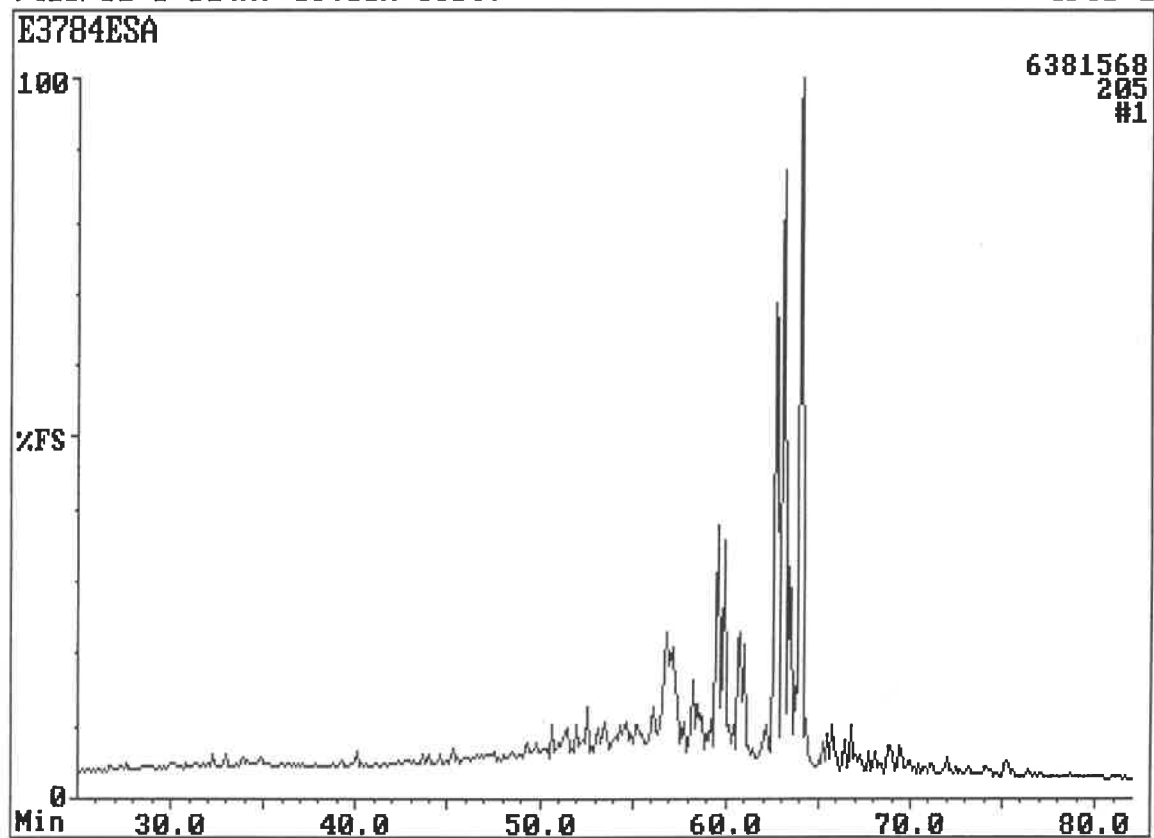
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Trio-1



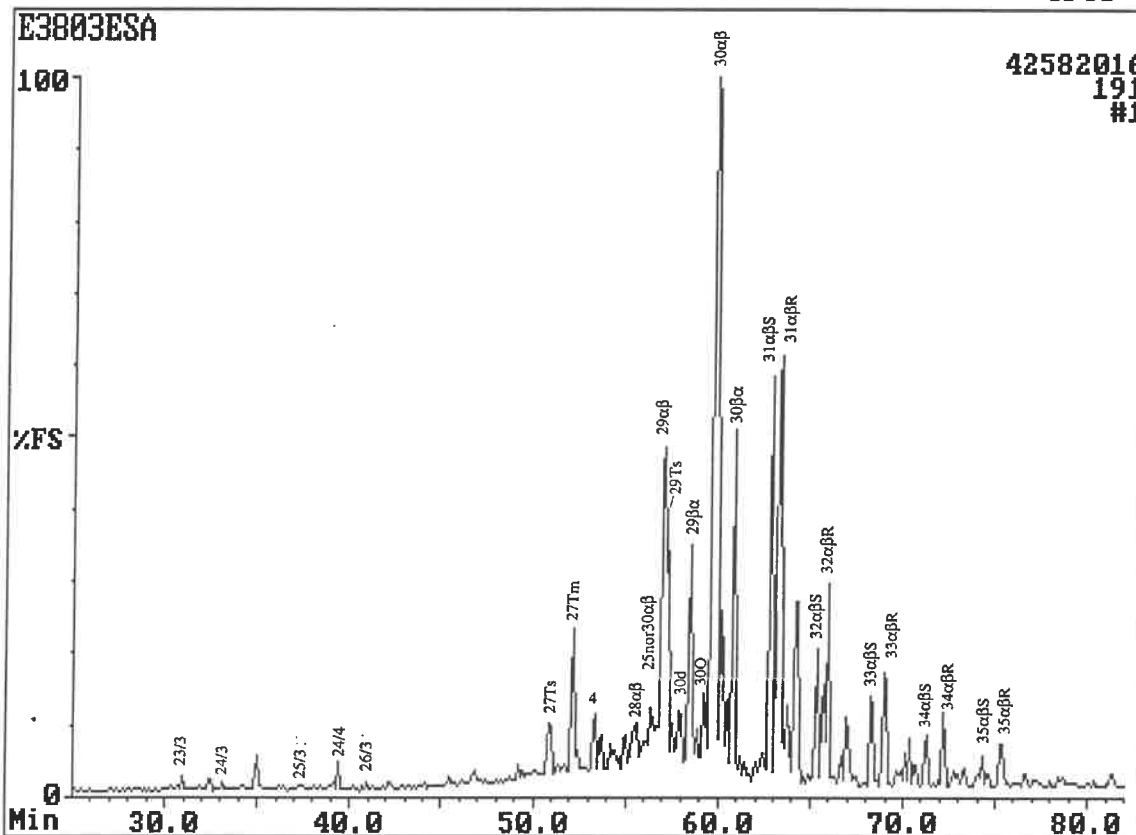
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7418/01-U-01(A) 39.36m Clst.

Trio-1



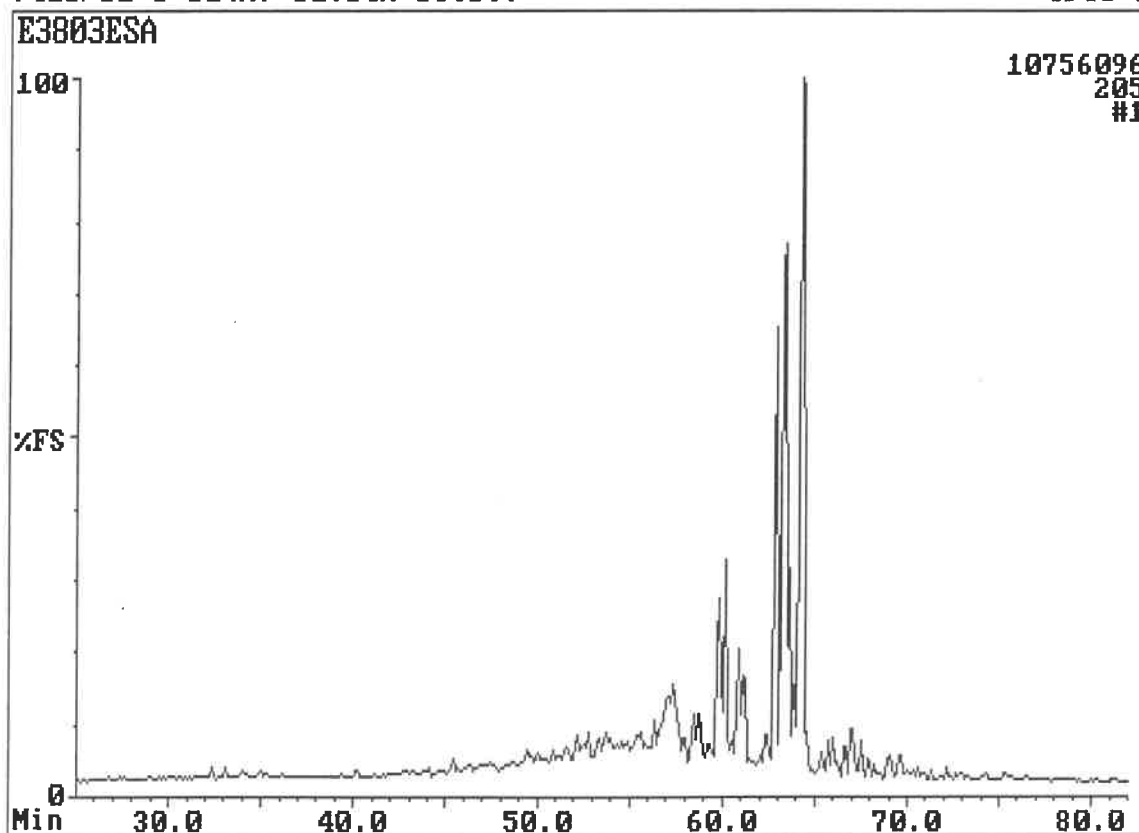
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01(A) 61.34m Slst.

Trio-1



Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01(A) 61.34m Slst.

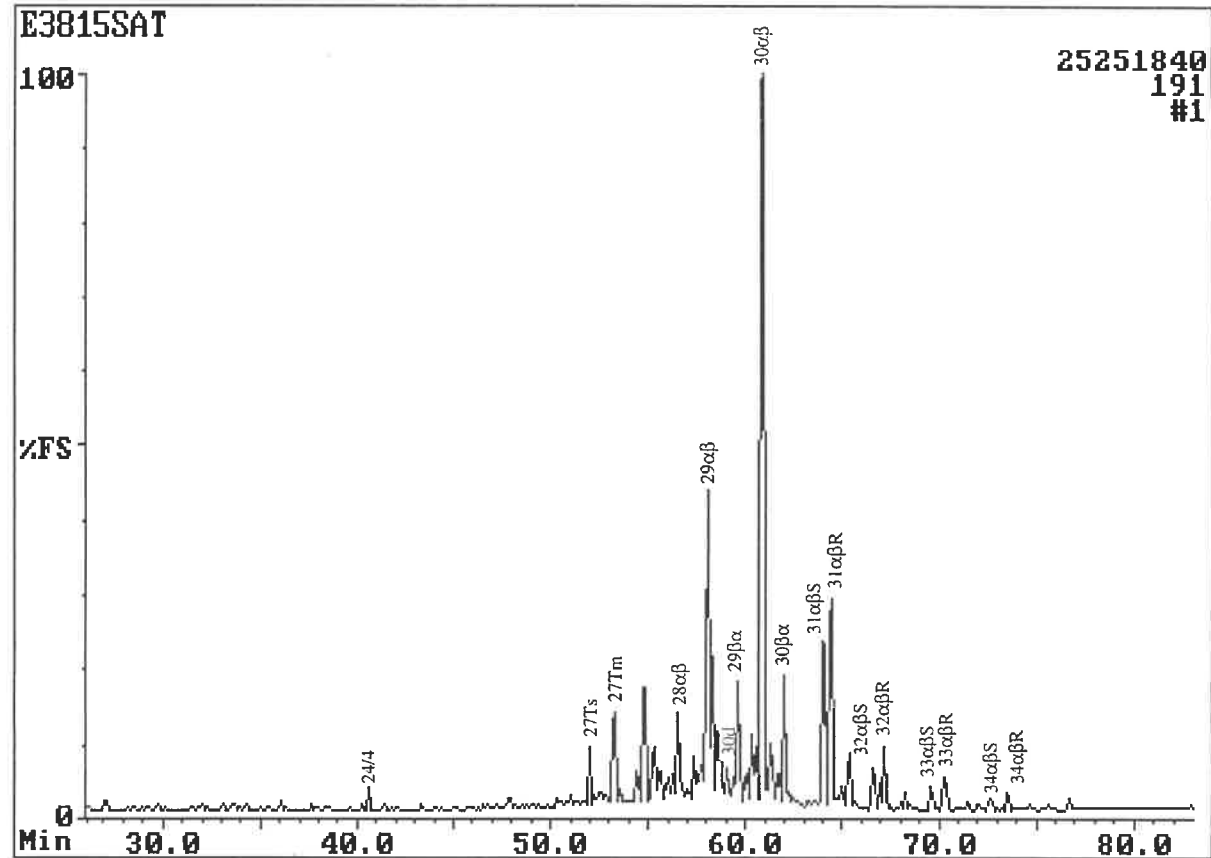
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Fisons Instruments TRI0-1000 LAB BASE Data System

7418/01-U-01 71.44m

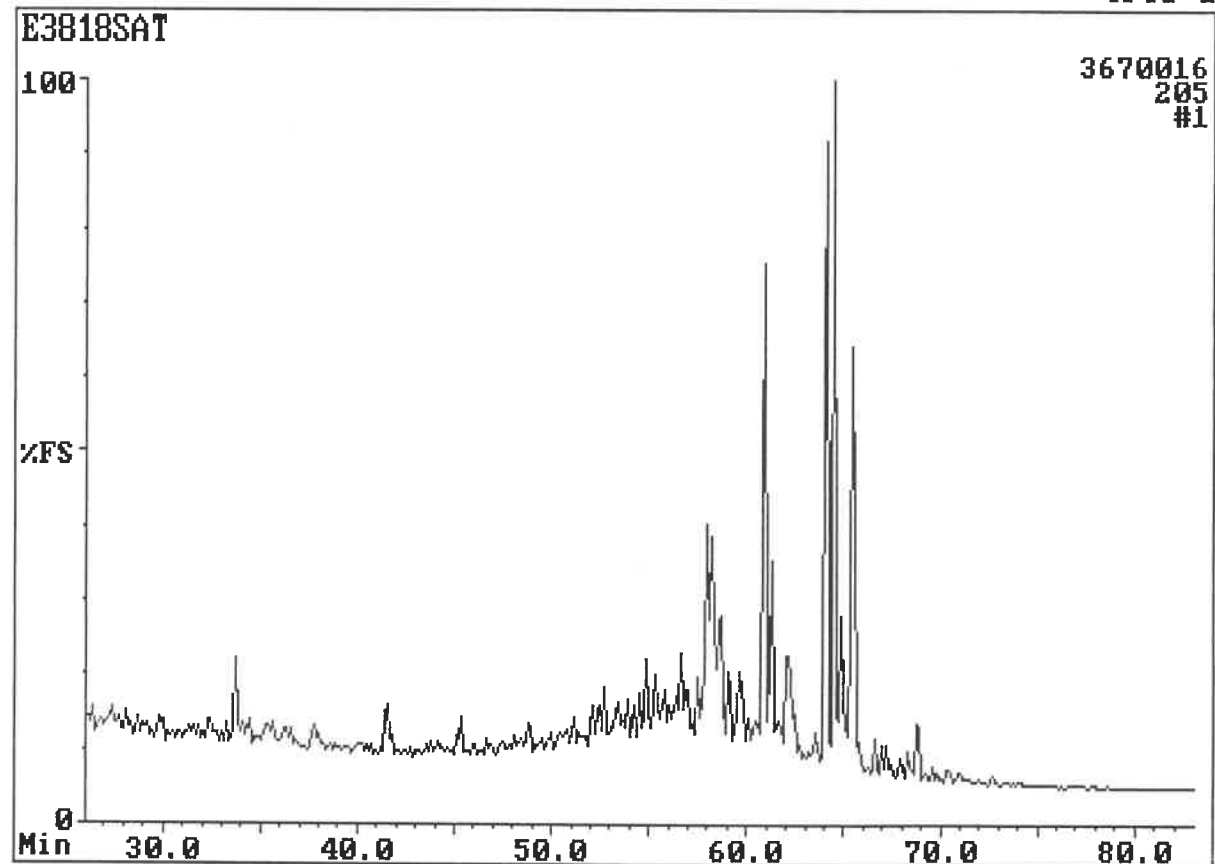
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Fisons Instruments TRI0-1000 LAB BASE Data System

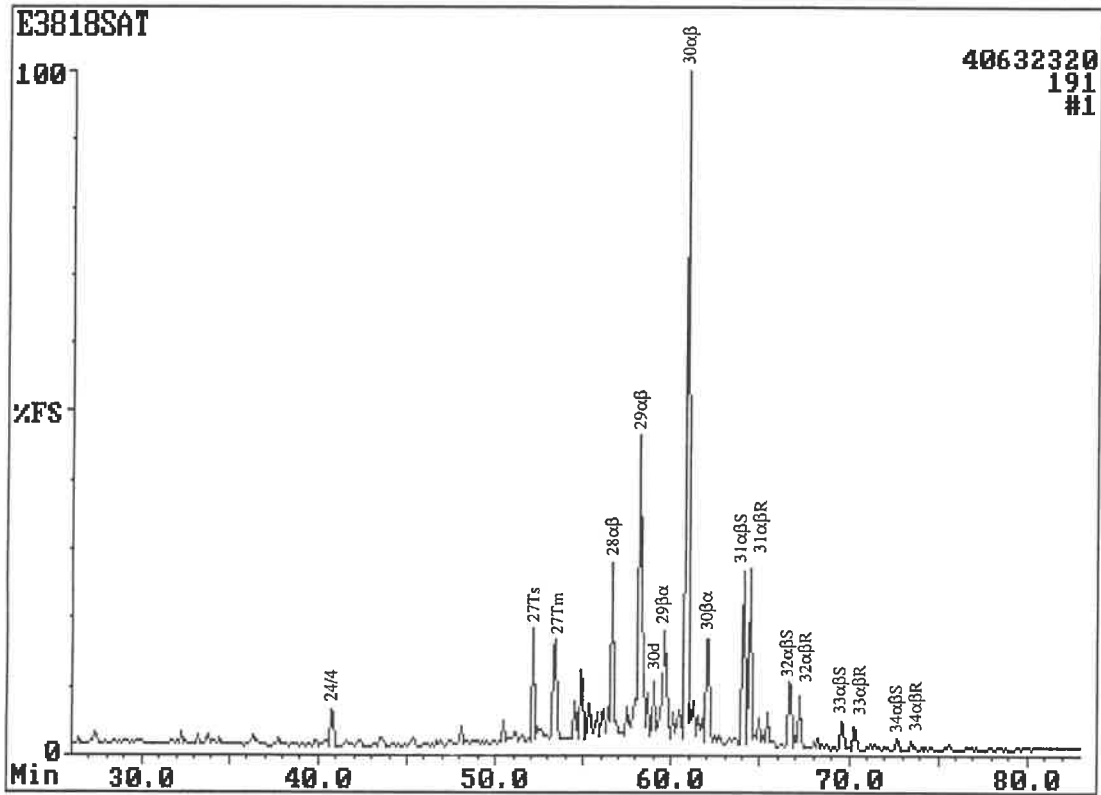
7418/01-U-01 74.62m

Trio-1



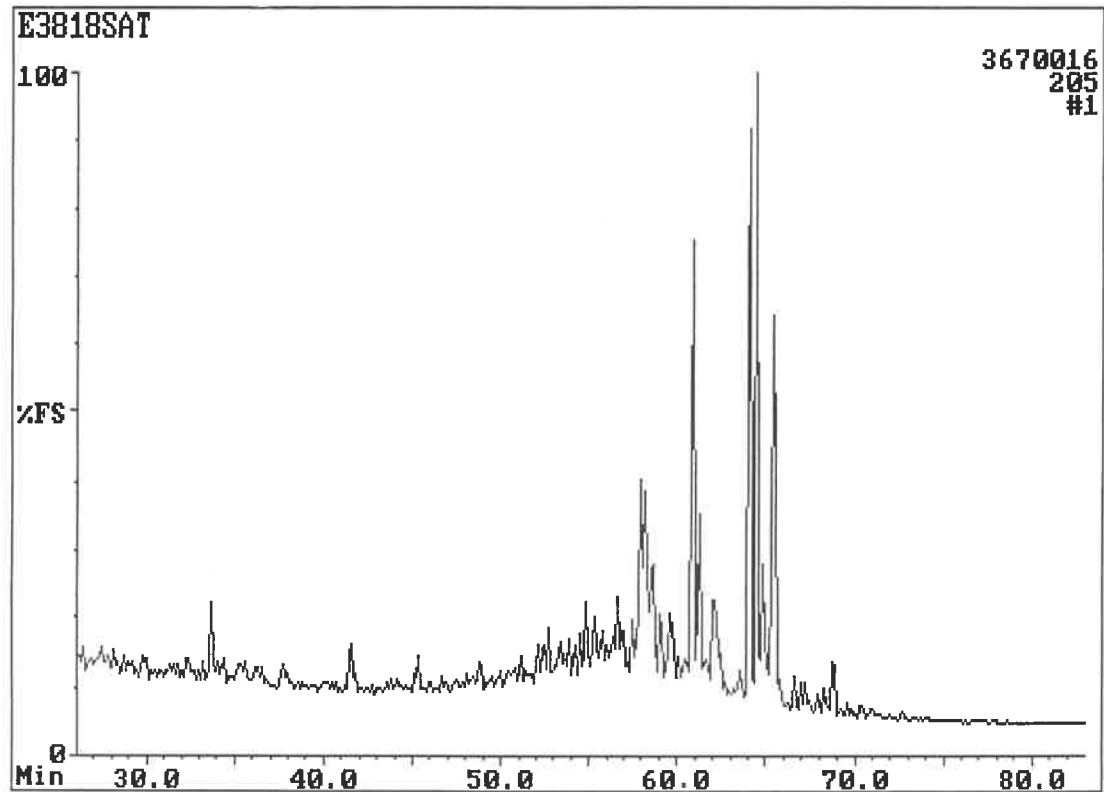
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7418/01-U-01 74.62m

Trio-1



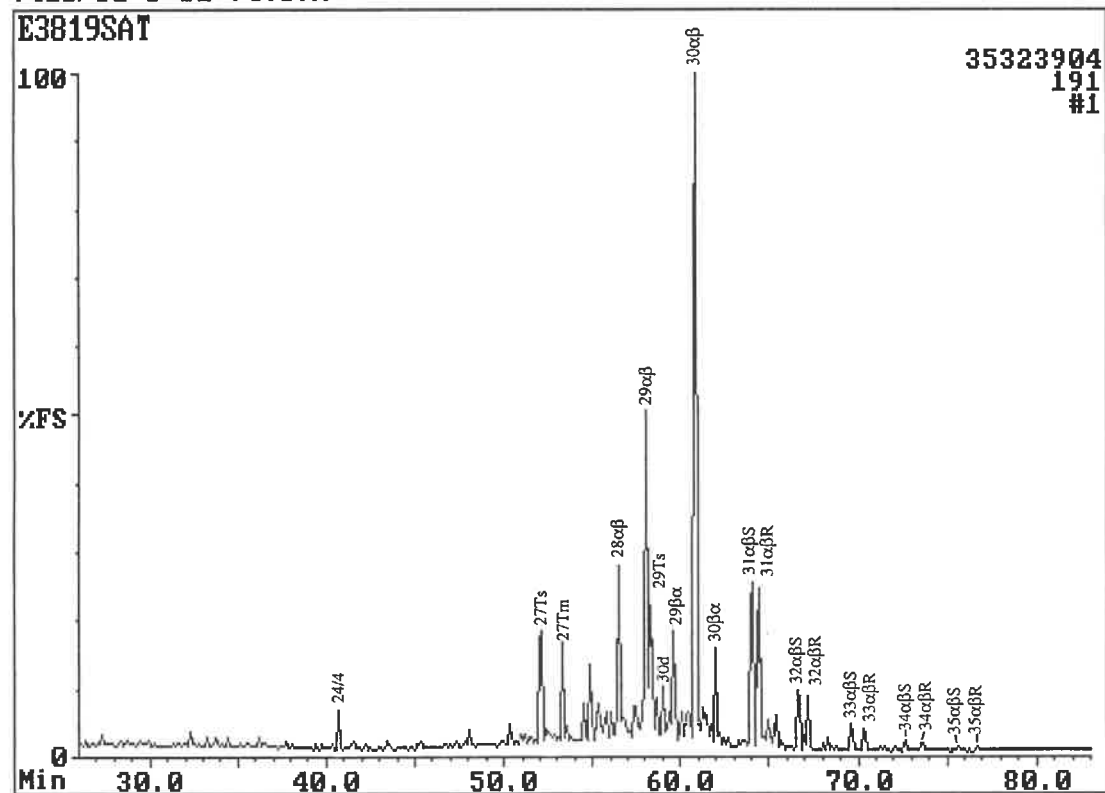
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7418/01-U-01 74.62m

Trio-1



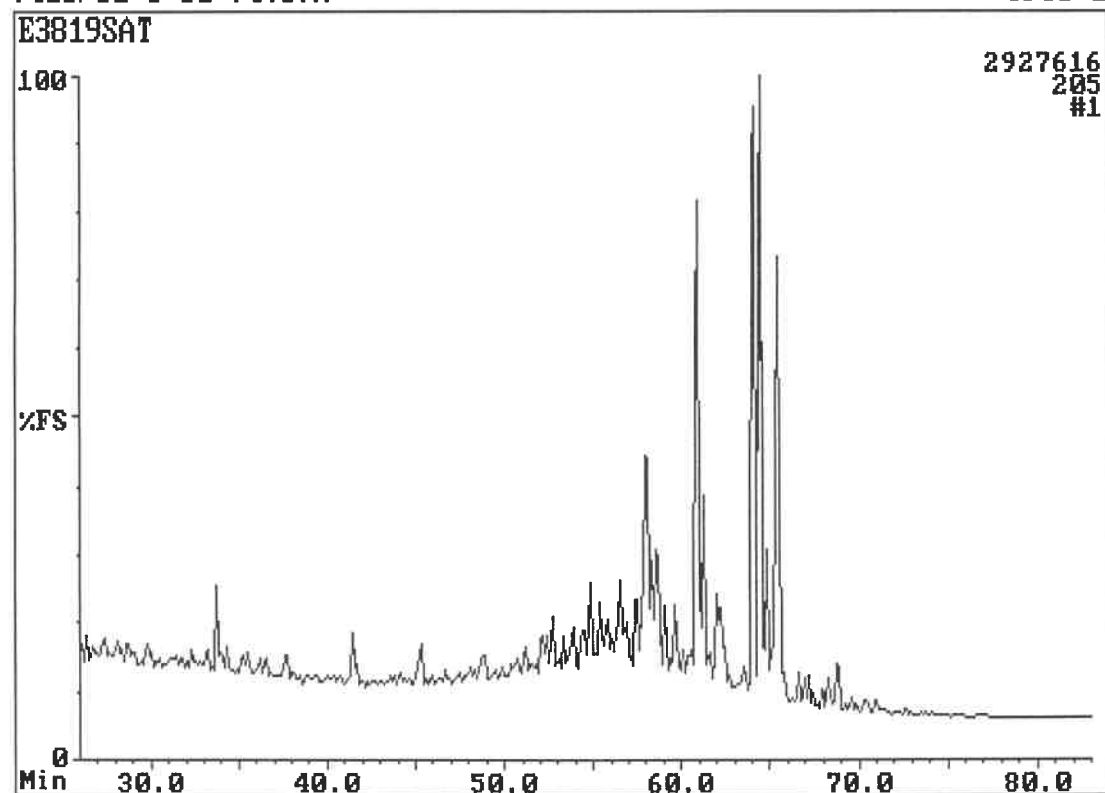
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7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
Trio-1



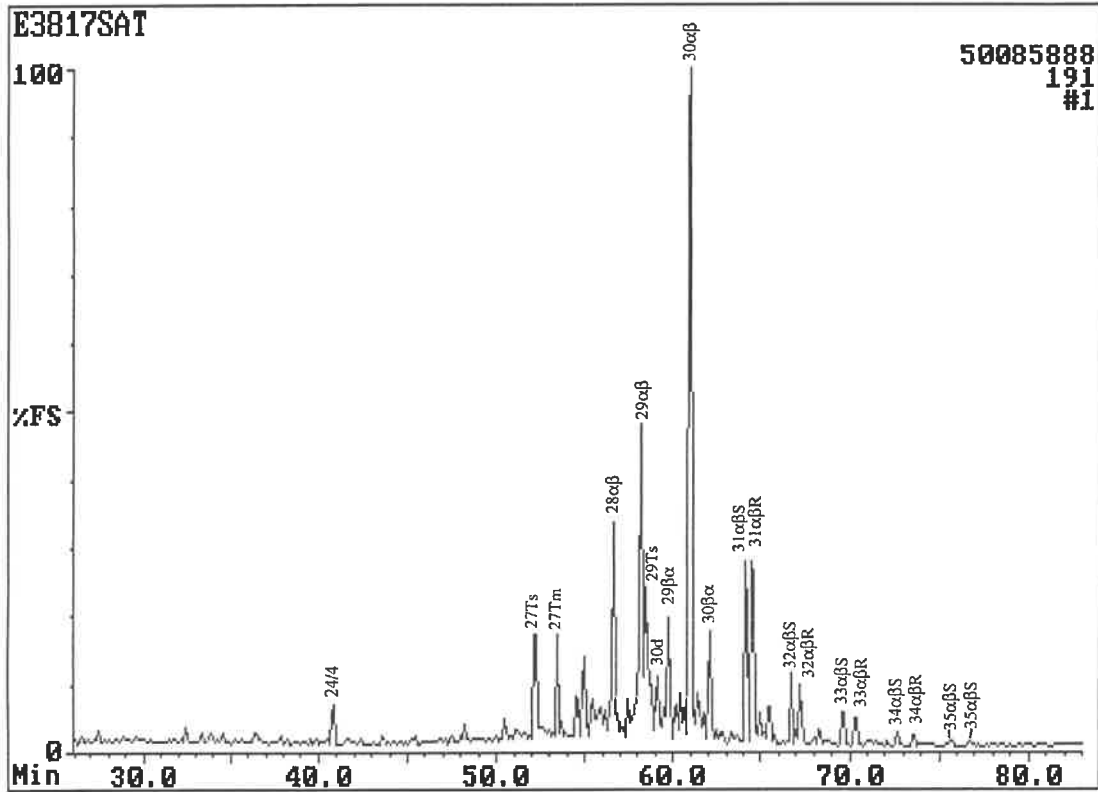
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7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
Trio-1



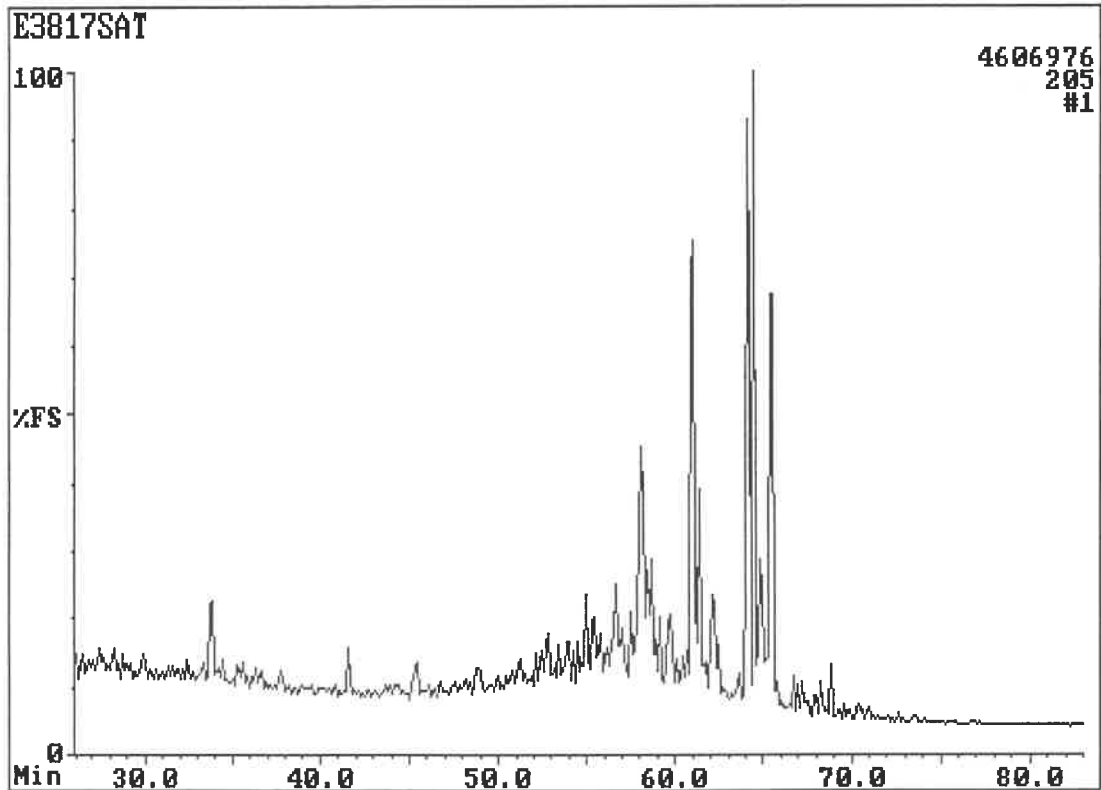
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7418/01-U-01 74.70m

Trio-1



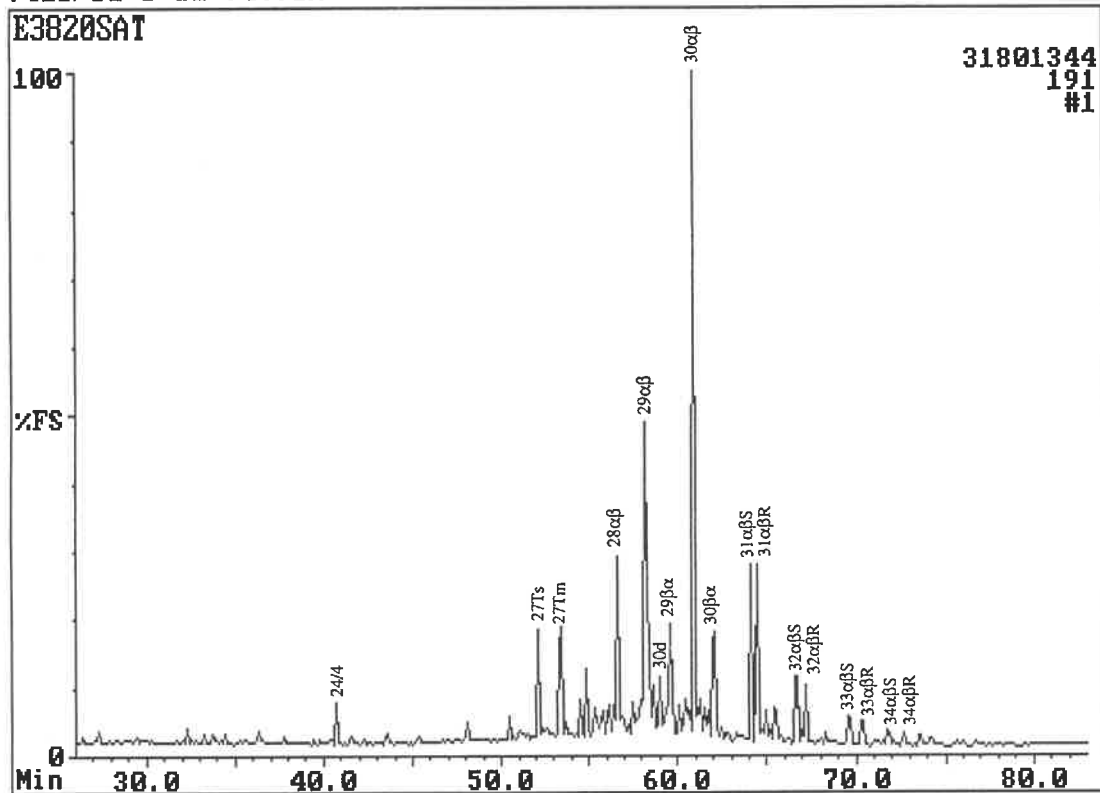
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7418/01-U-01 74.70m

Trio-1



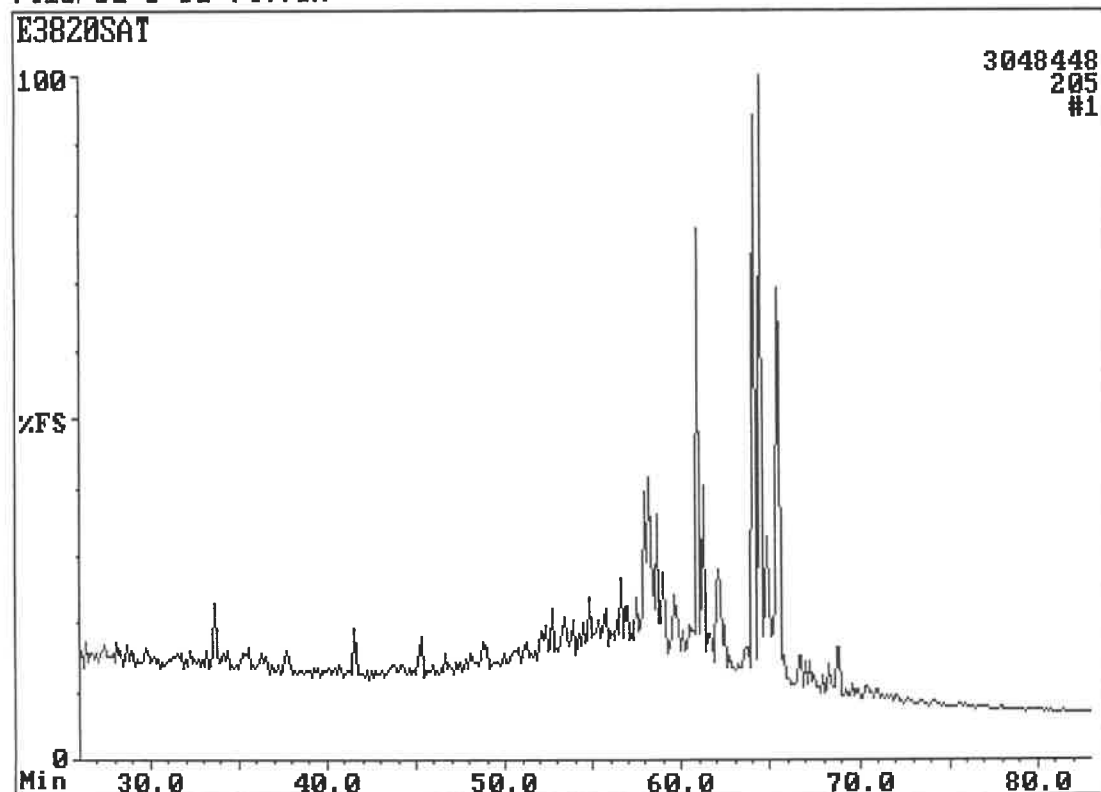
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Trio-1



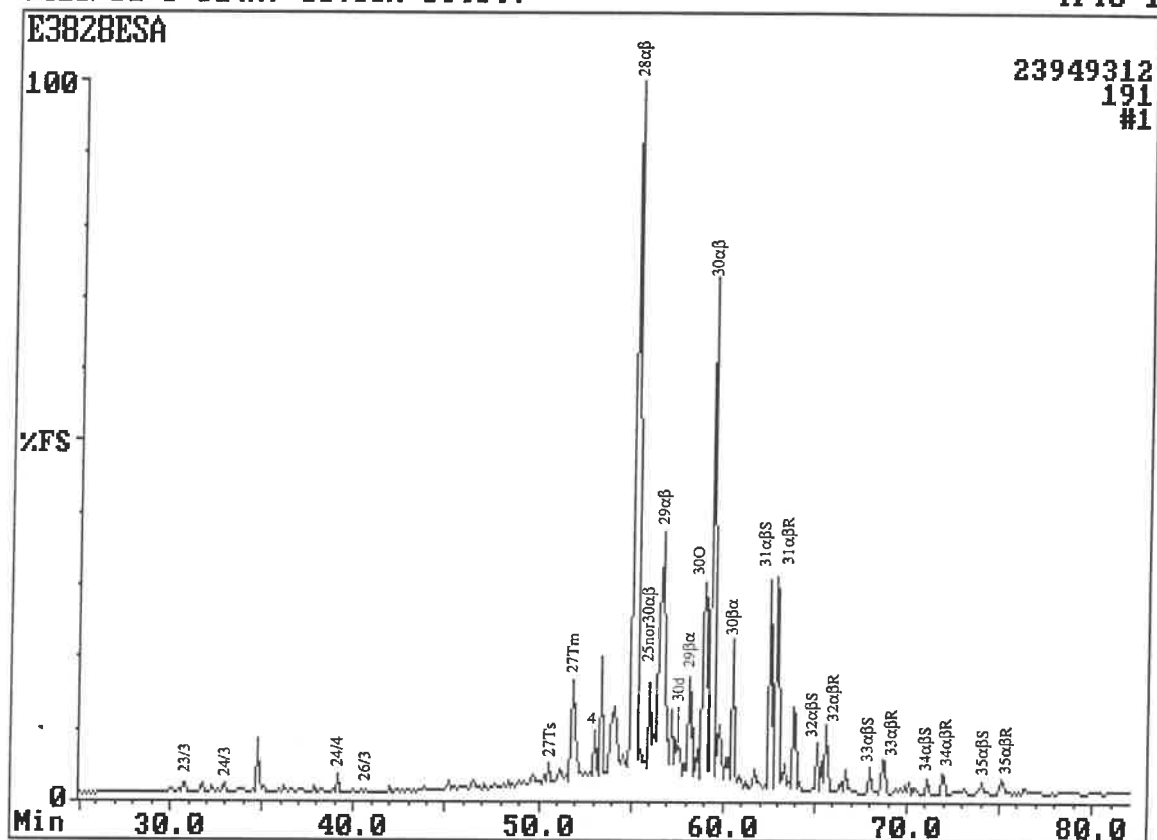
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7418/01-U-01 74.73m

Trio-1



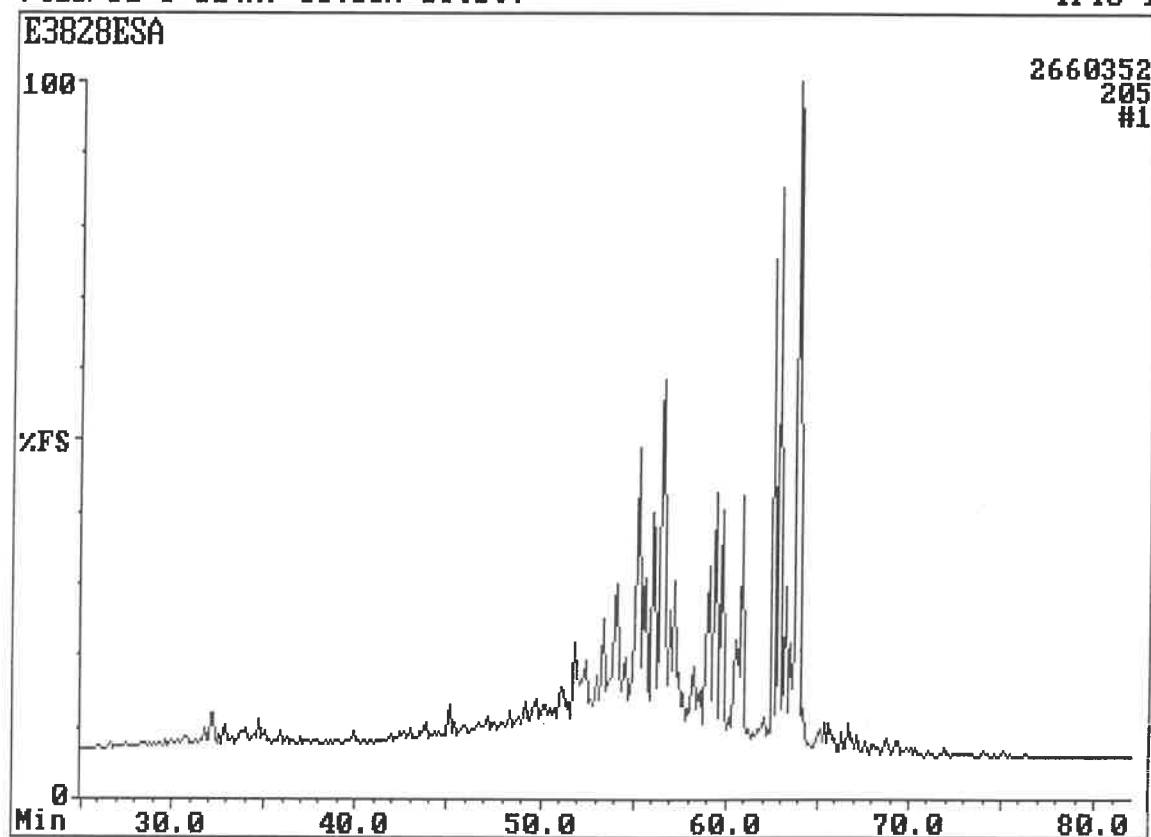
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7418/01-U-01(A) 85.00m Slitst.

Trio-1



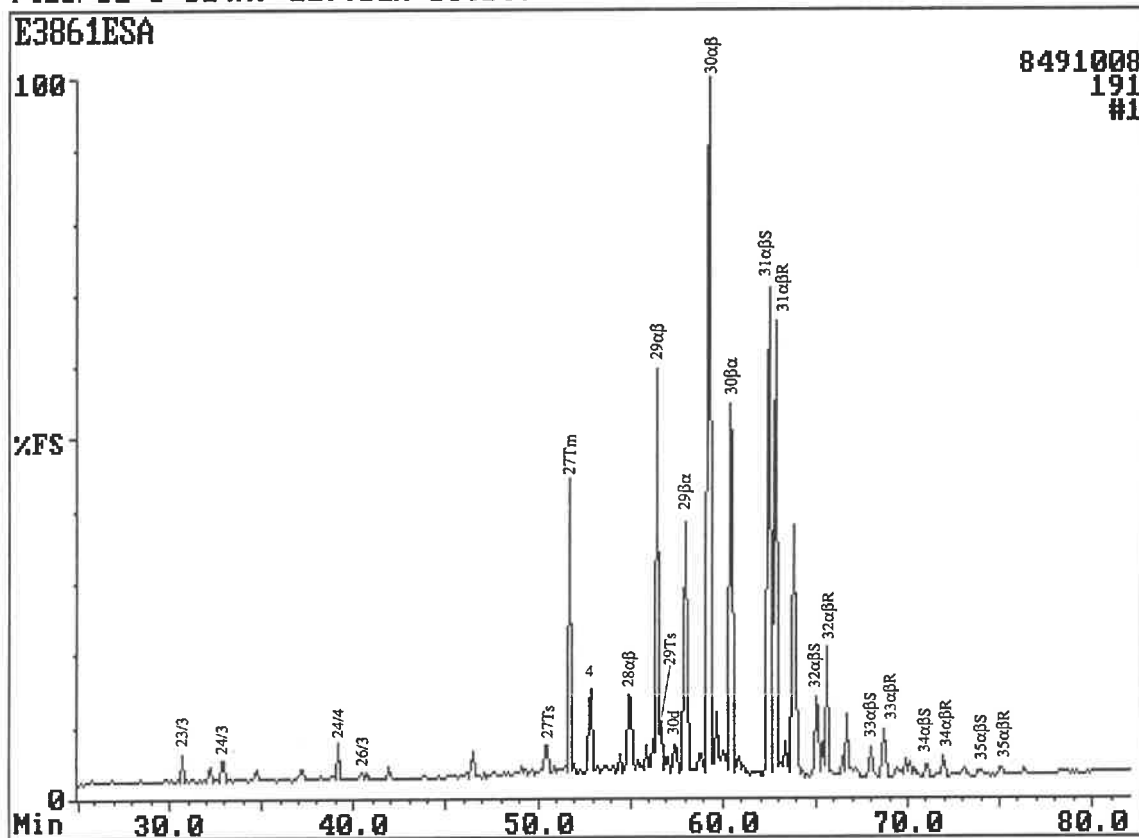
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7418/01-U-01(A) 85.00m Slitst.

Trio-1



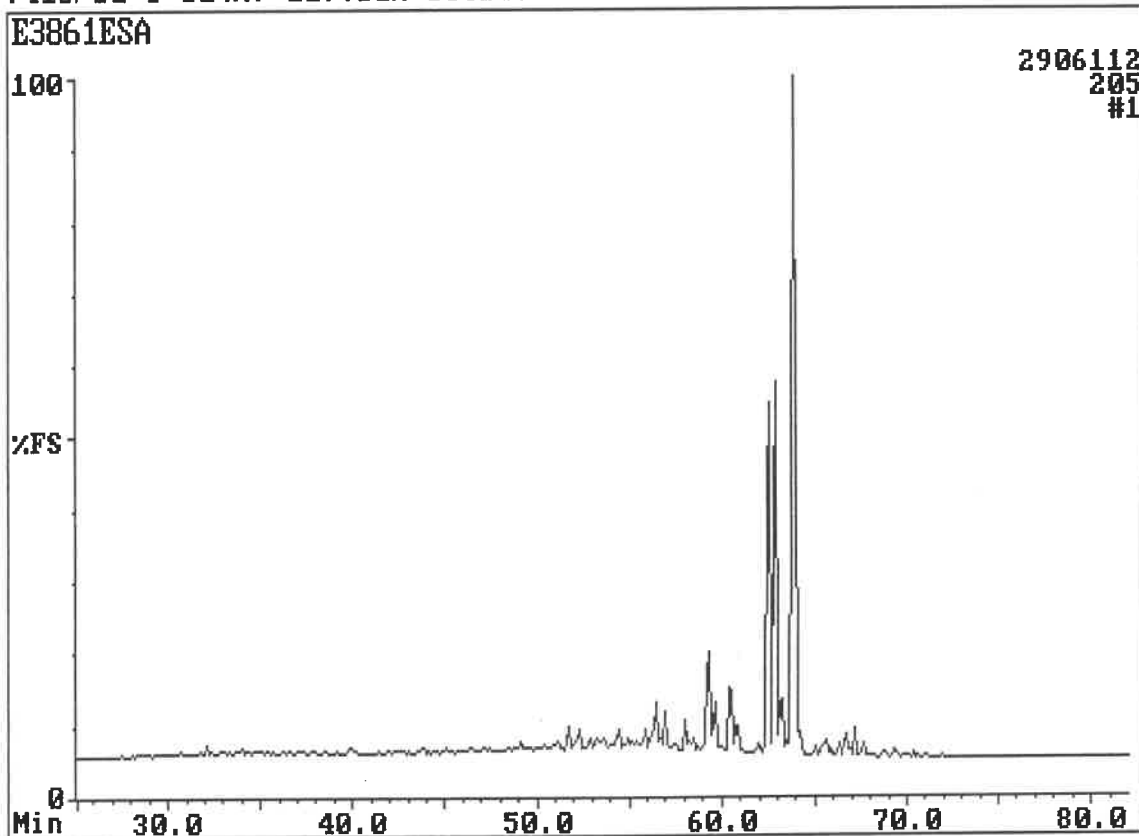
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7418/01-U-01(A) 117.81m Sltst.

Trio-1



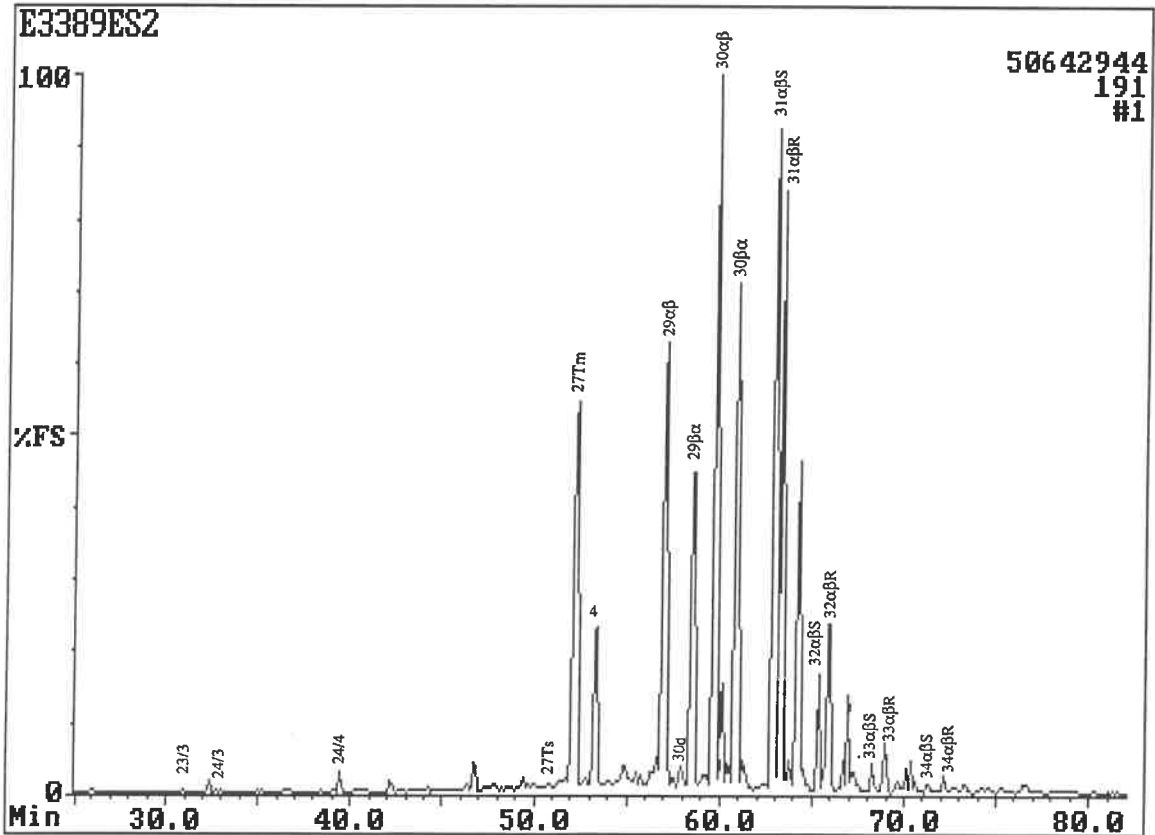
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7418/01-U-01(A) 117.81m Sltst.

Trio-1



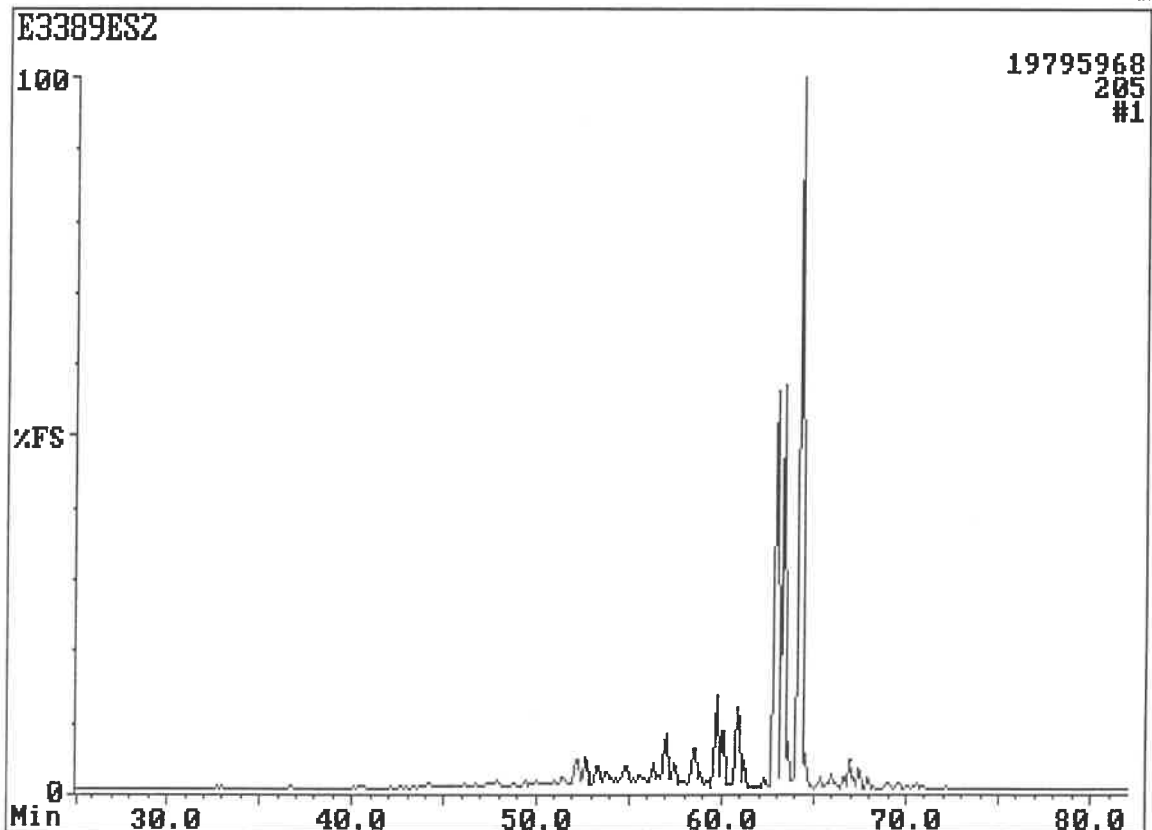
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7517/12-U-01(B) 111.15m Clst-sltst.

Trio-1



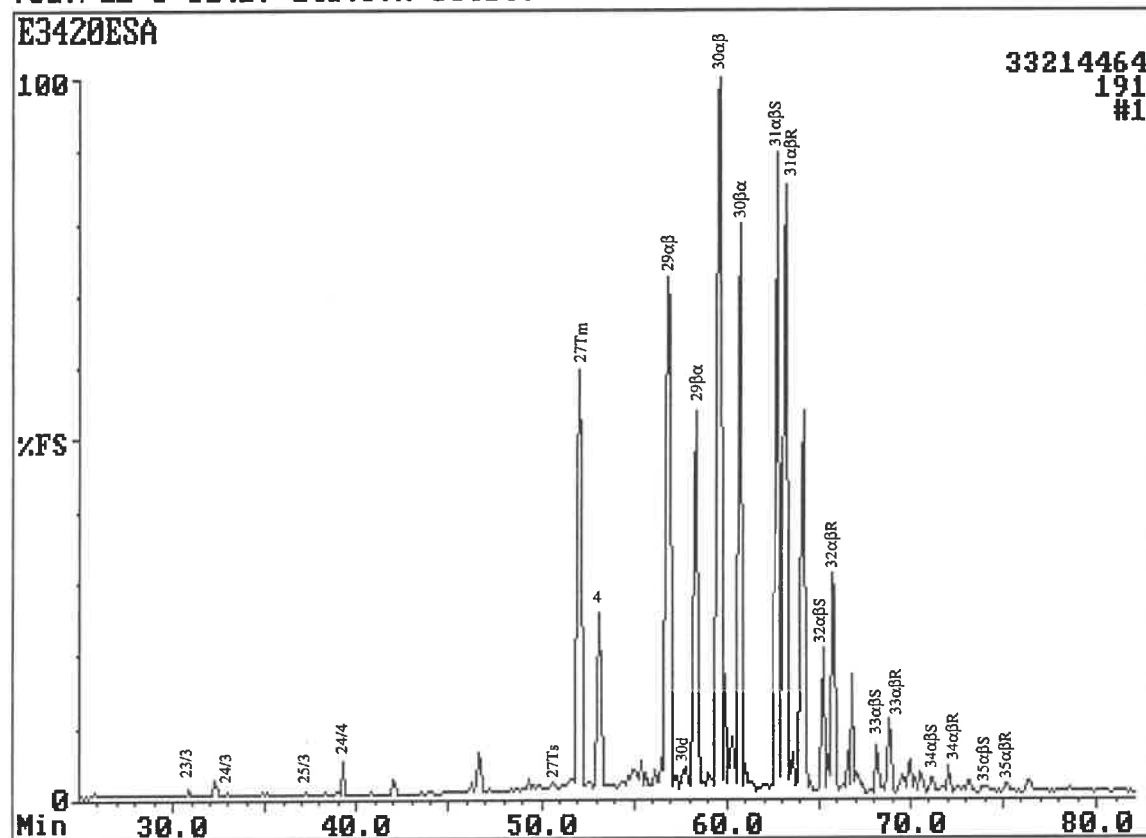
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Trio-1



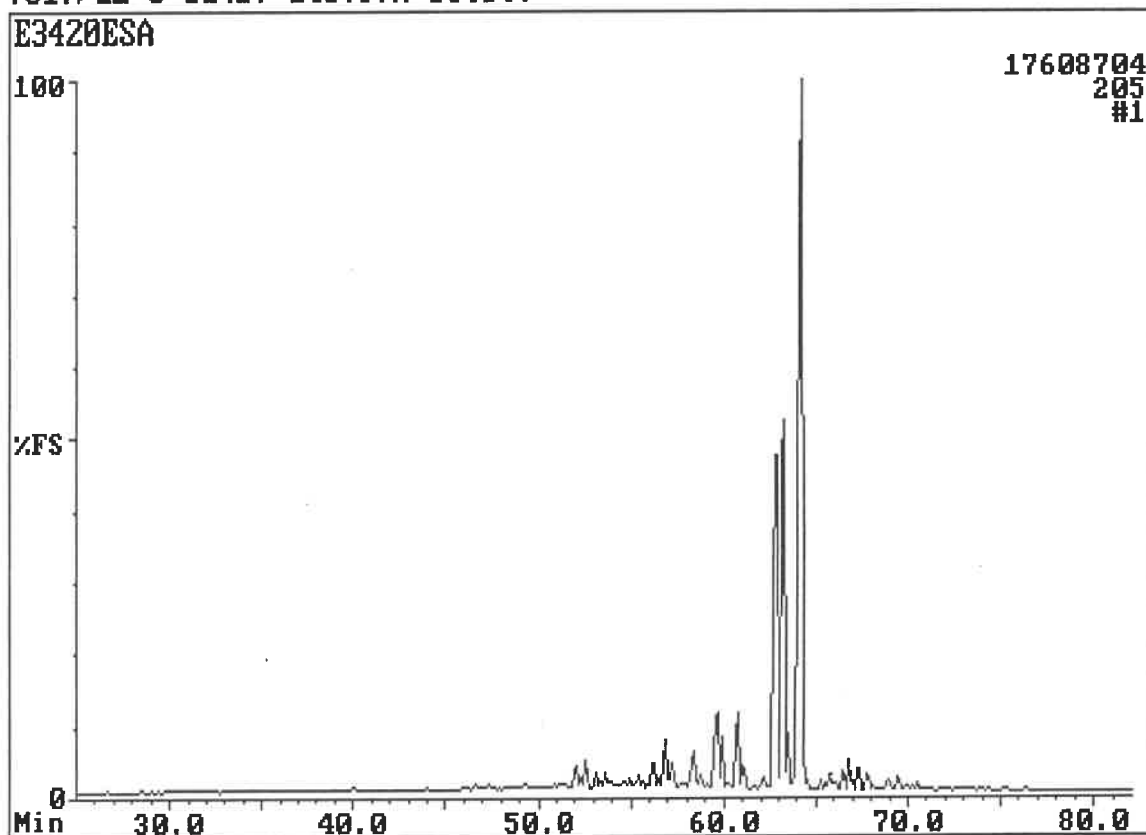
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Trio-1



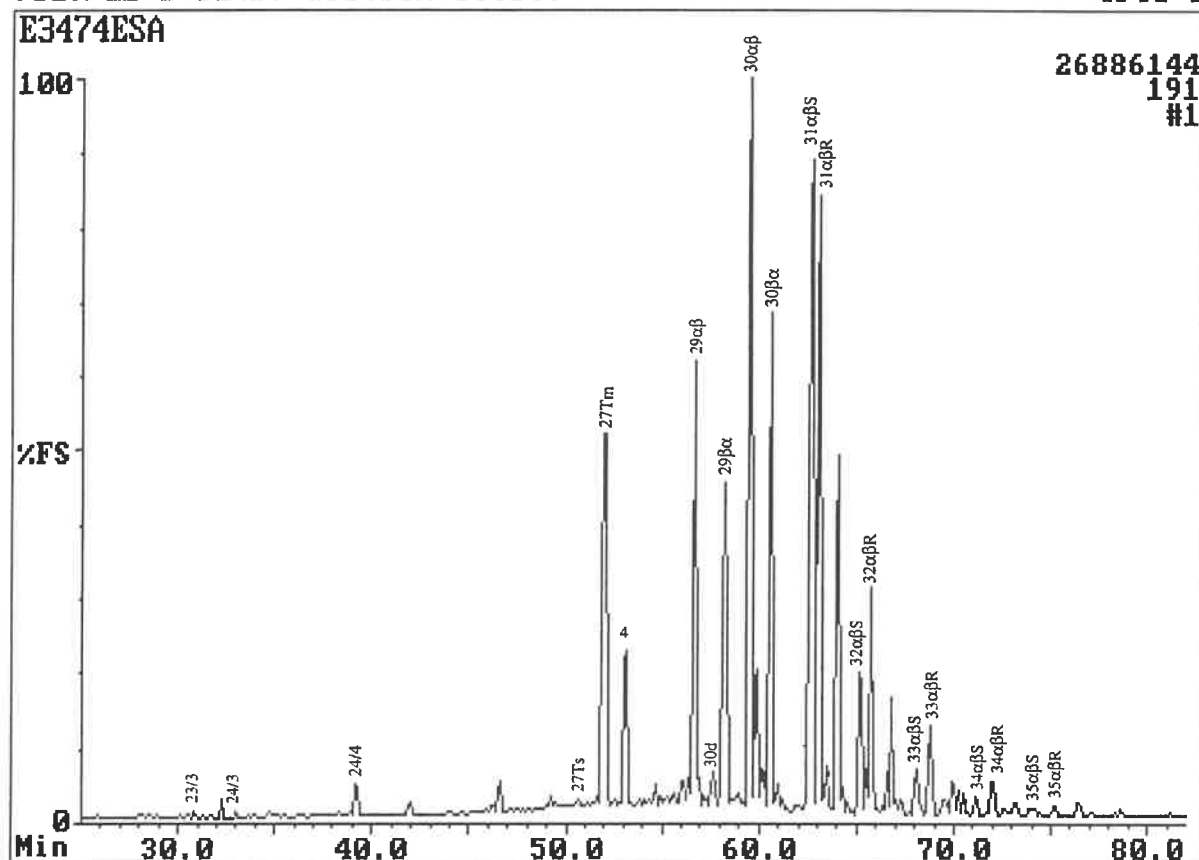
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7517/12-U-01(B) 143.97m Sltst.

Trio-1



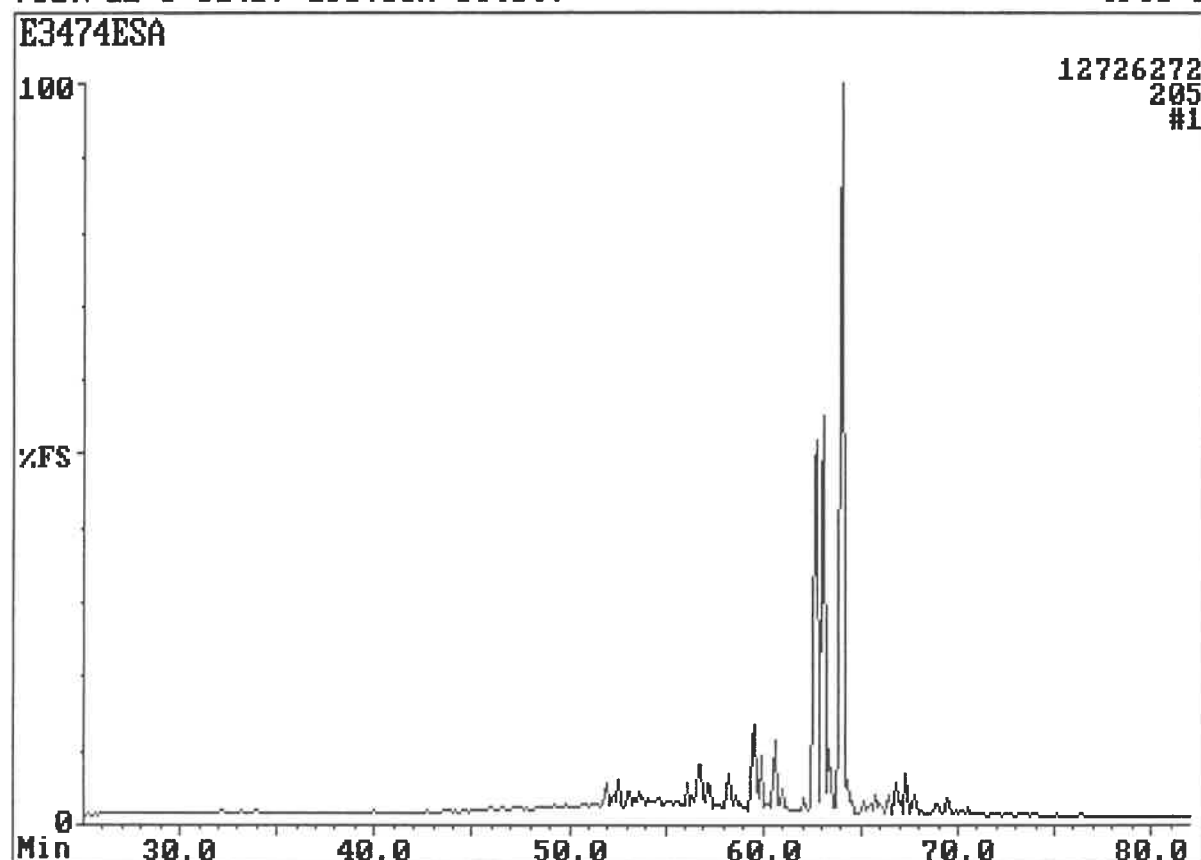
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Trio-1



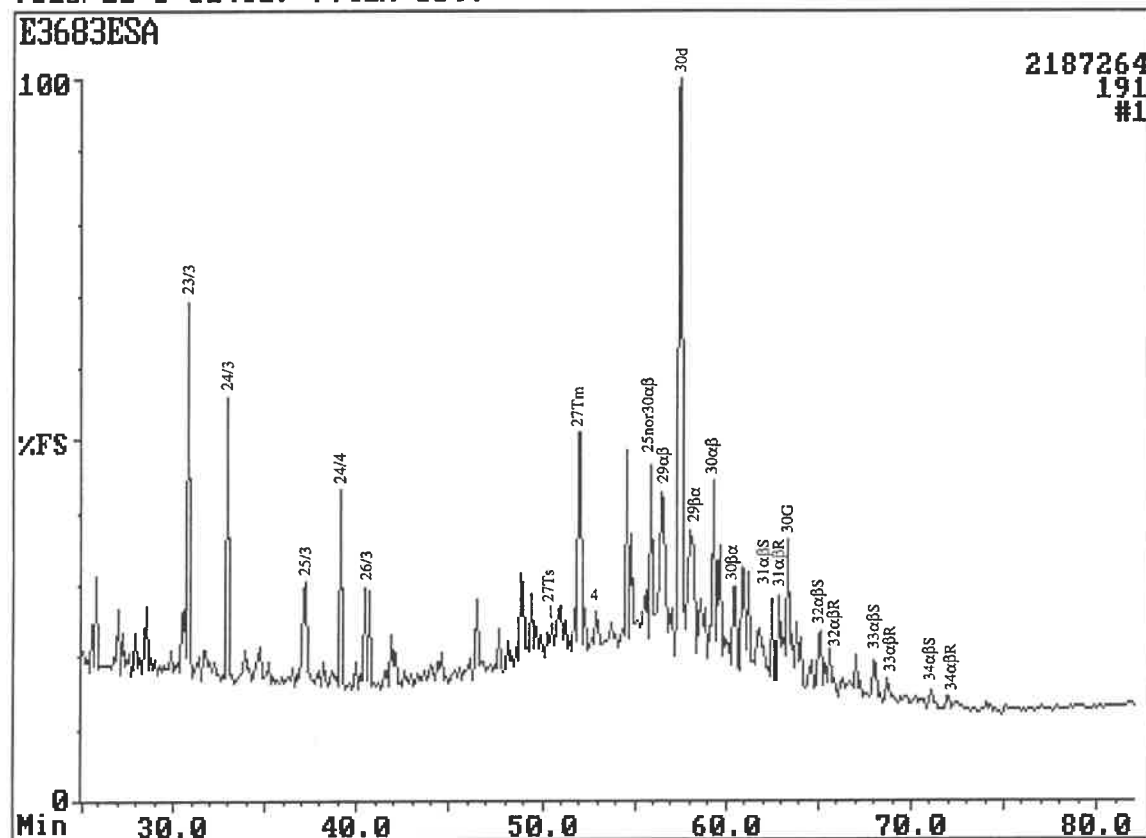
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7517/12-U-01(B) 198.68m Sltst.

Trio-1



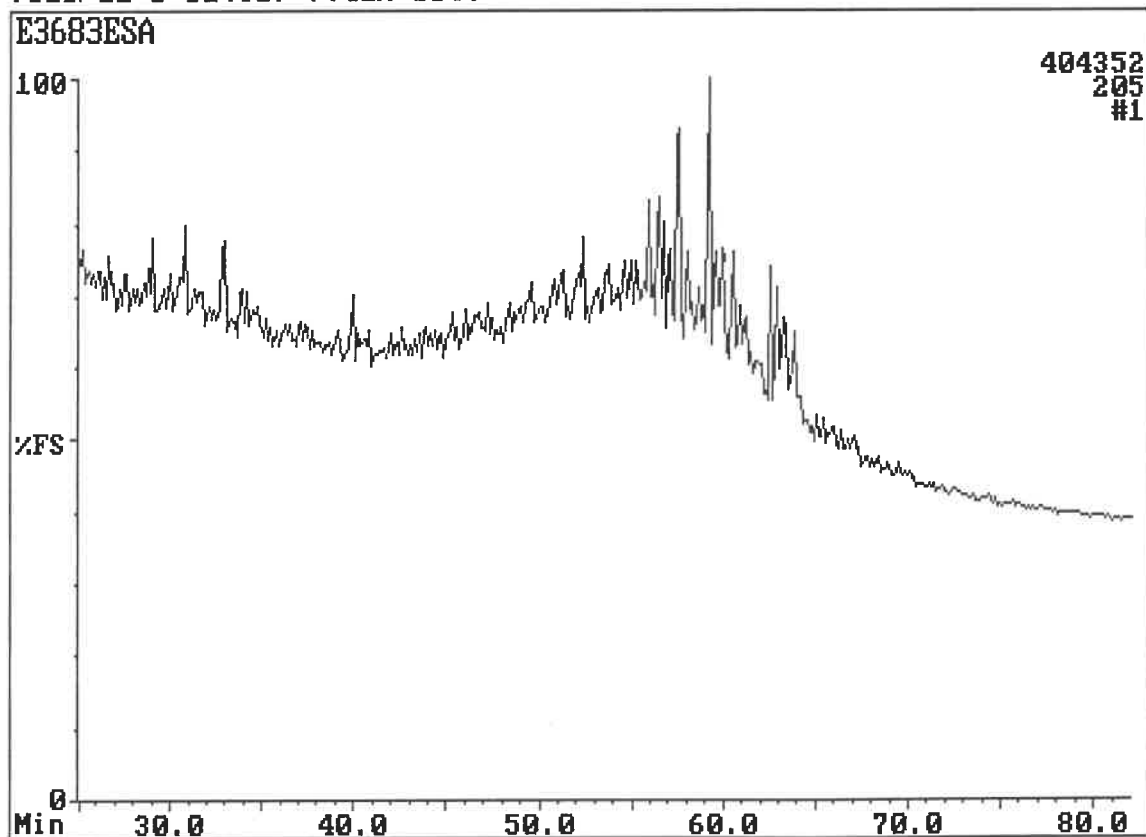
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7616/11-U-01(C1) 7.41m Sst.

Trio-1



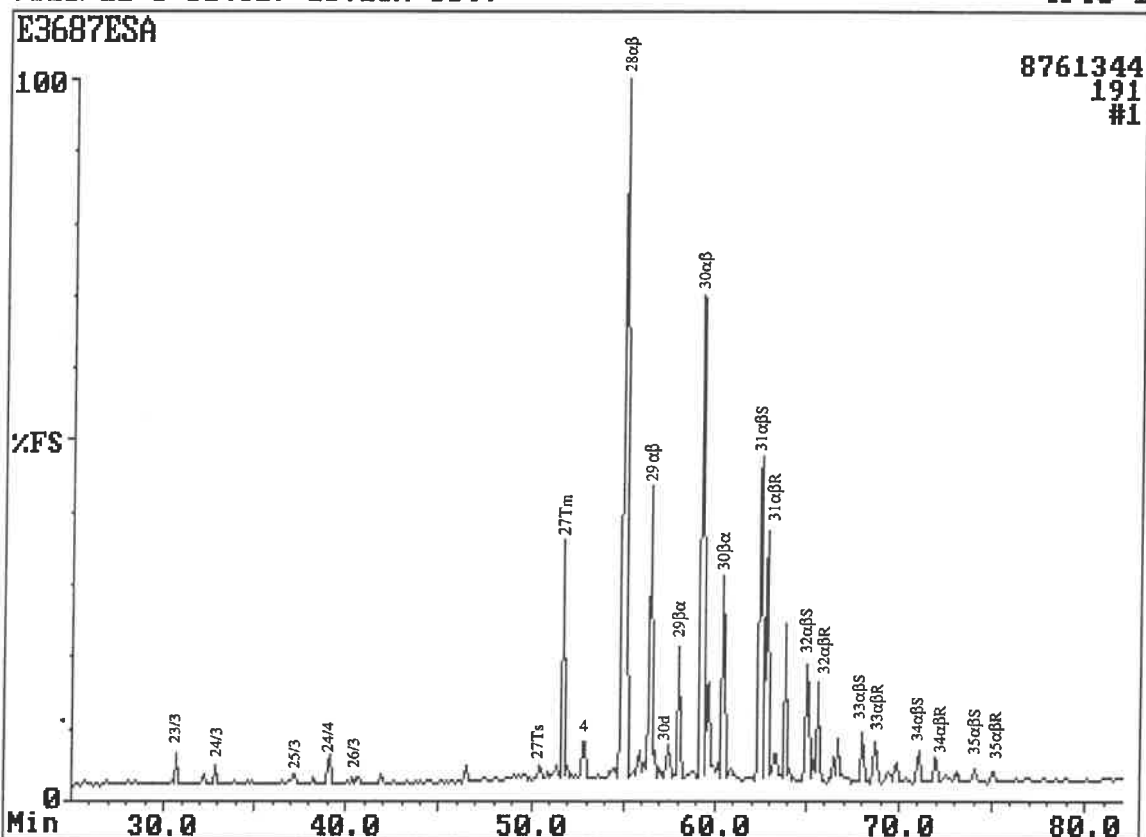
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7616/11-U-01(C1) 7.41m Sst.

Trio-1



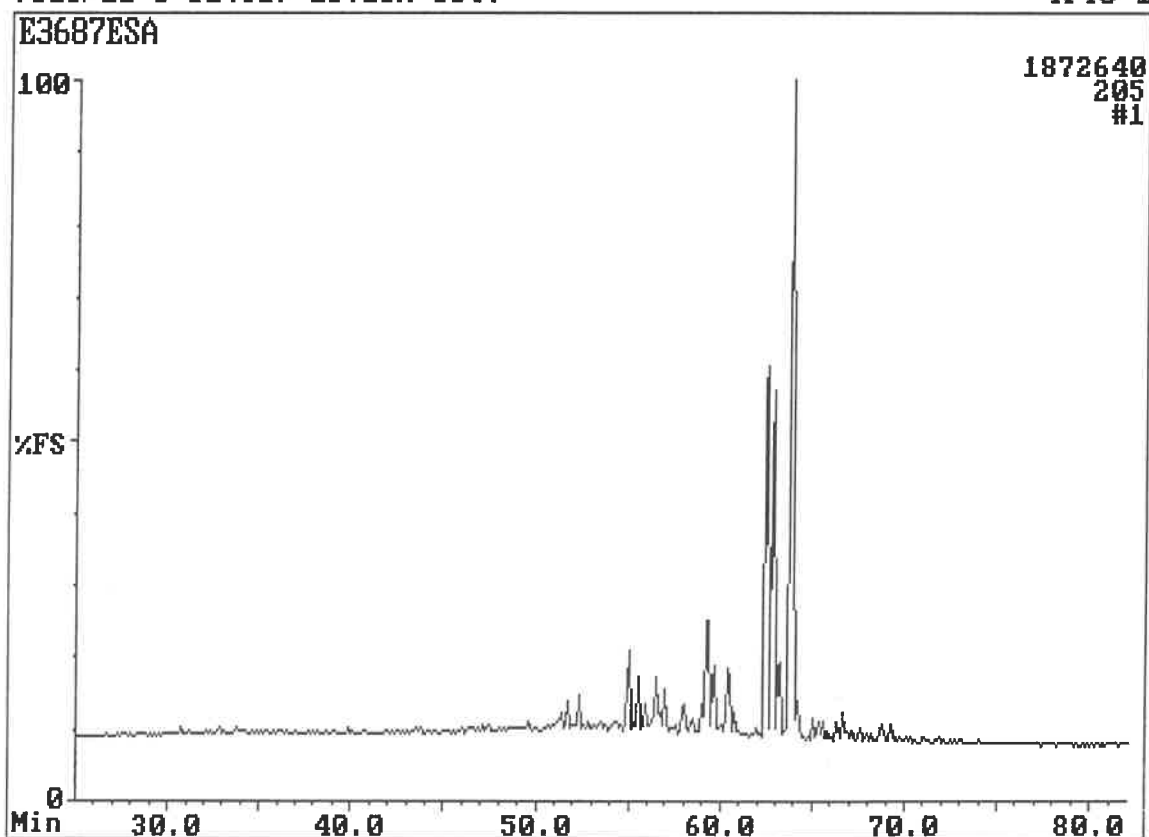
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7616/11-U-01(C1) 13.15m Sst.

Trio-1



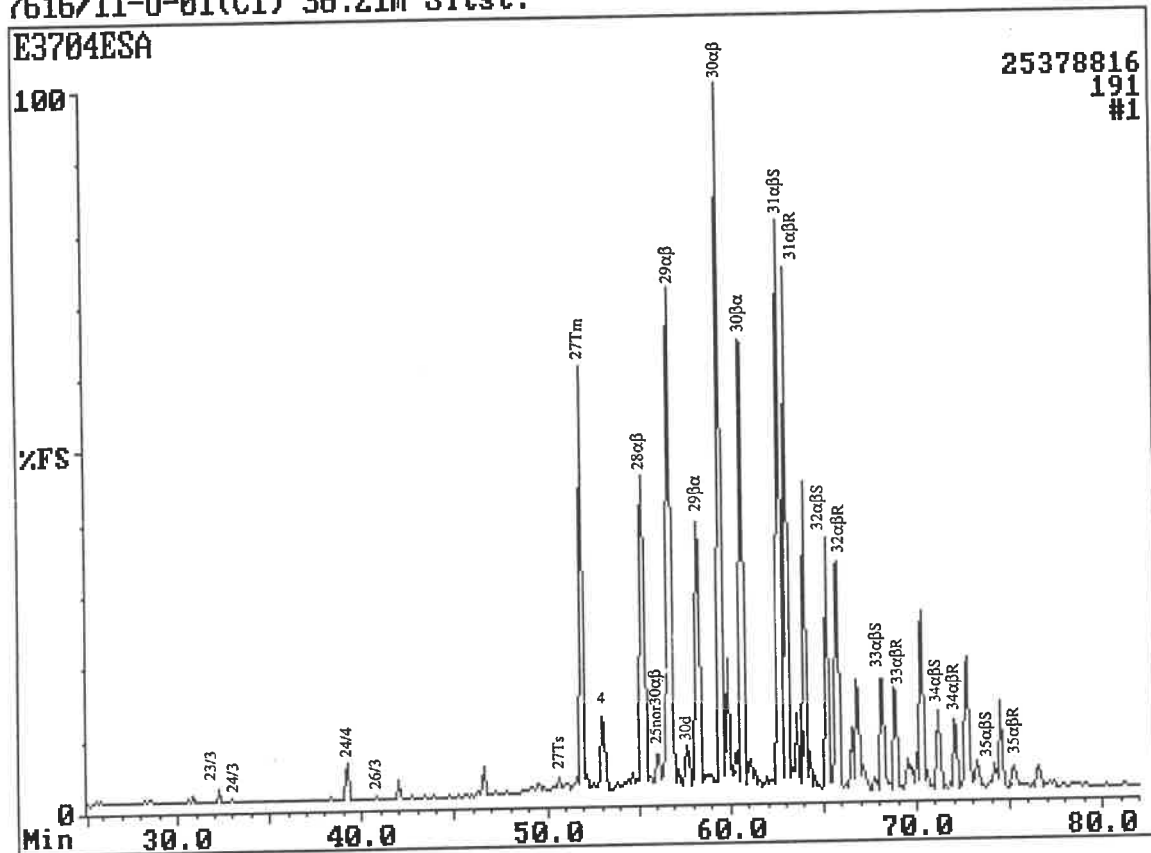
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Trio-1



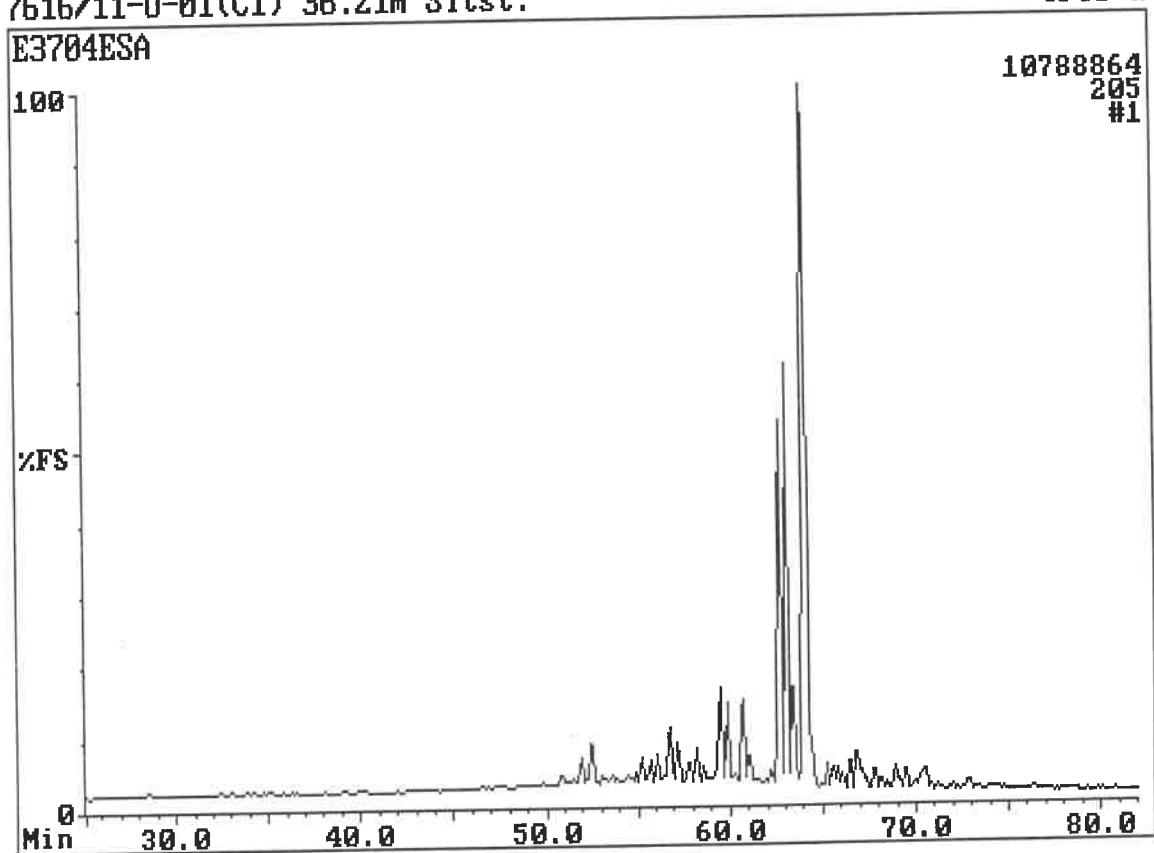
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Trio-1



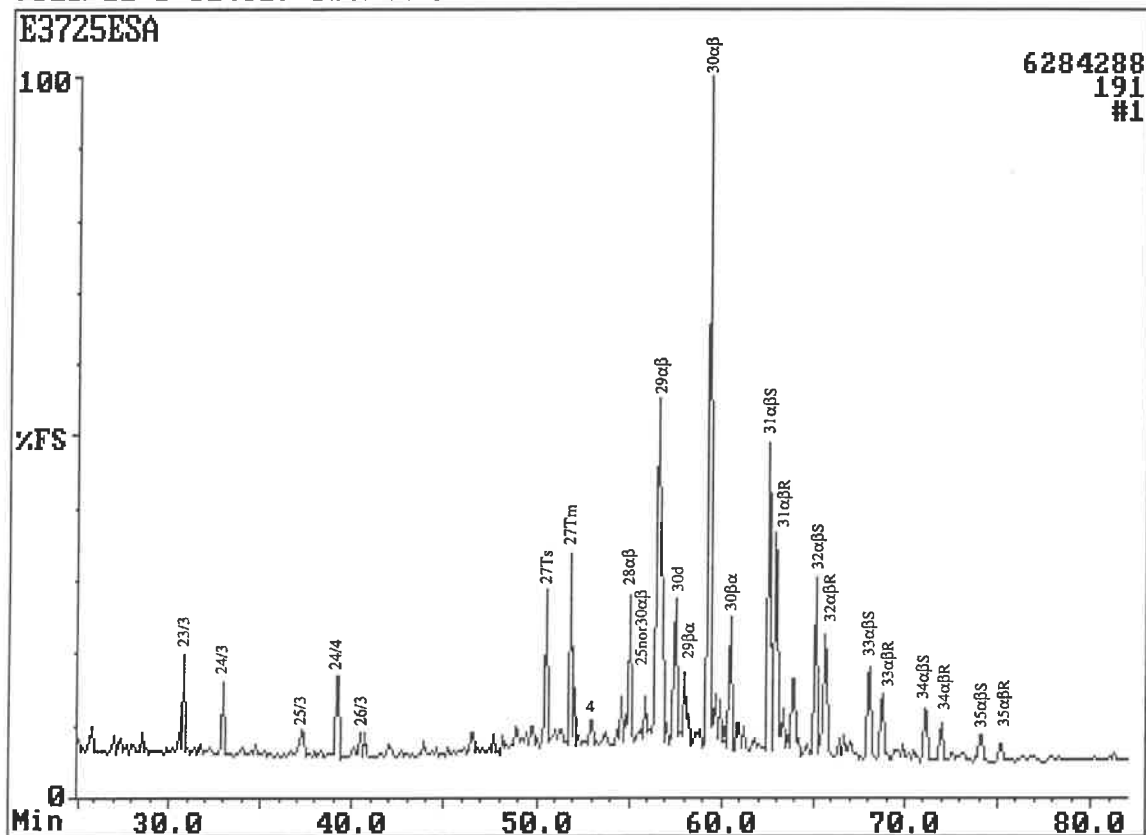
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Trio-1



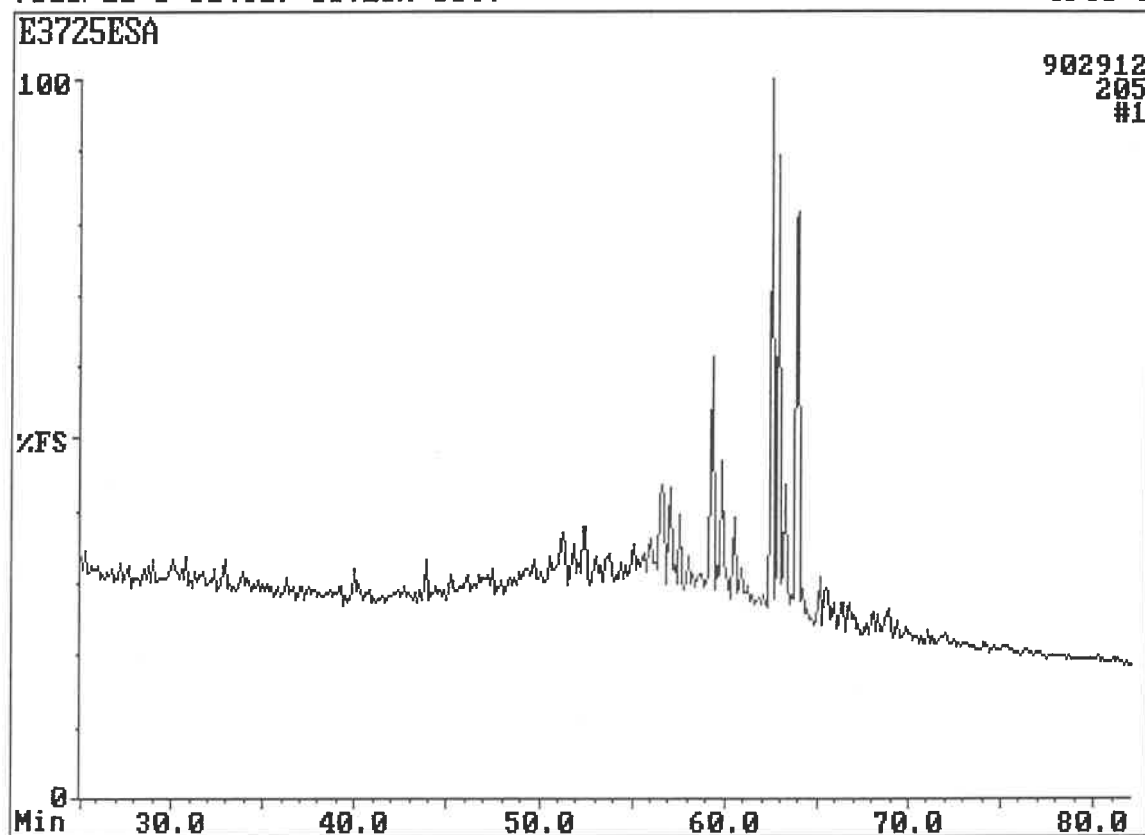
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7616/11-U-01(C1) 56.25m Sst.

Trio-1



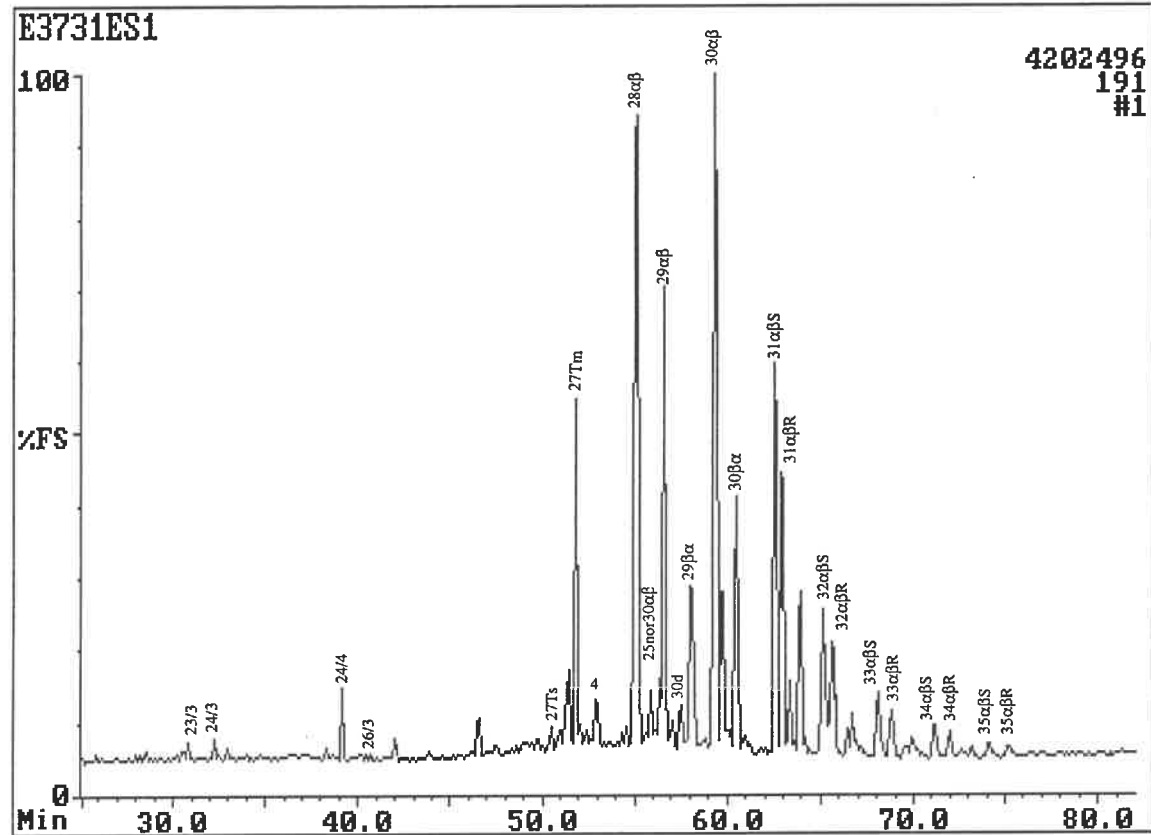
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7616/11-U-01(C1) 56.25m Sst.

Trio-1



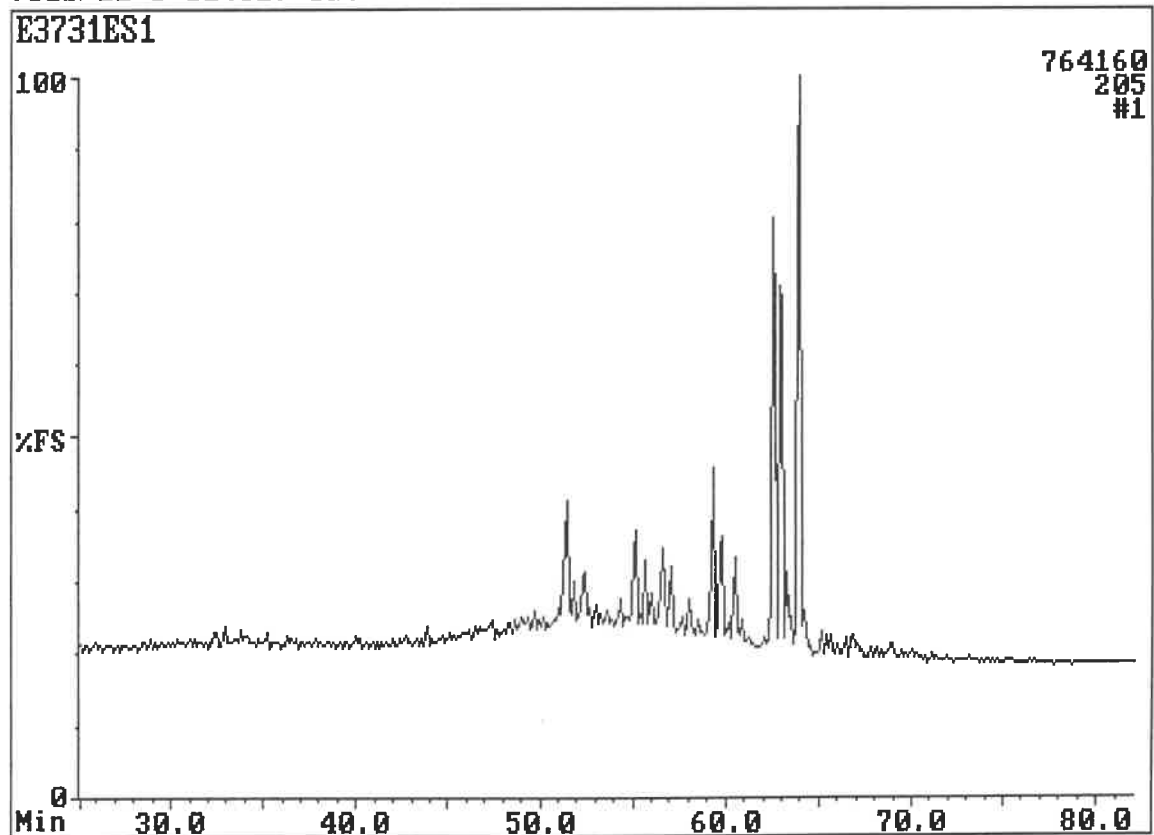
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7616/11-U-01(C1) 65.08m Sst.

Trio-1



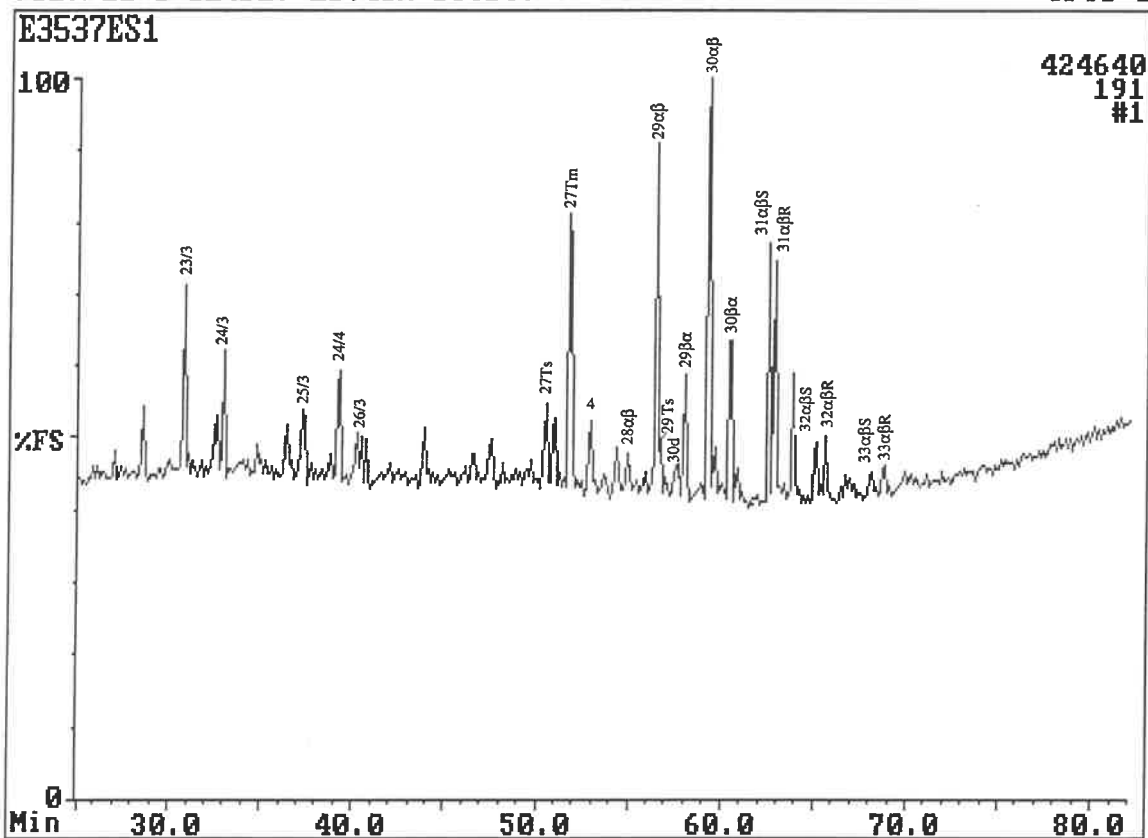
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7616/11-U-01(C1) 65.08m Sst.

Trio-1



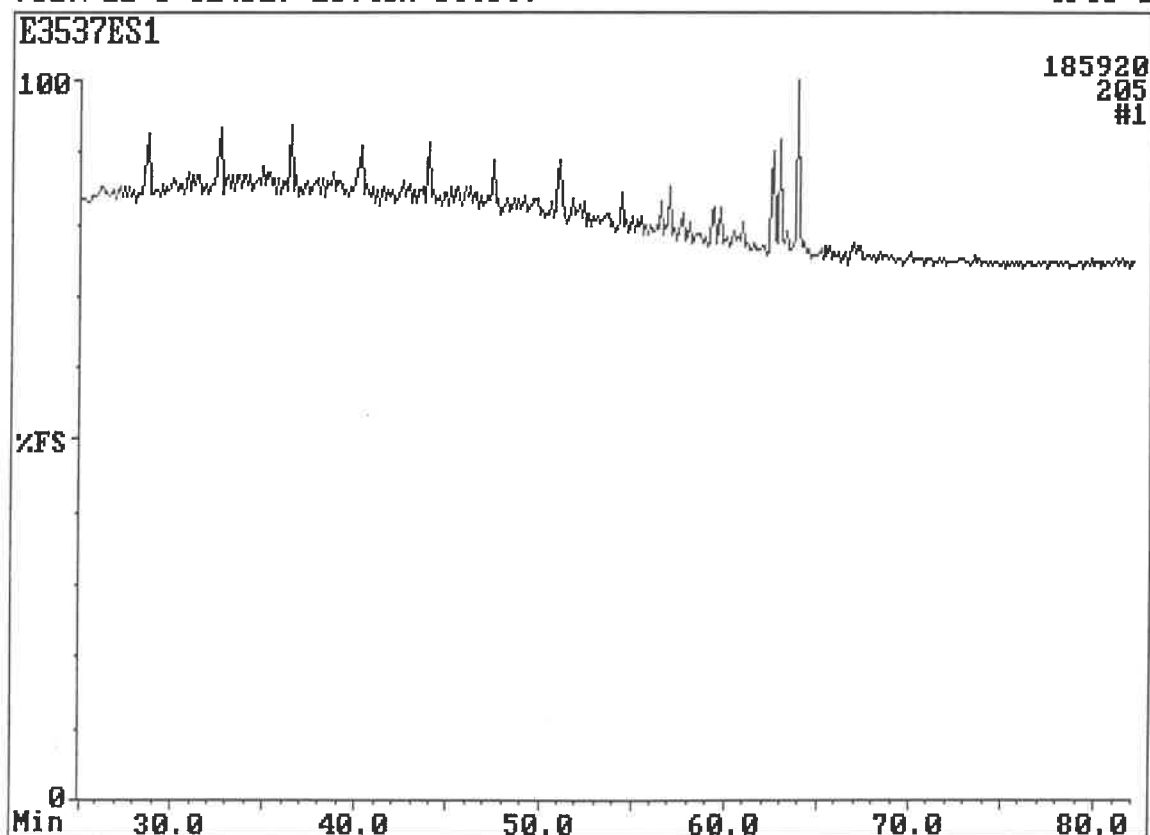
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7617/11-U-02(D2) 23.45m Slst.

Trio-1



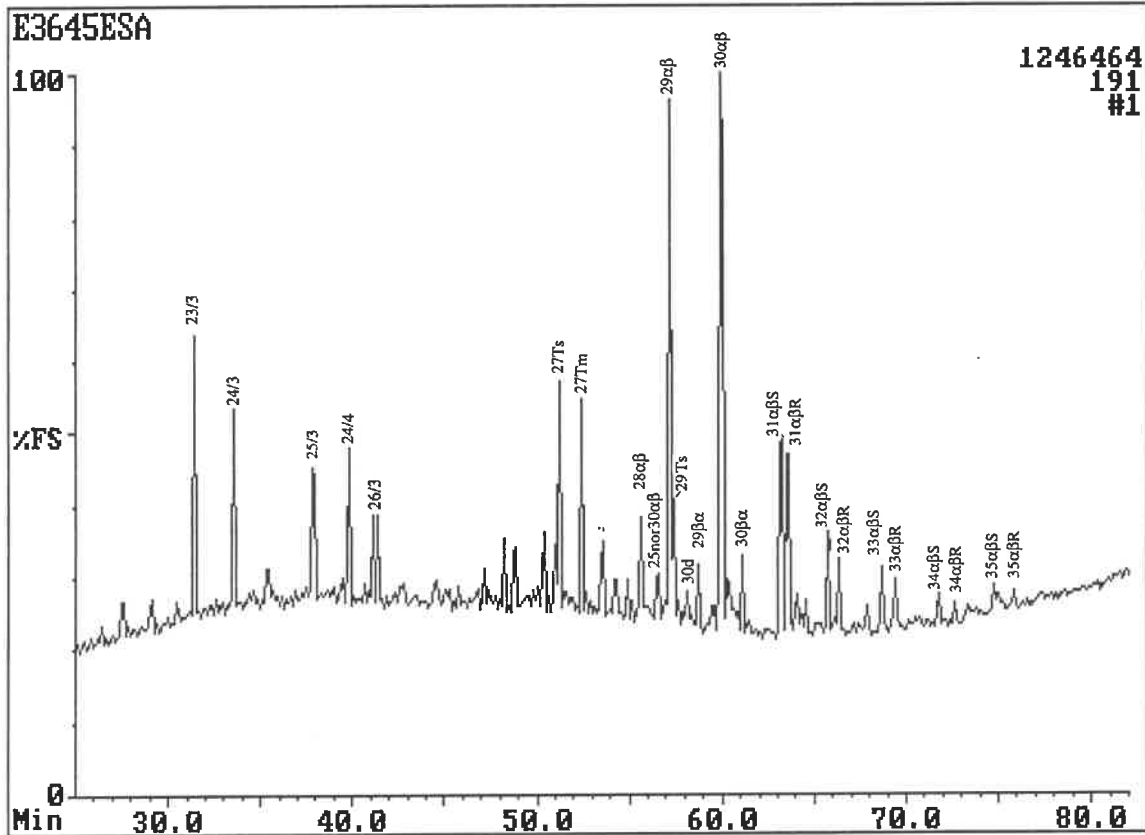
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7617/11-U-02(D2) 23.45m Slst.

Trio-1



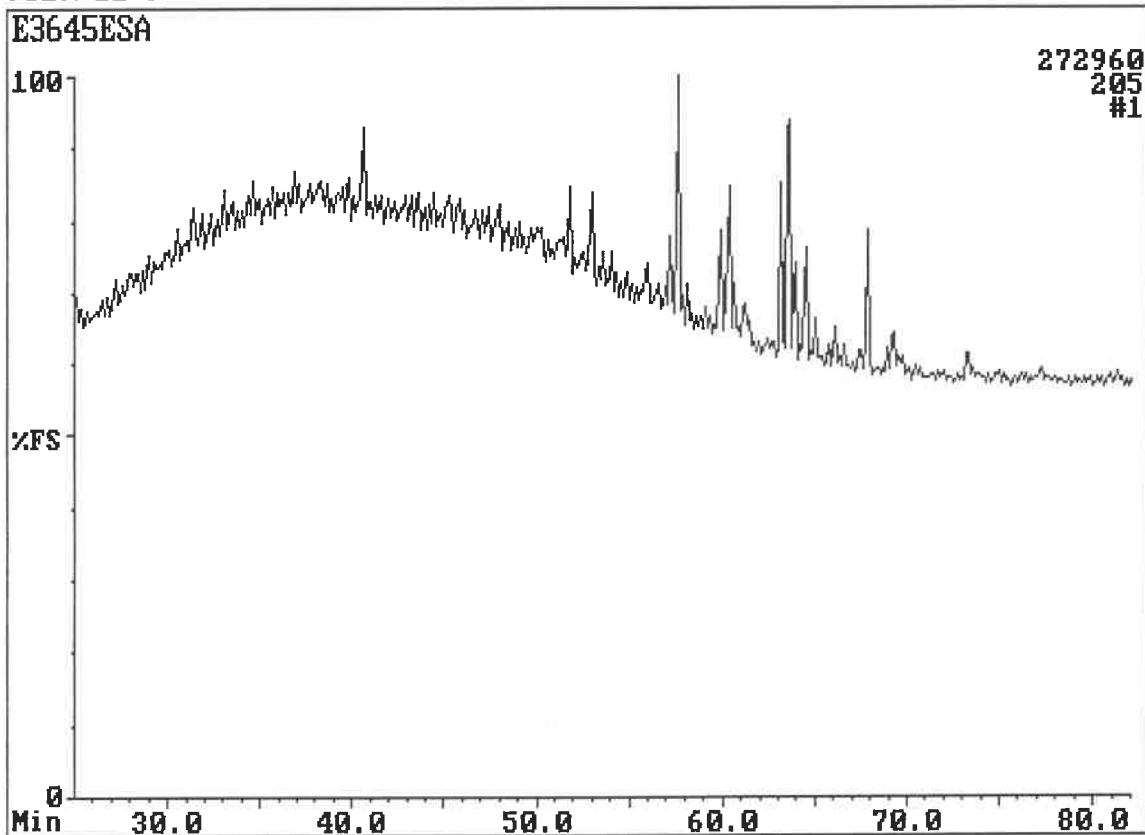
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Trio-1



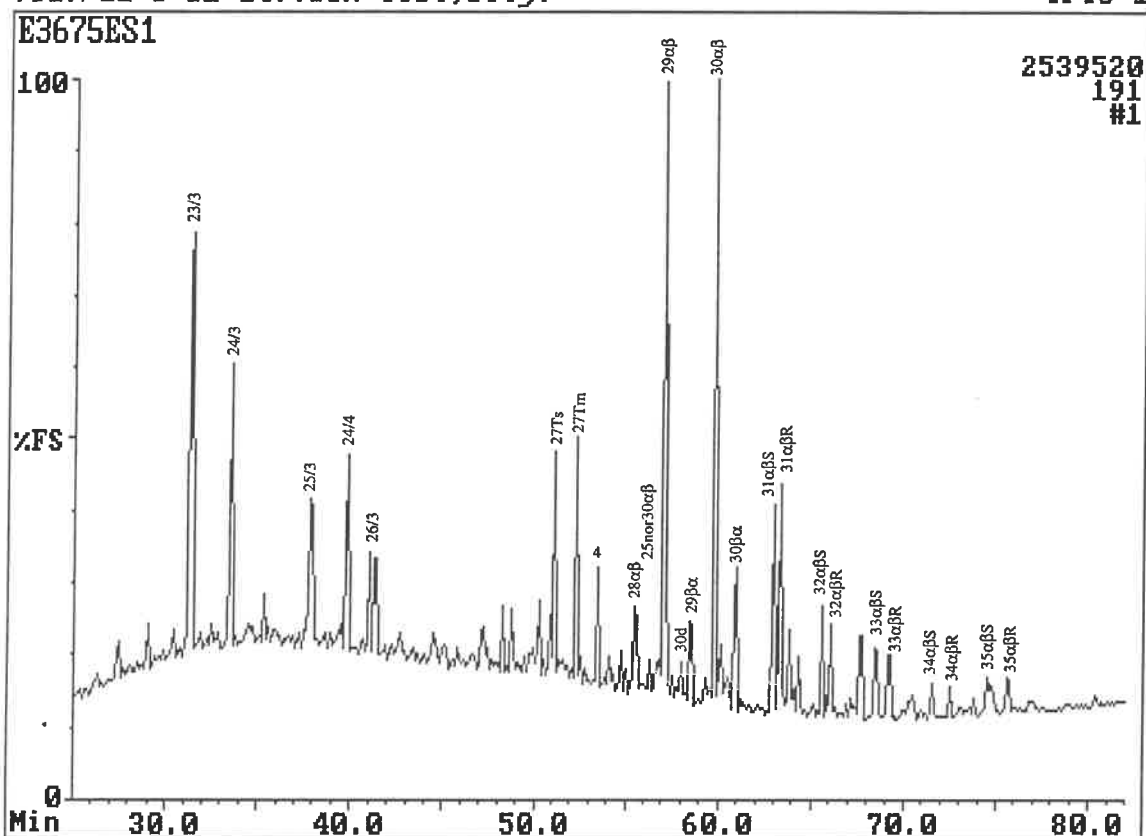
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Trio-1



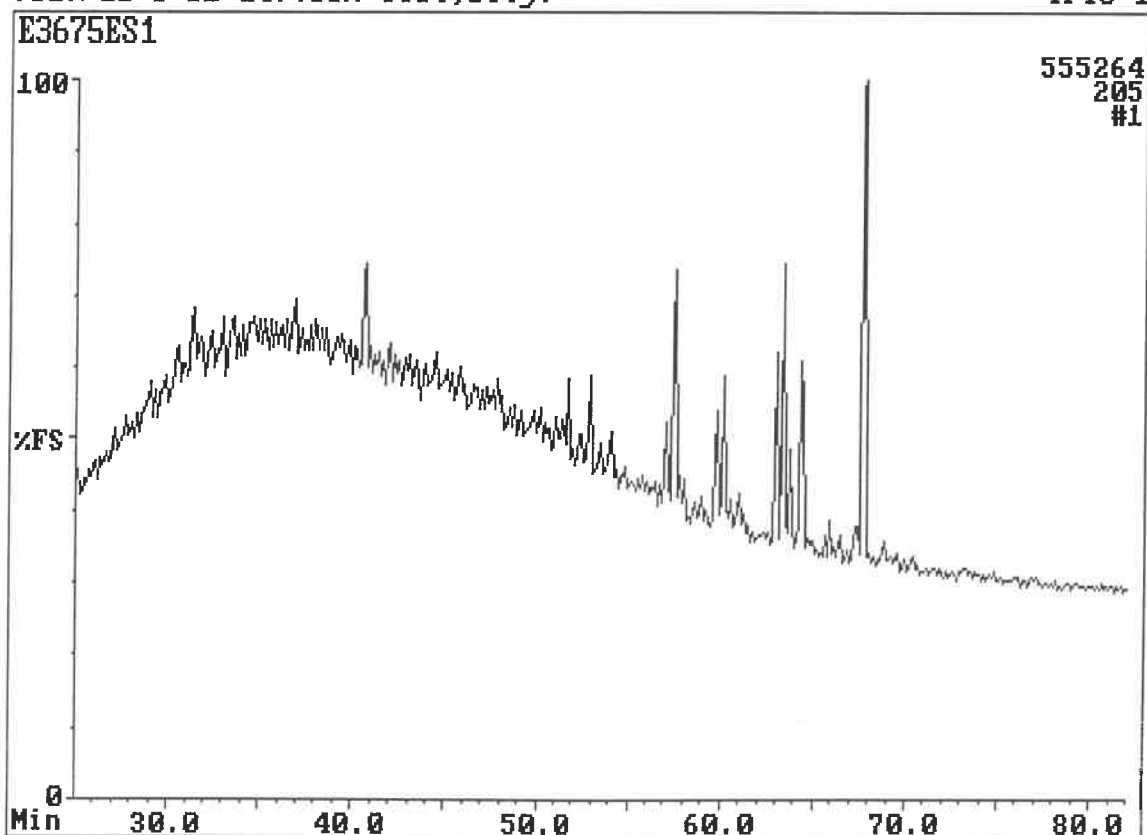
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Trio-1



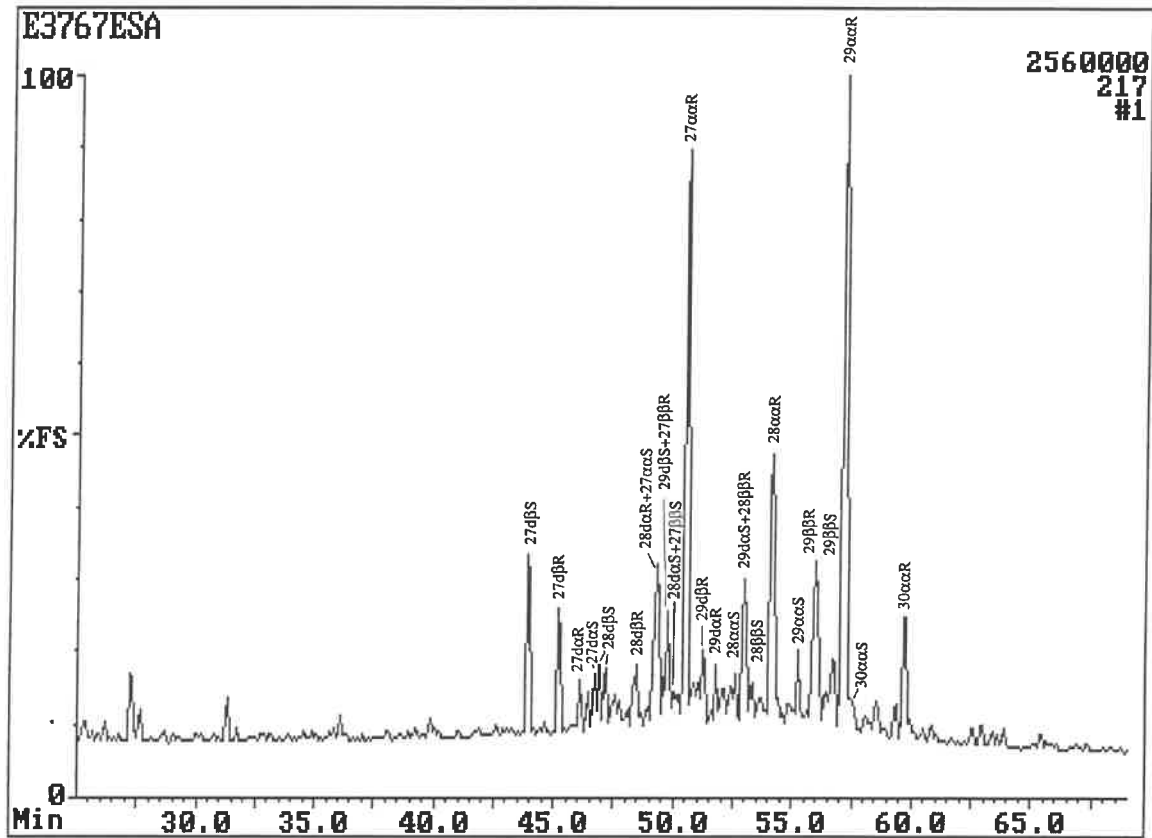
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Trio-1



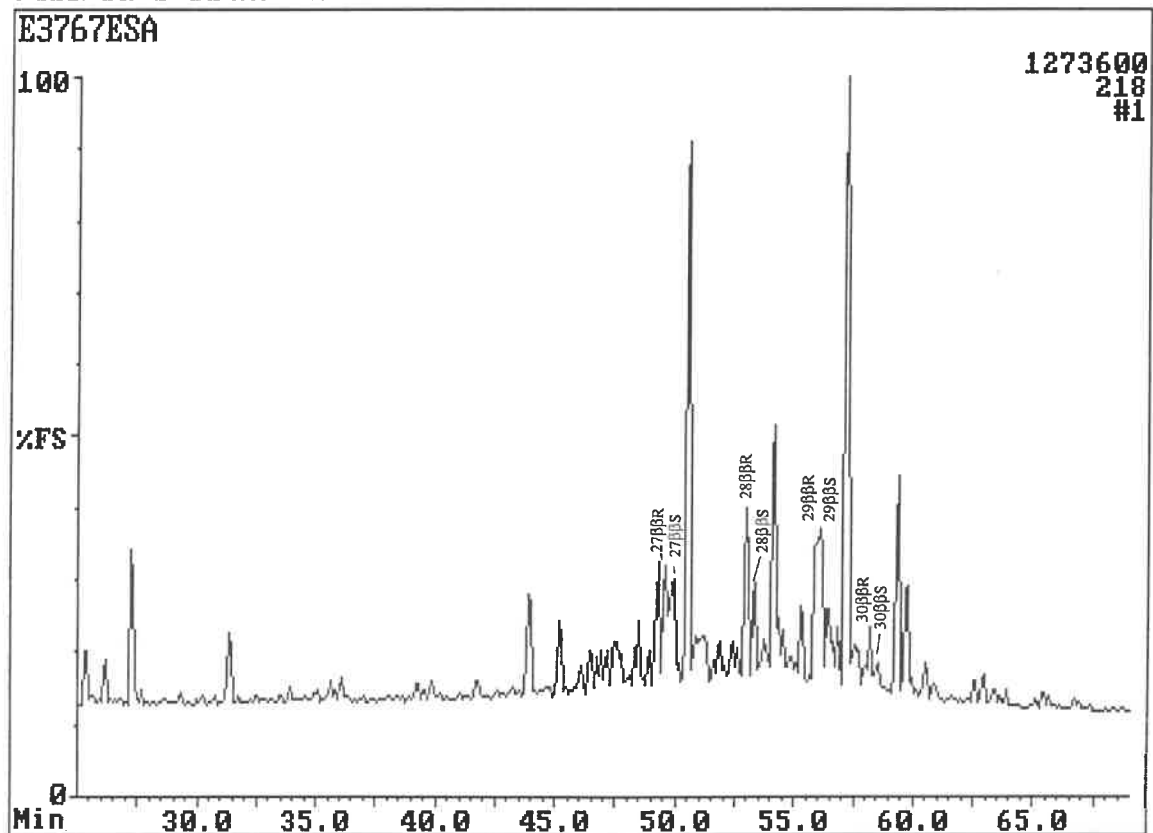
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7418/01-U-01(A) 21.68m Clst.

Trio-1



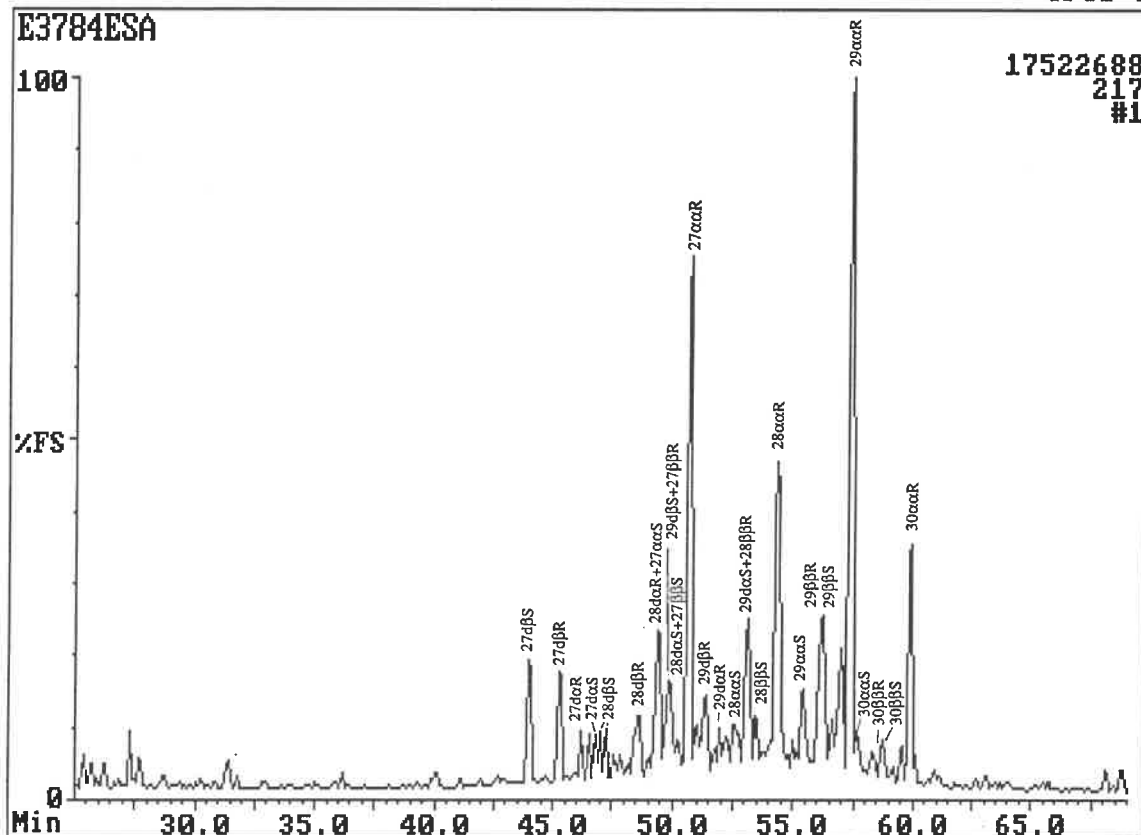
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Trio-1



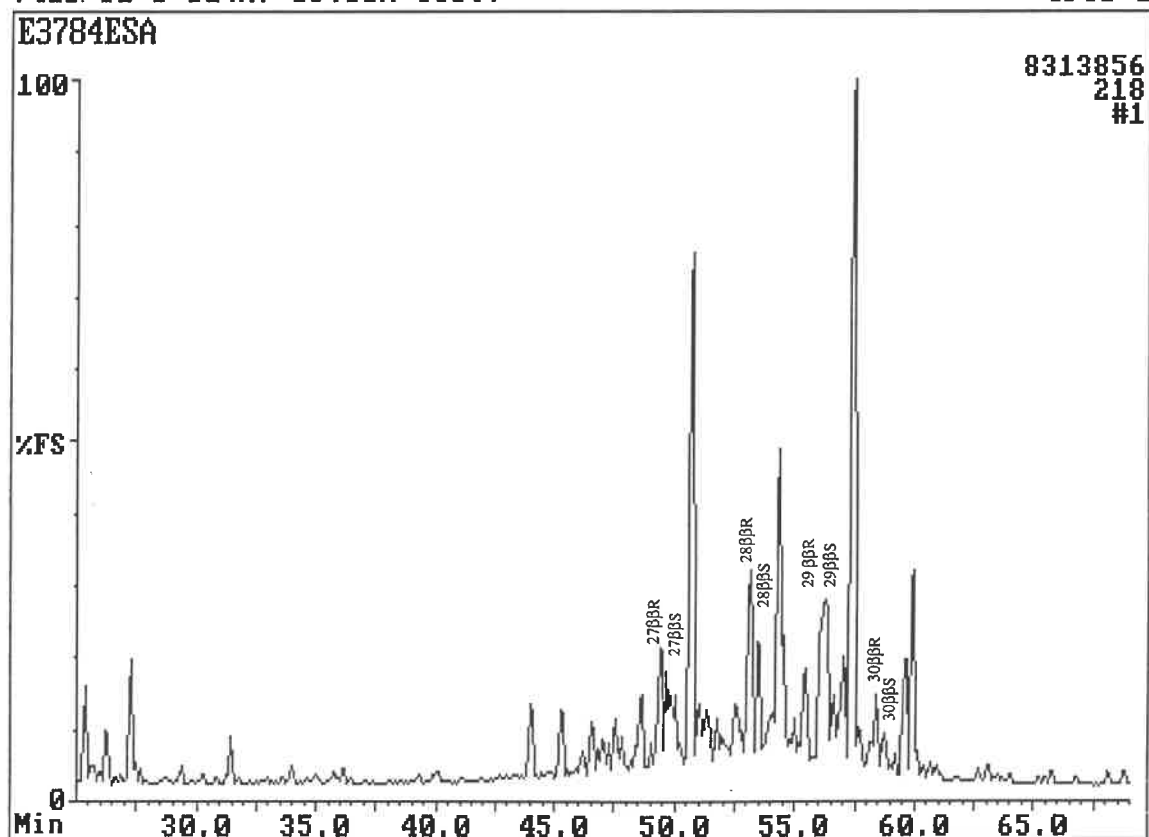
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01(A) 39.36m Clst.

Trio-1



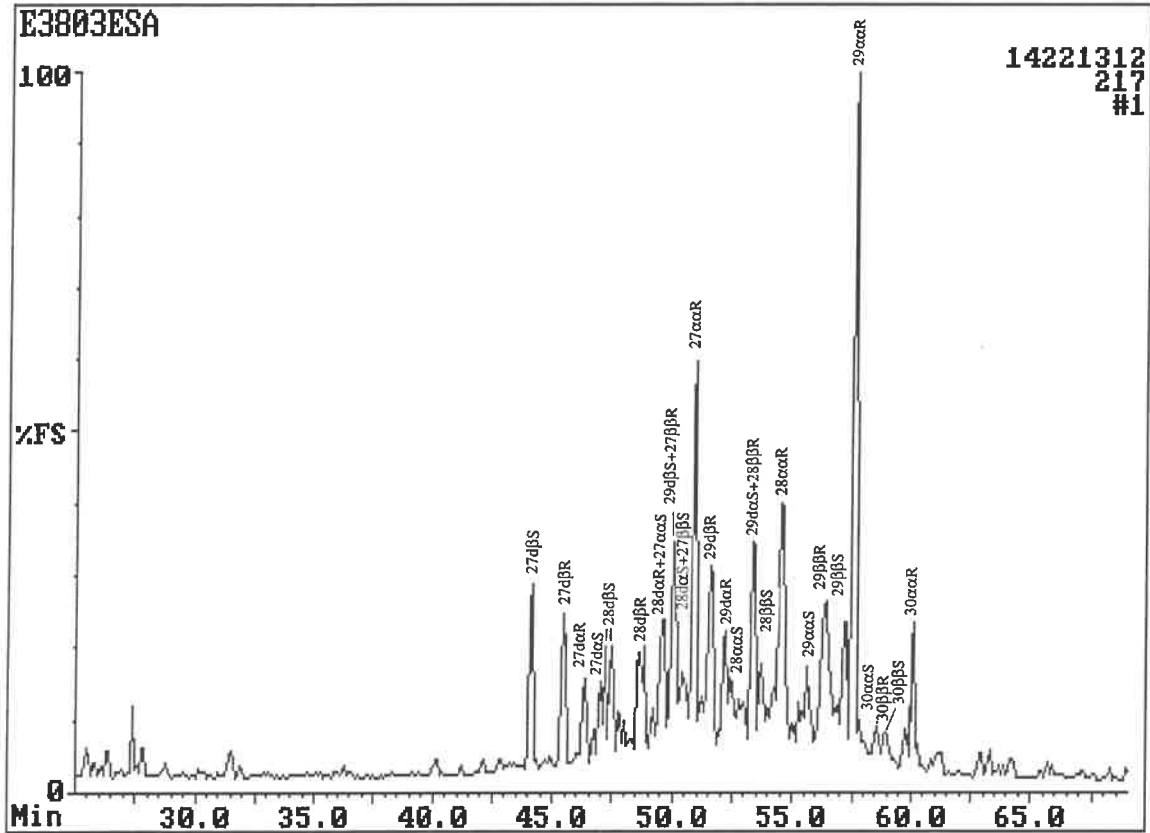
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7418/01-U-01(A) 39.36m Clst.

Trio-1



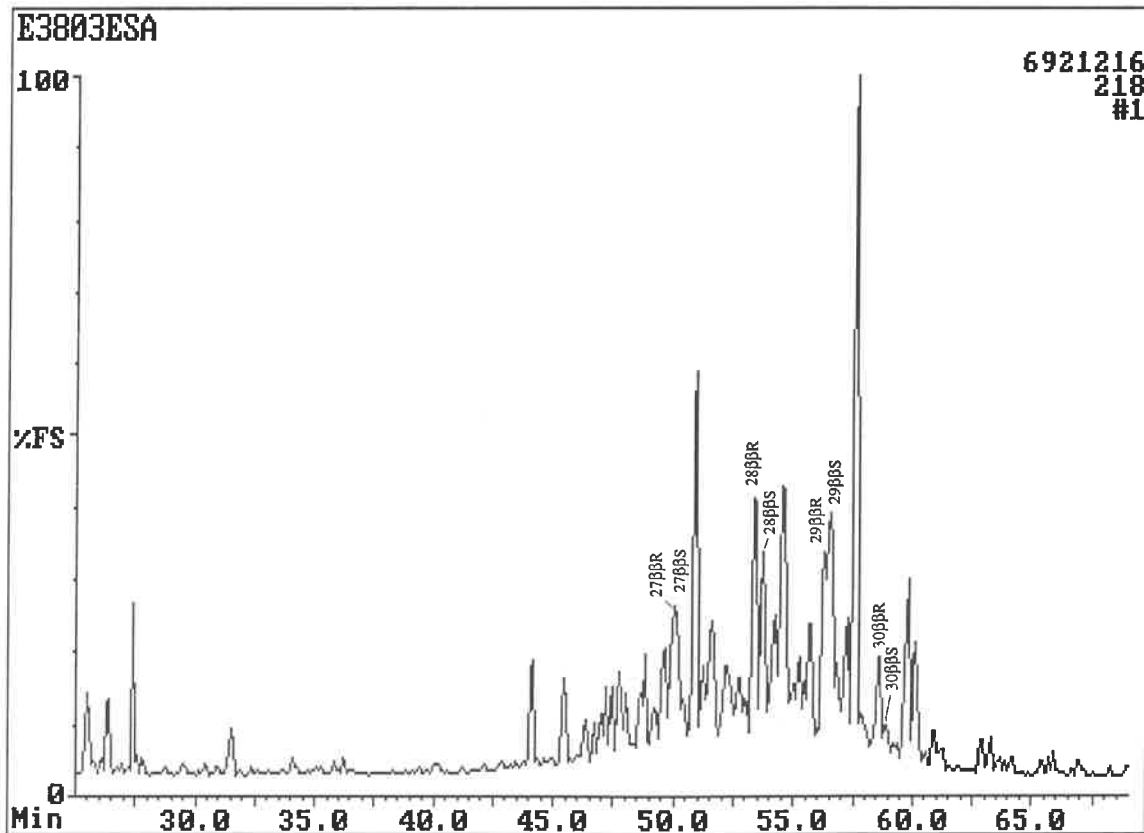
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7418/01-U-01(A) 61.34m Sltst.

Trio-1



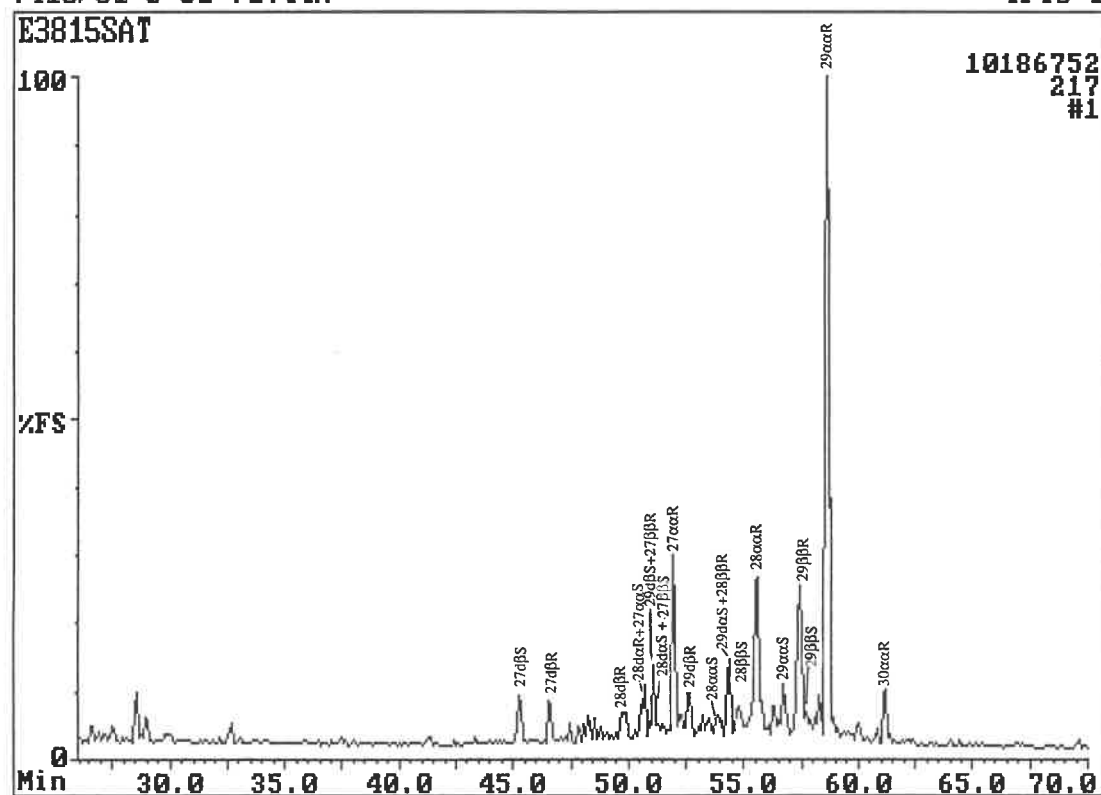
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7418/01-U-01(A) 61.34m Sltst.

Trio-1



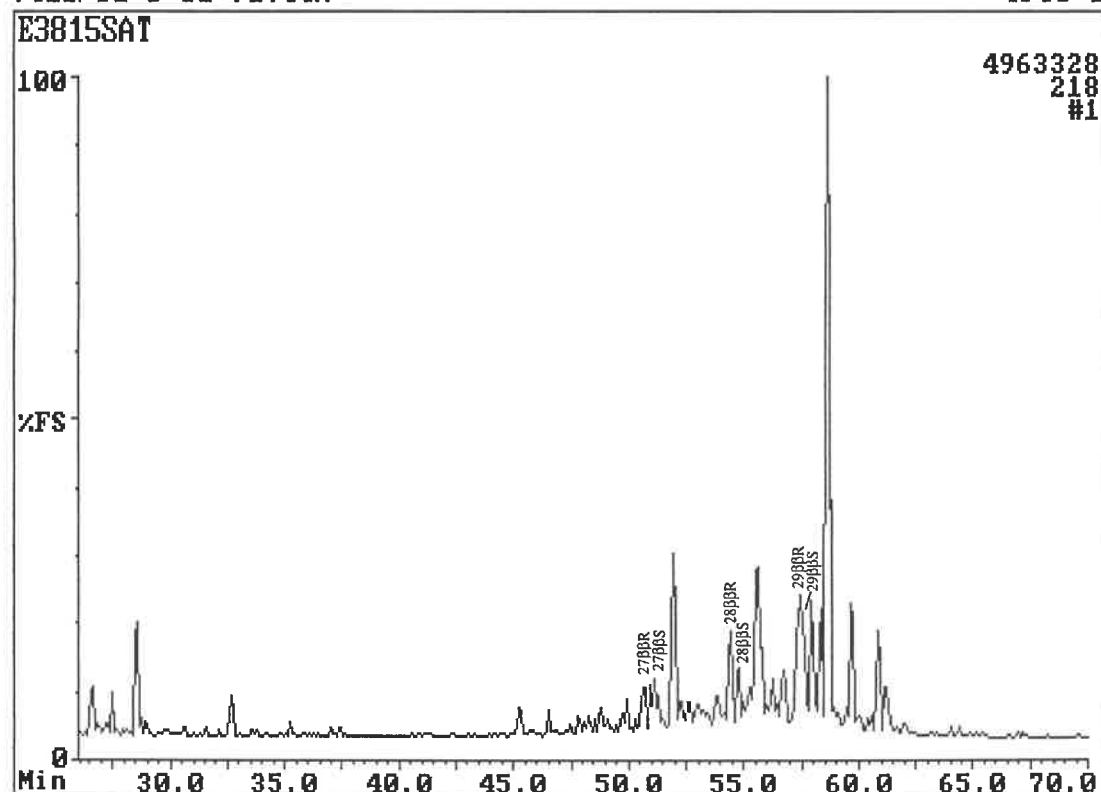
Fisons Instruments
7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



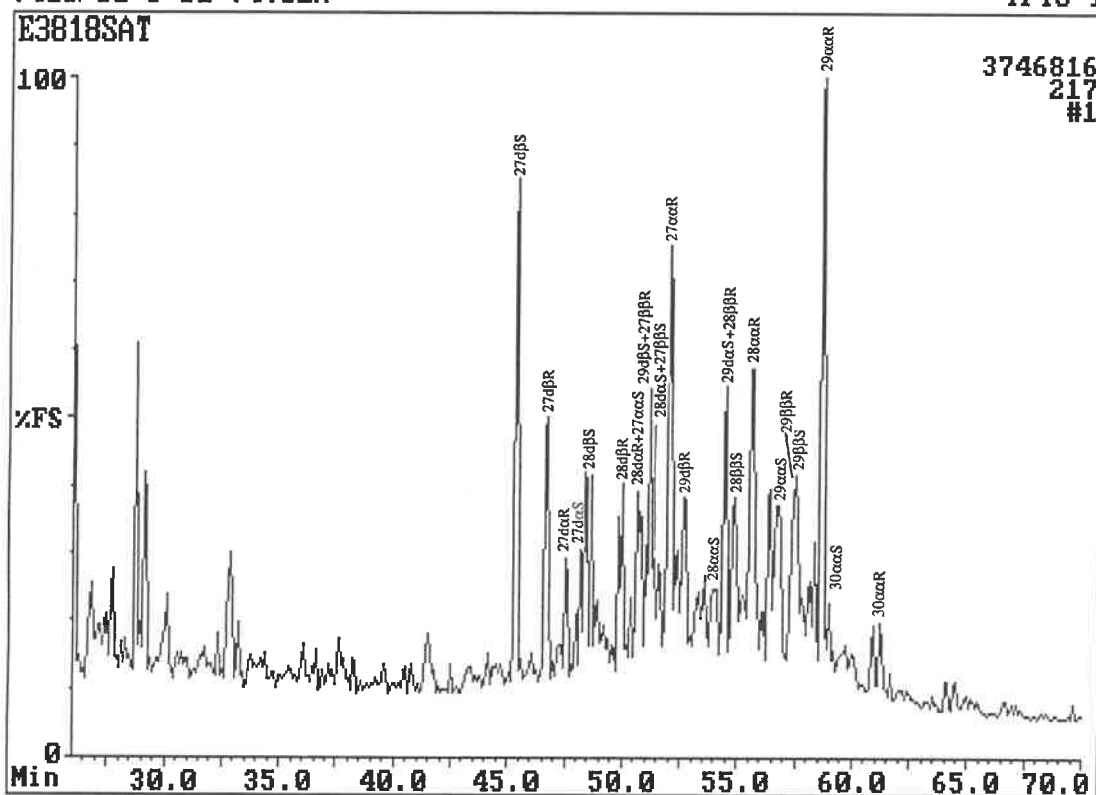
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7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



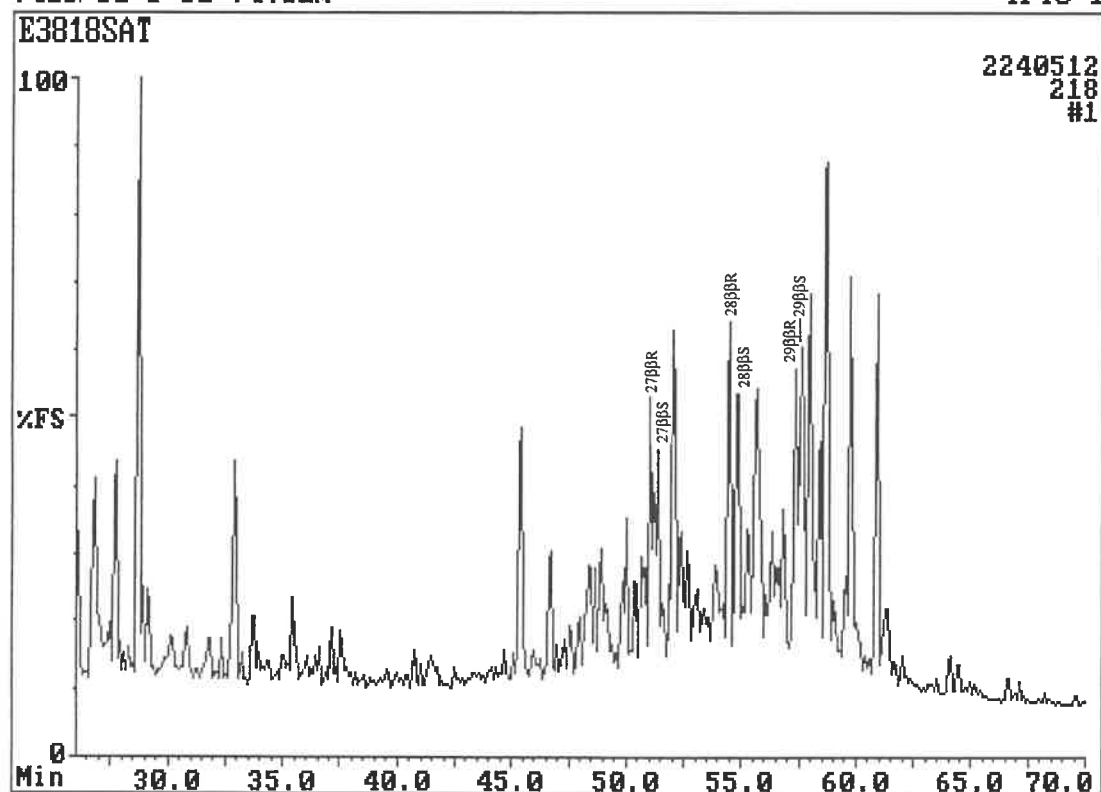
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7418/01-U-01 74.62m

Trio-1

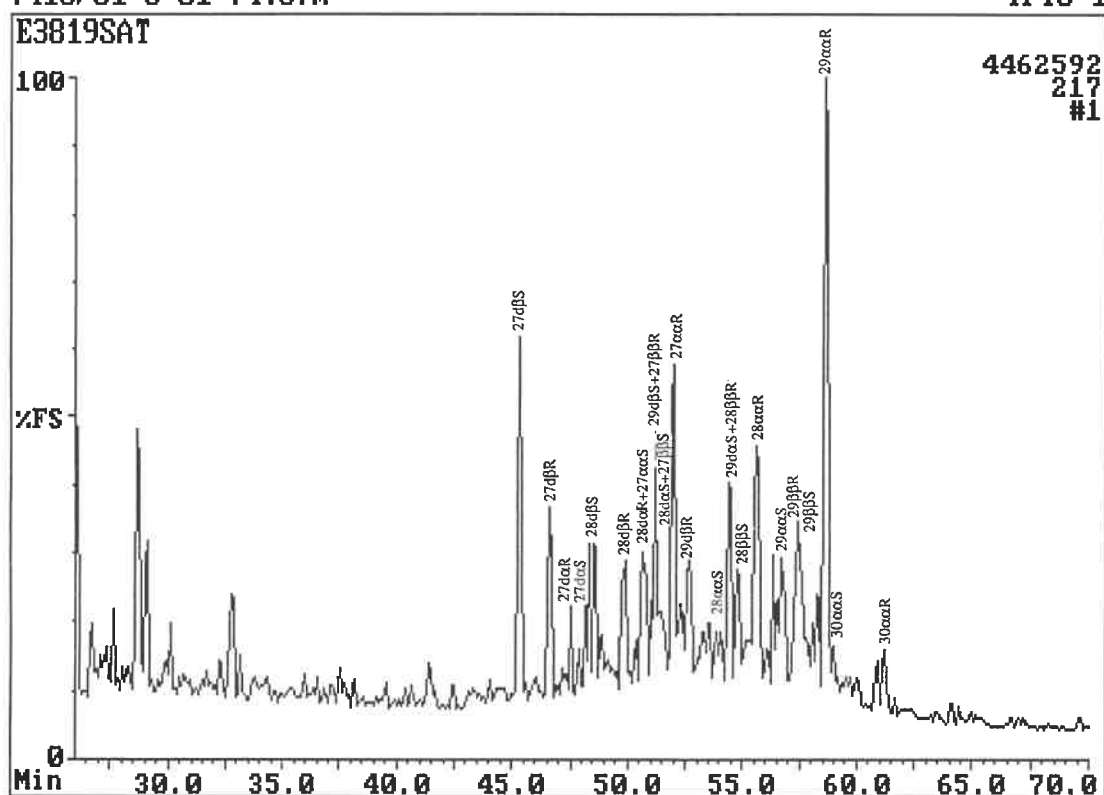


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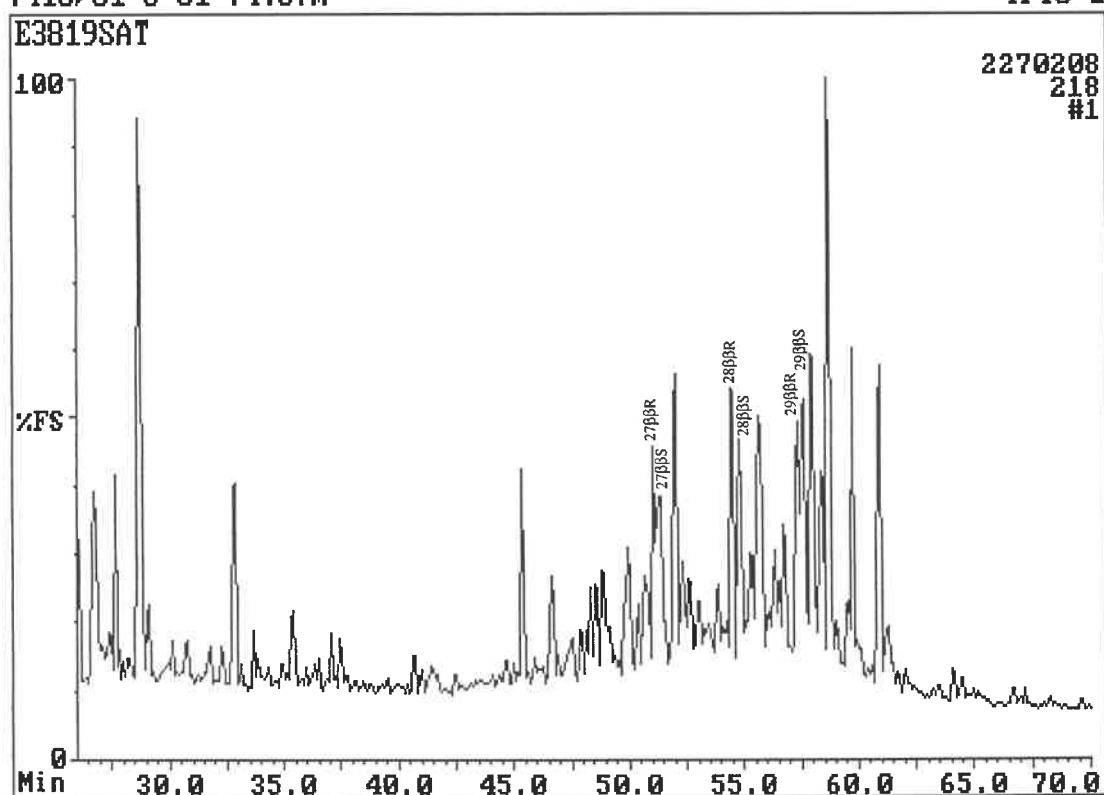
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TRIO-1000 LAB BASE Data System
Trio-1

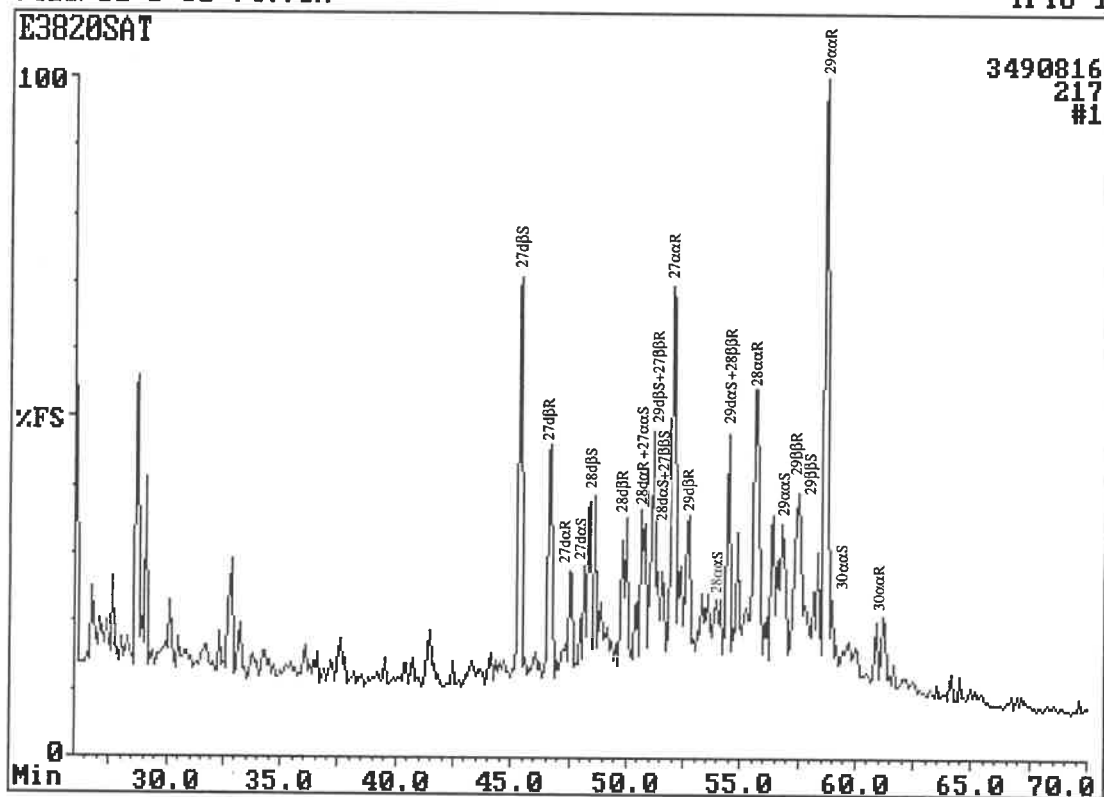


TRIO-1000 LAB BASE Data System
Trio-1



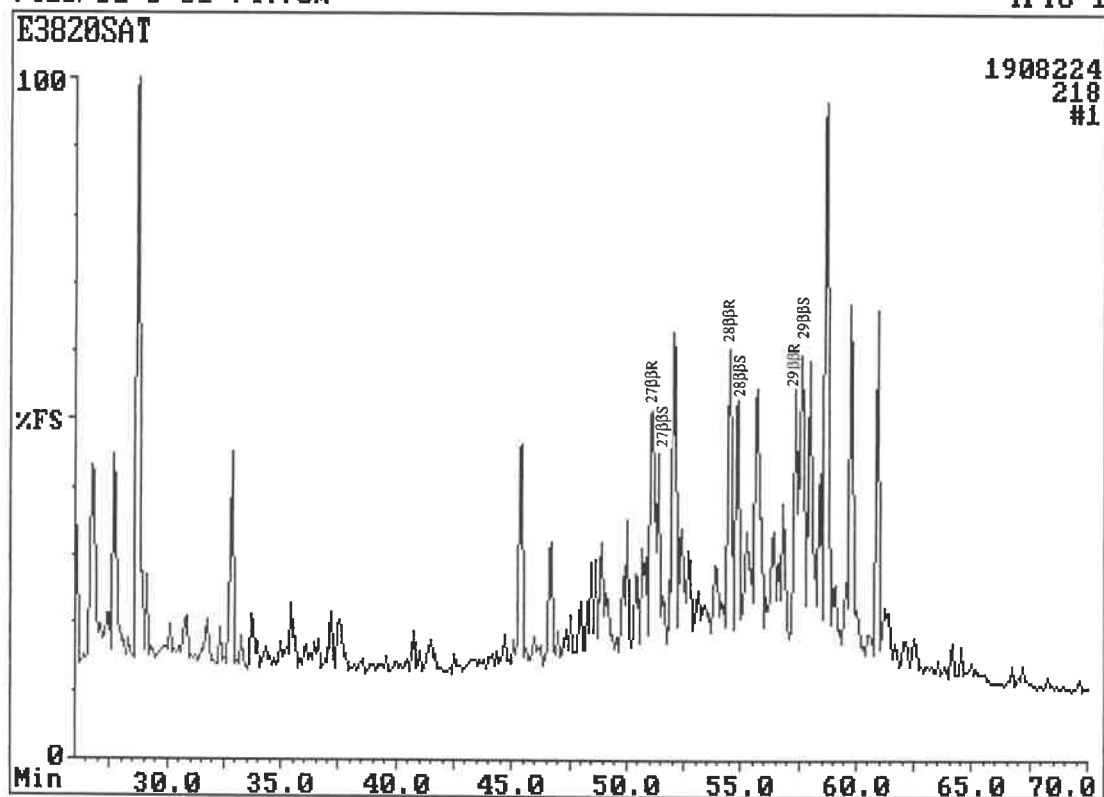
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



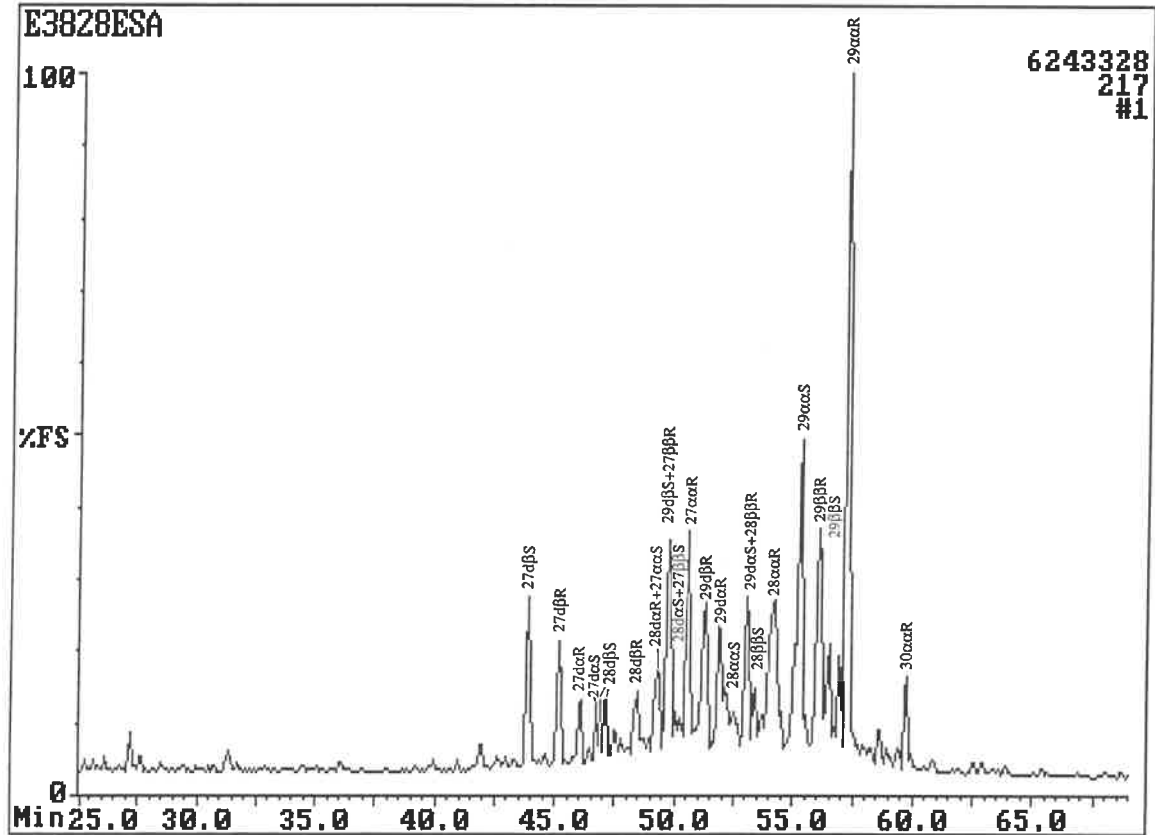
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7418/01-U-01 74.73m

Trio-1



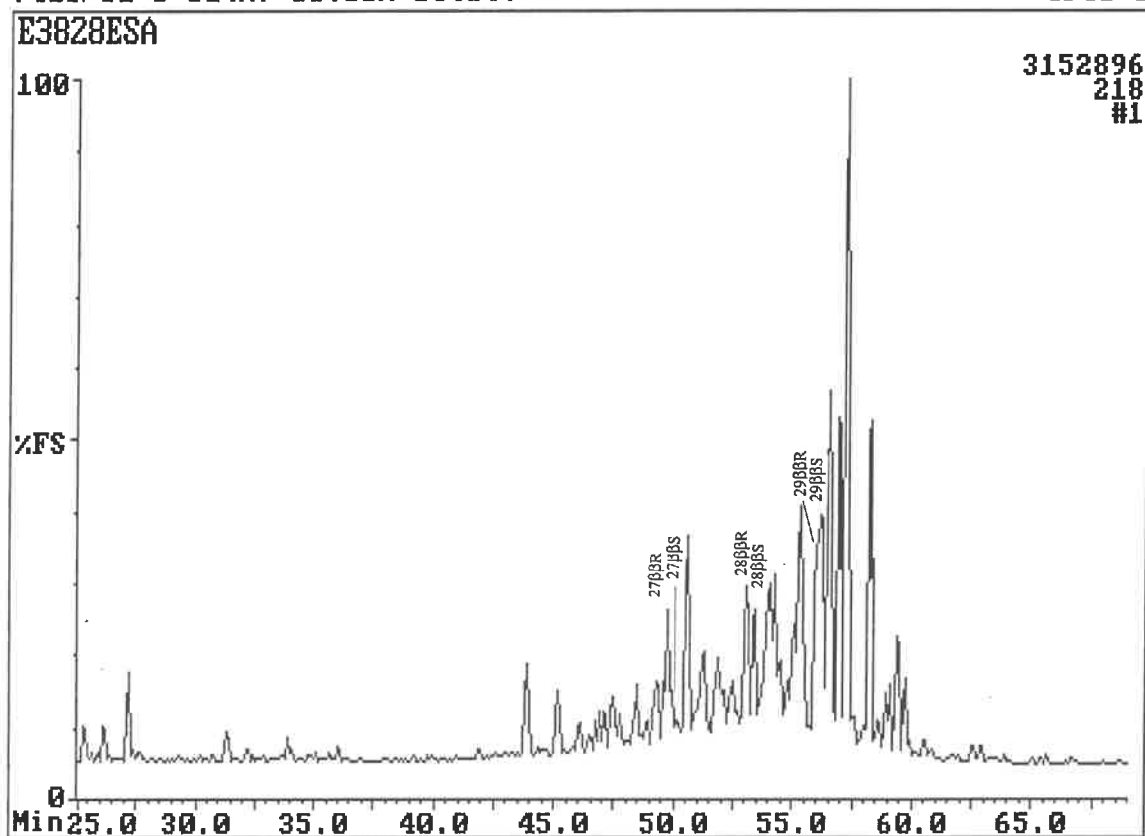
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7418/01-U-01(A) 85.00m Sltst.

Trio-1

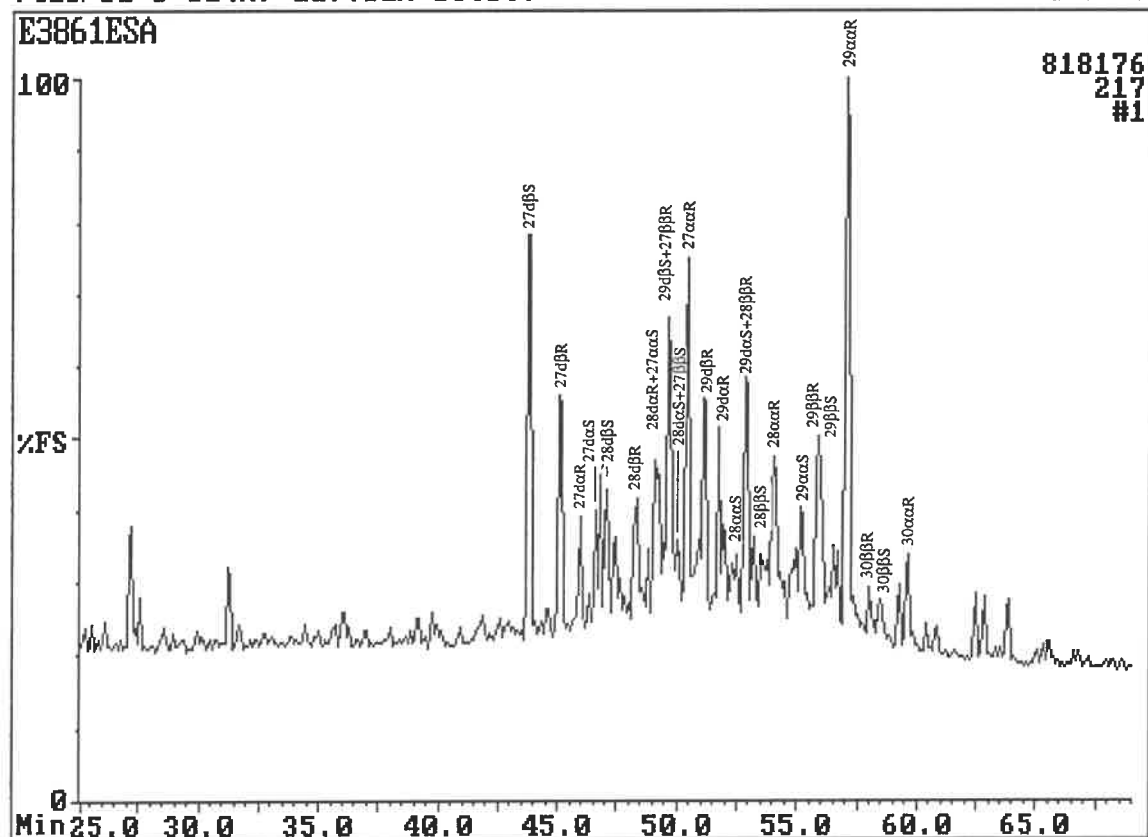


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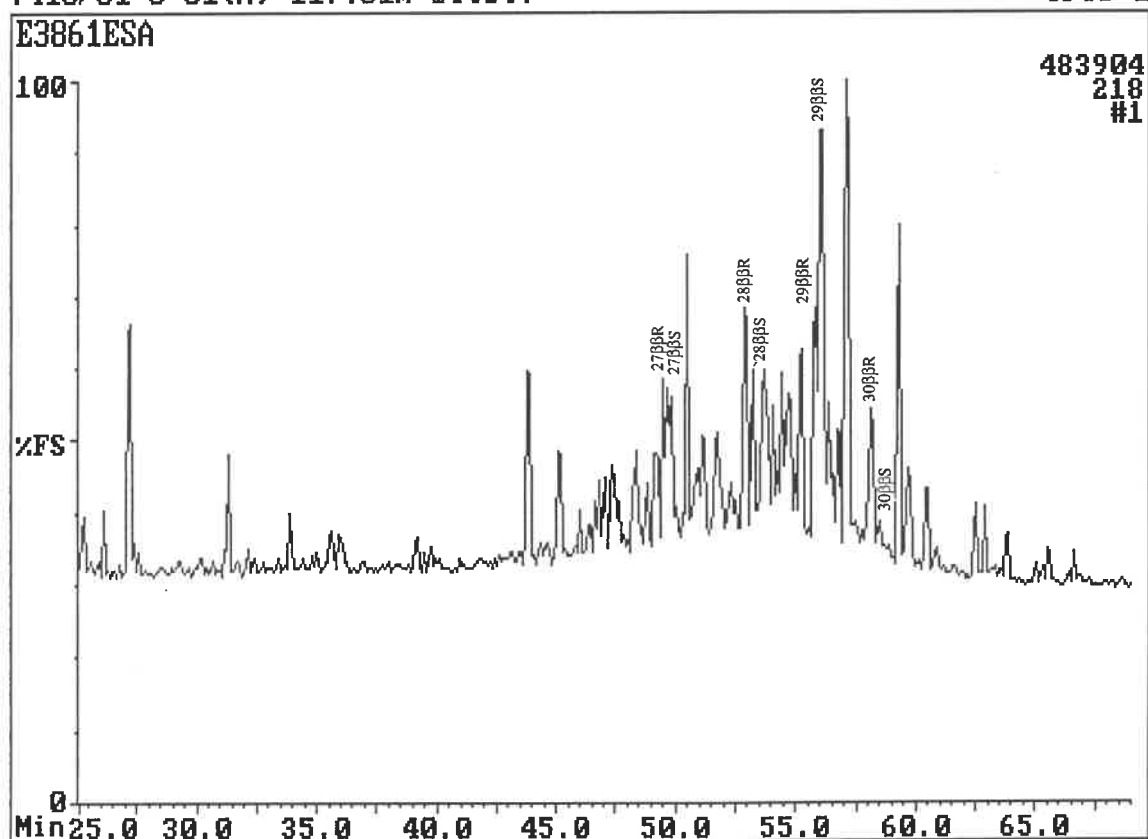
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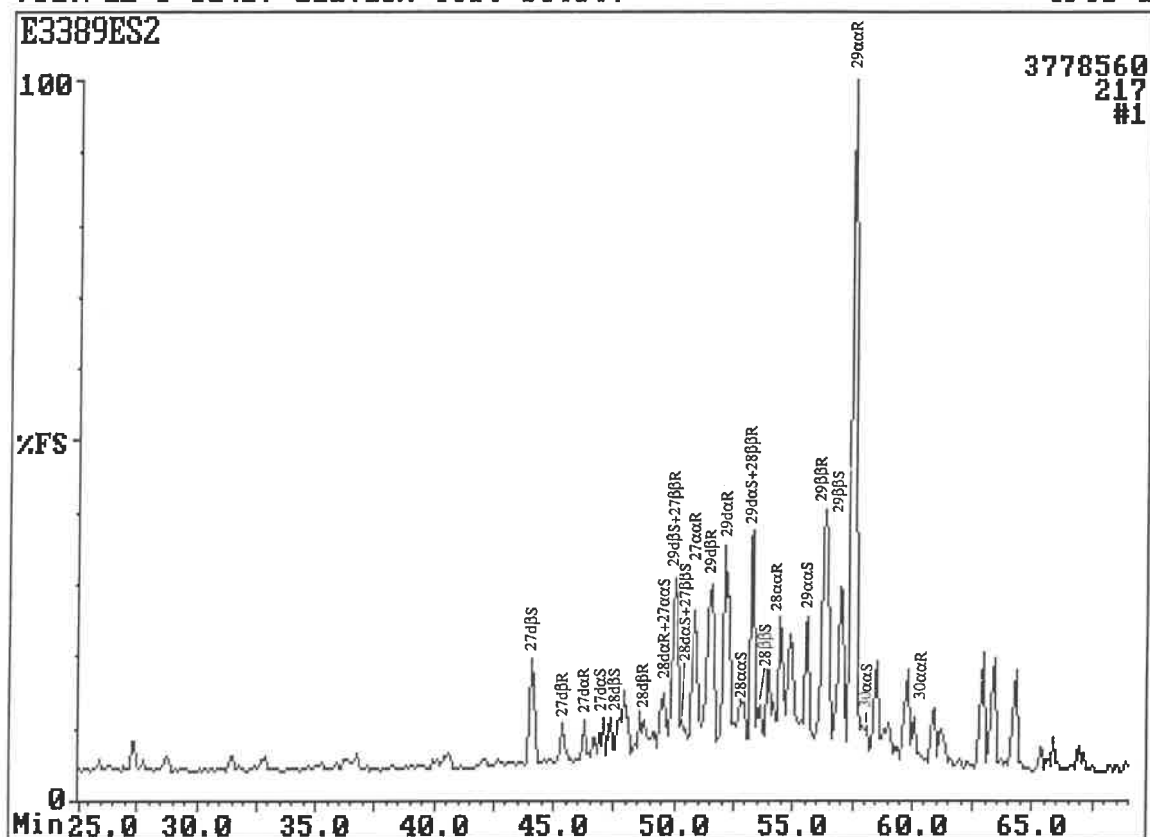
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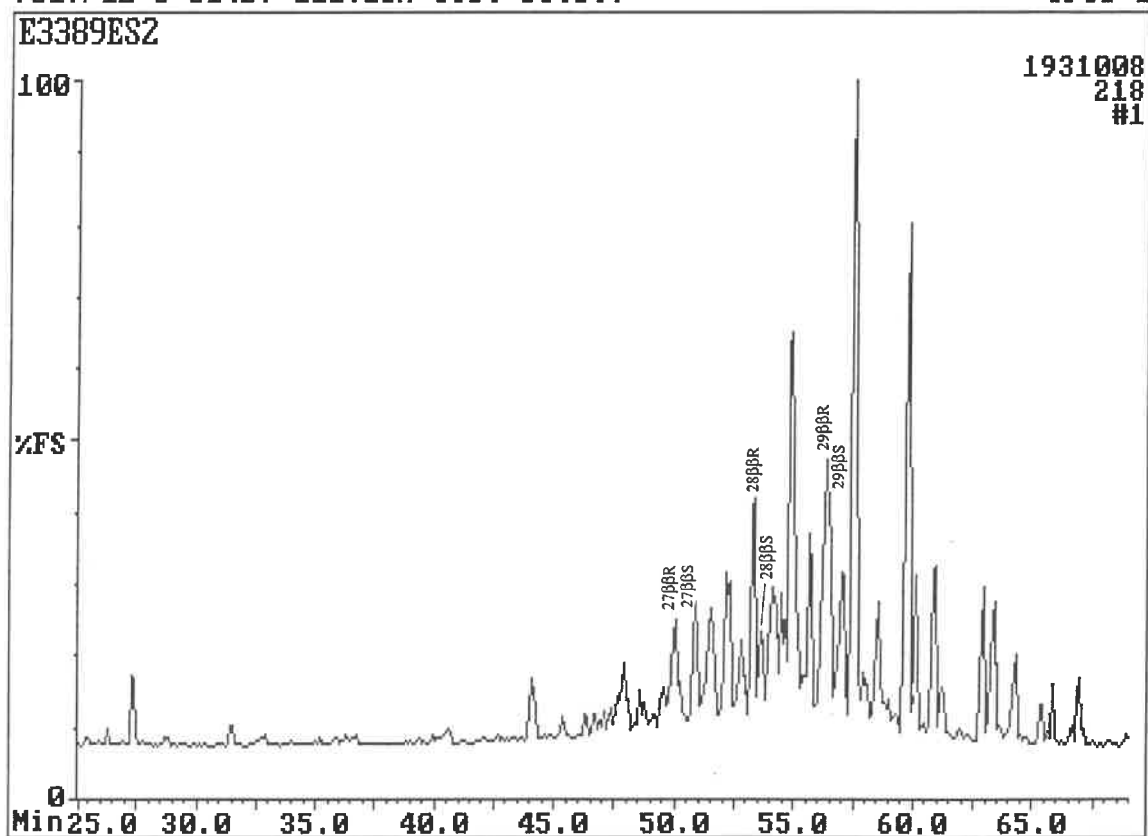
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Trio-1

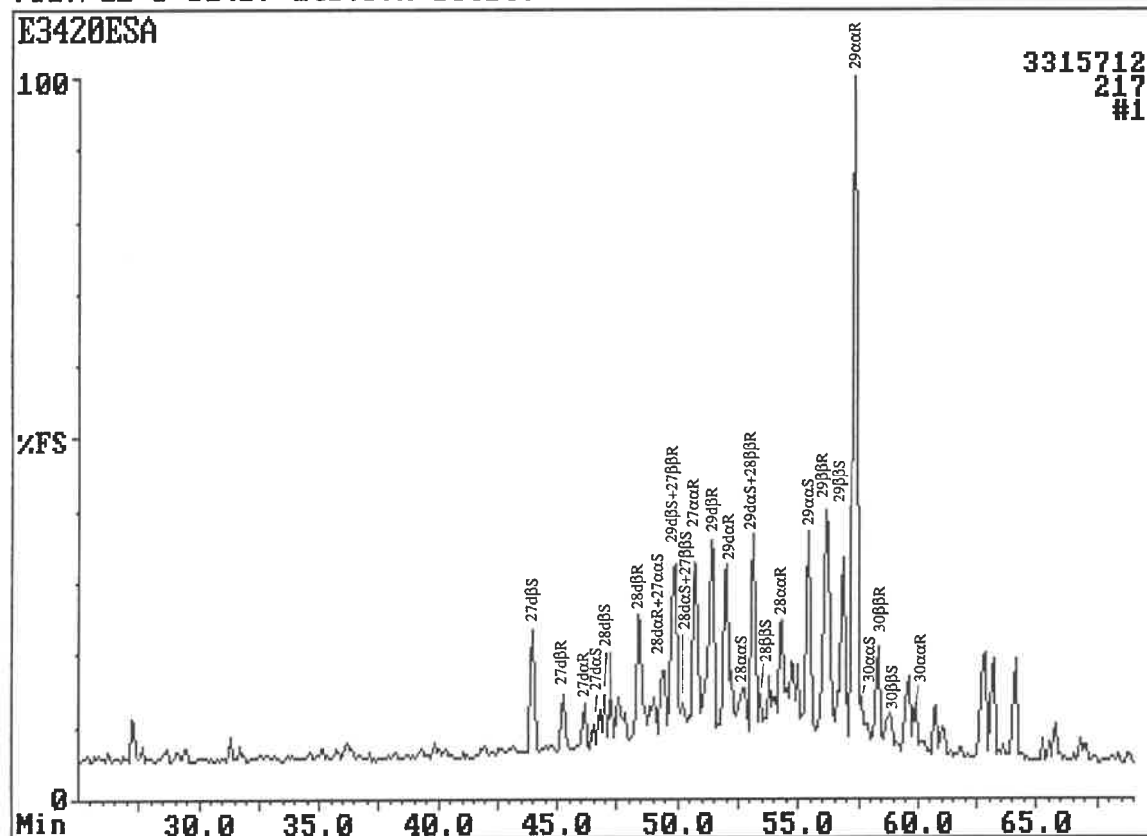


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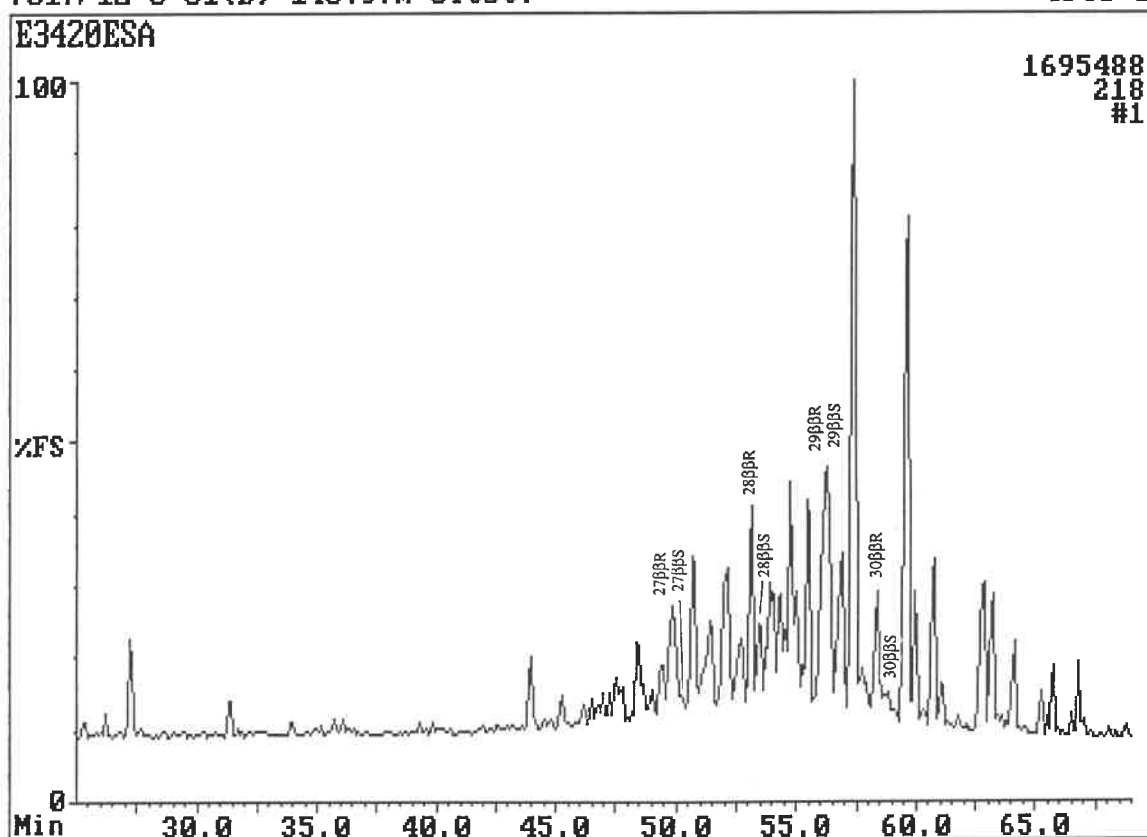
Fisons Instruments TRIO-1000 LAB BASE Data System
7517/12-U-01(B) 143.97m Sltst.

Trio-1



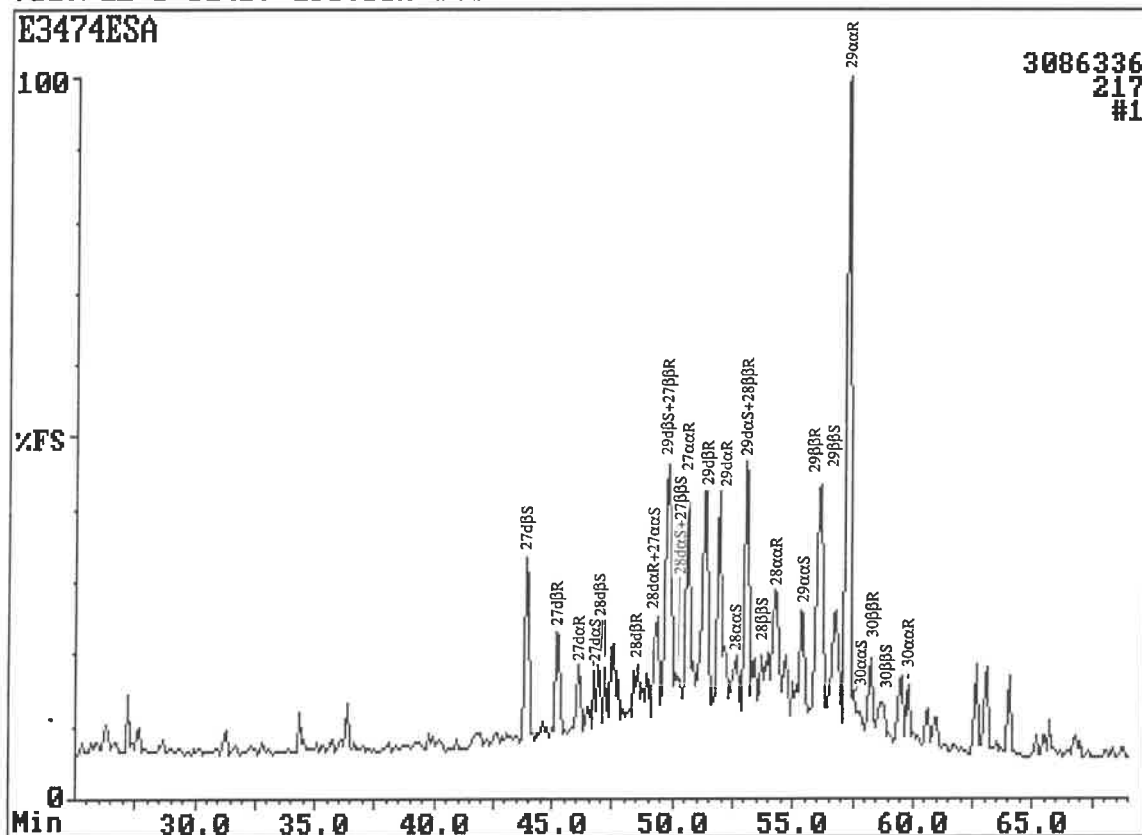
Fisons Instruments TRIO-1000 LAB BASE Data System
7517/12-U-01(B) 143.97m Sltst.

Trio-1



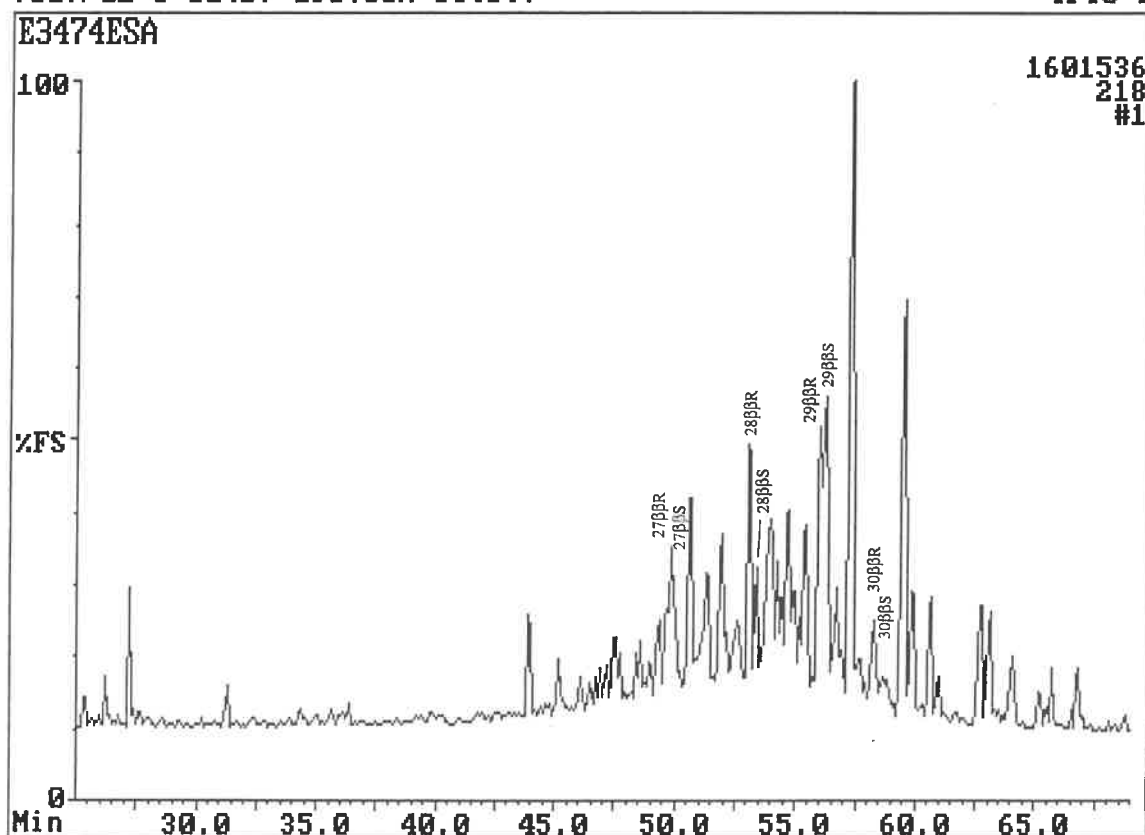
Fisons Instruments TRI0-1000 LAB BASE Data System
7517/12-U-01(B) 198.68m Slst.

Trio-1

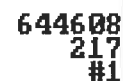


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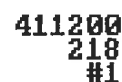
Trio-1



Trio-1

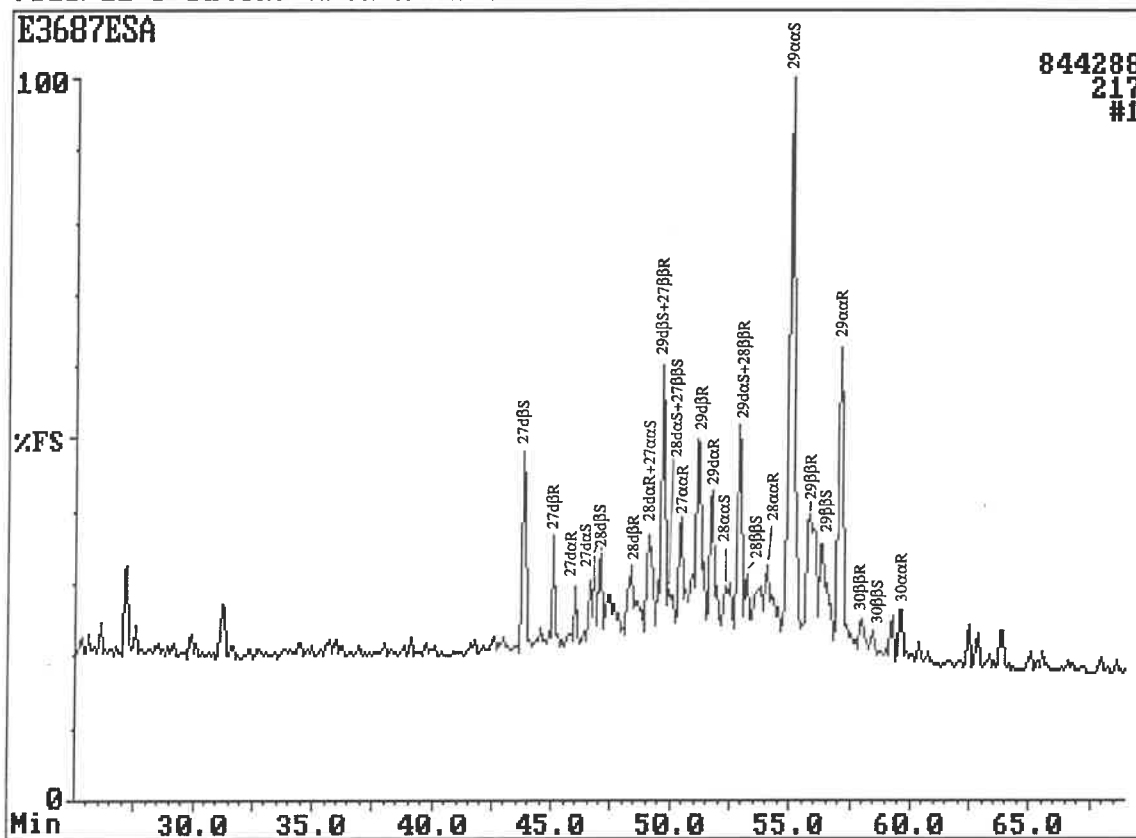


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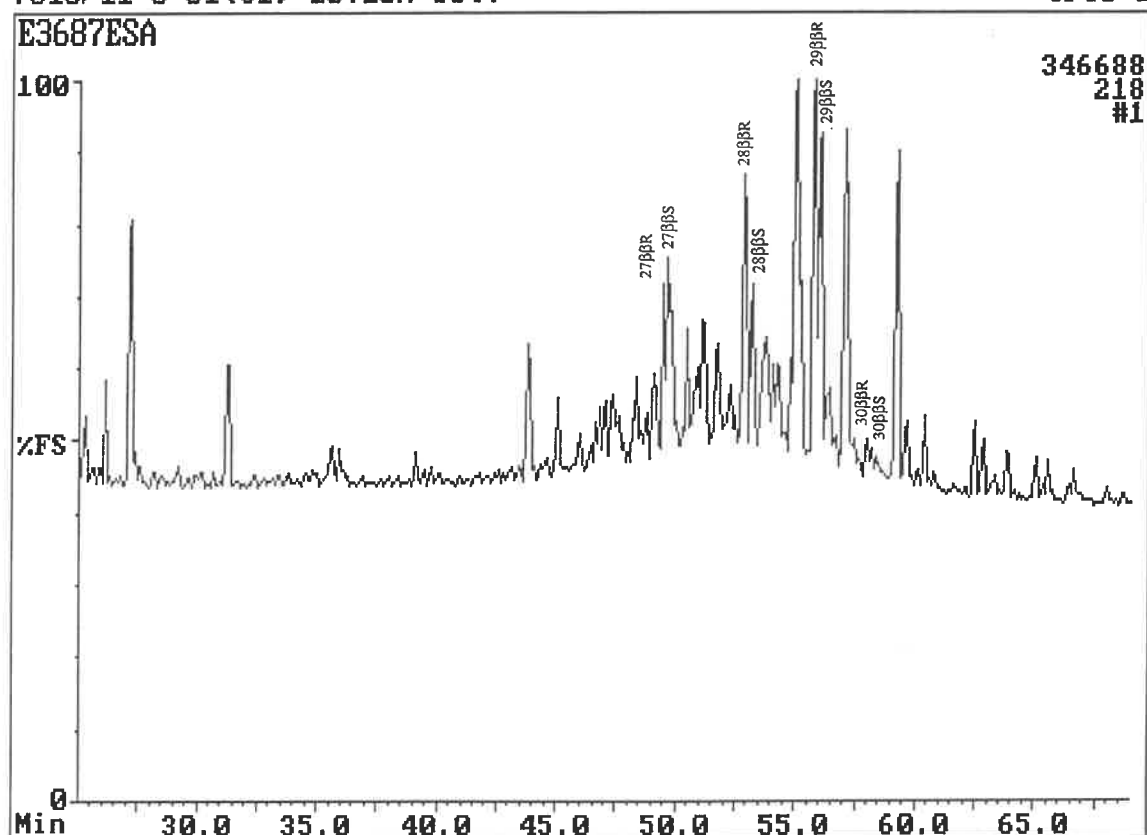
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 13.15m Sst.

Trio-1



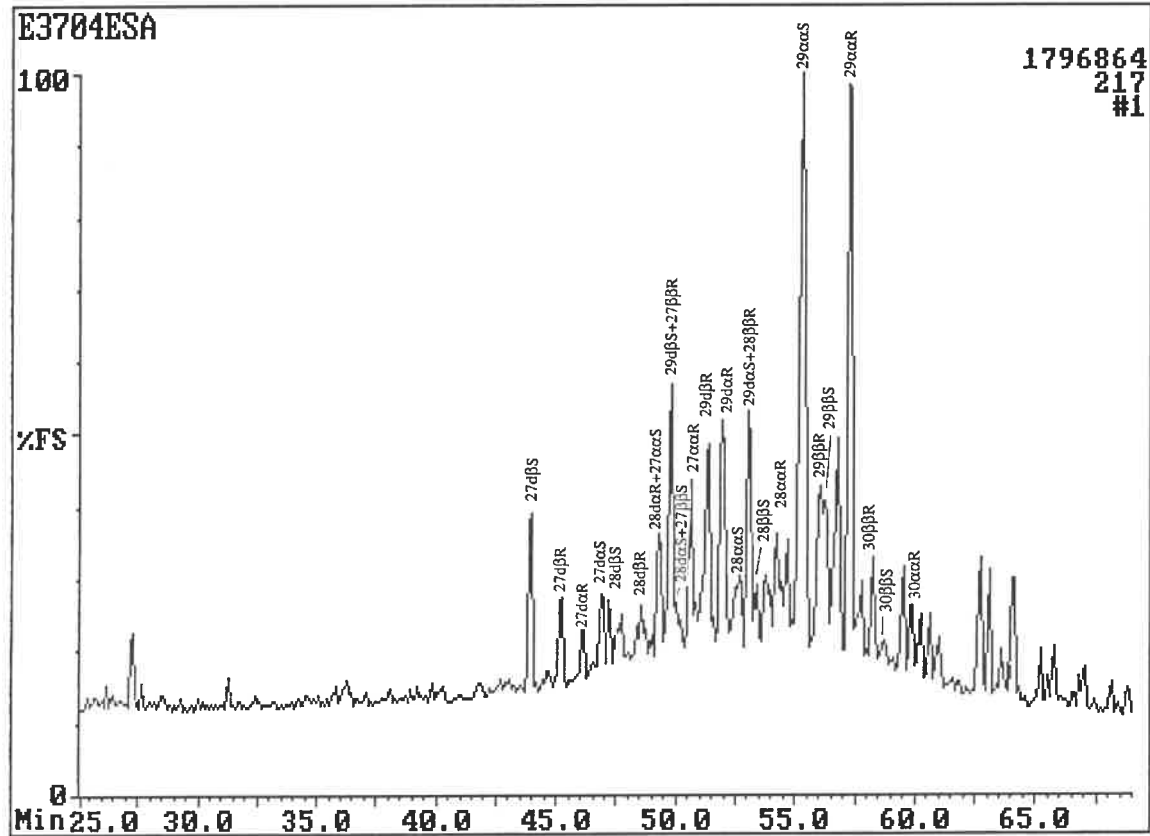
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7616/11-U-01(C1) 13.15m Sst.

Trio-1



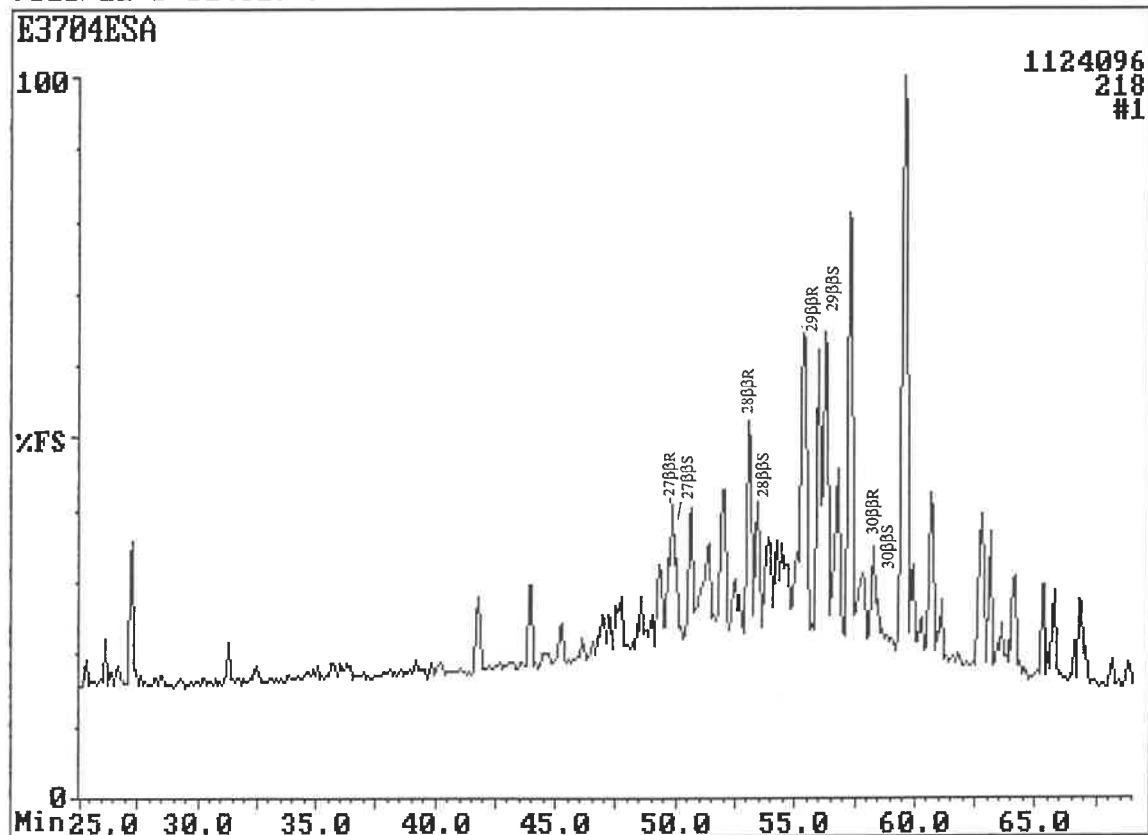
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 36.21m Sltst.

Trio-1



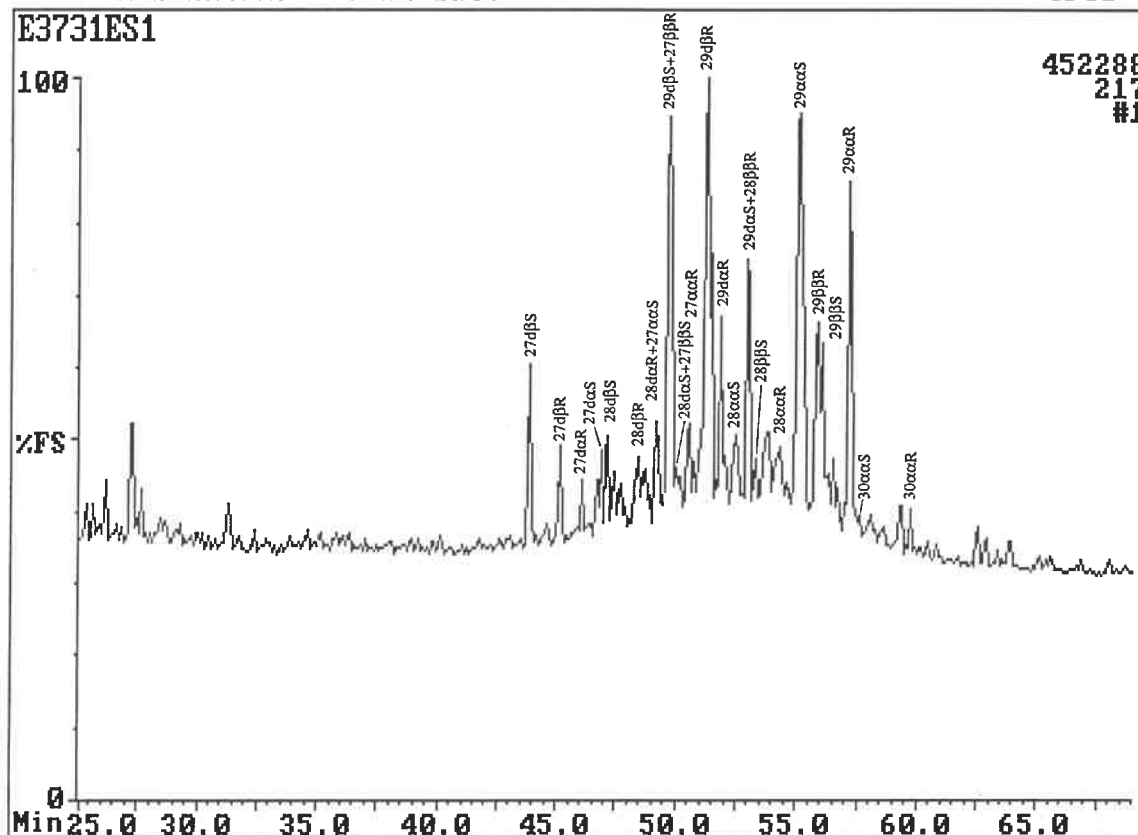
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7616/11-U-01(C1) 36.21m Sltst.

Trio-1



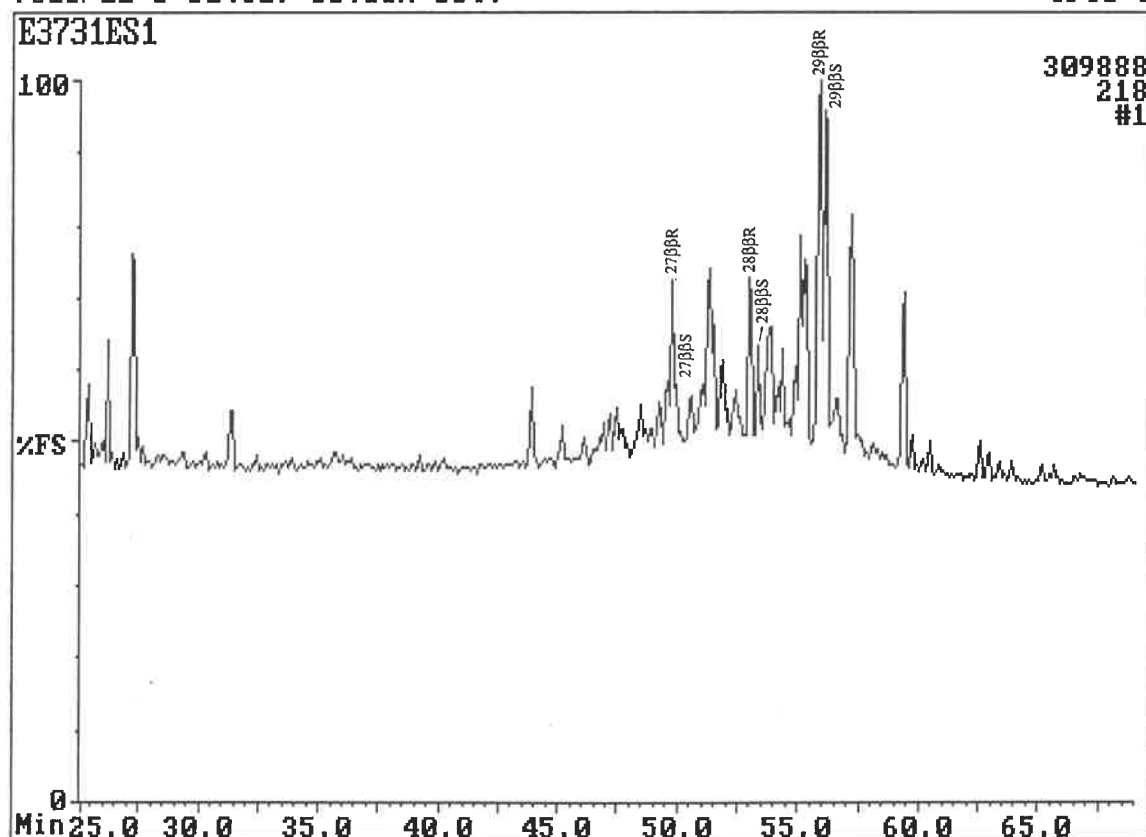
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7616/11-U-01(C1) 65.08m Sst.

Trio-1



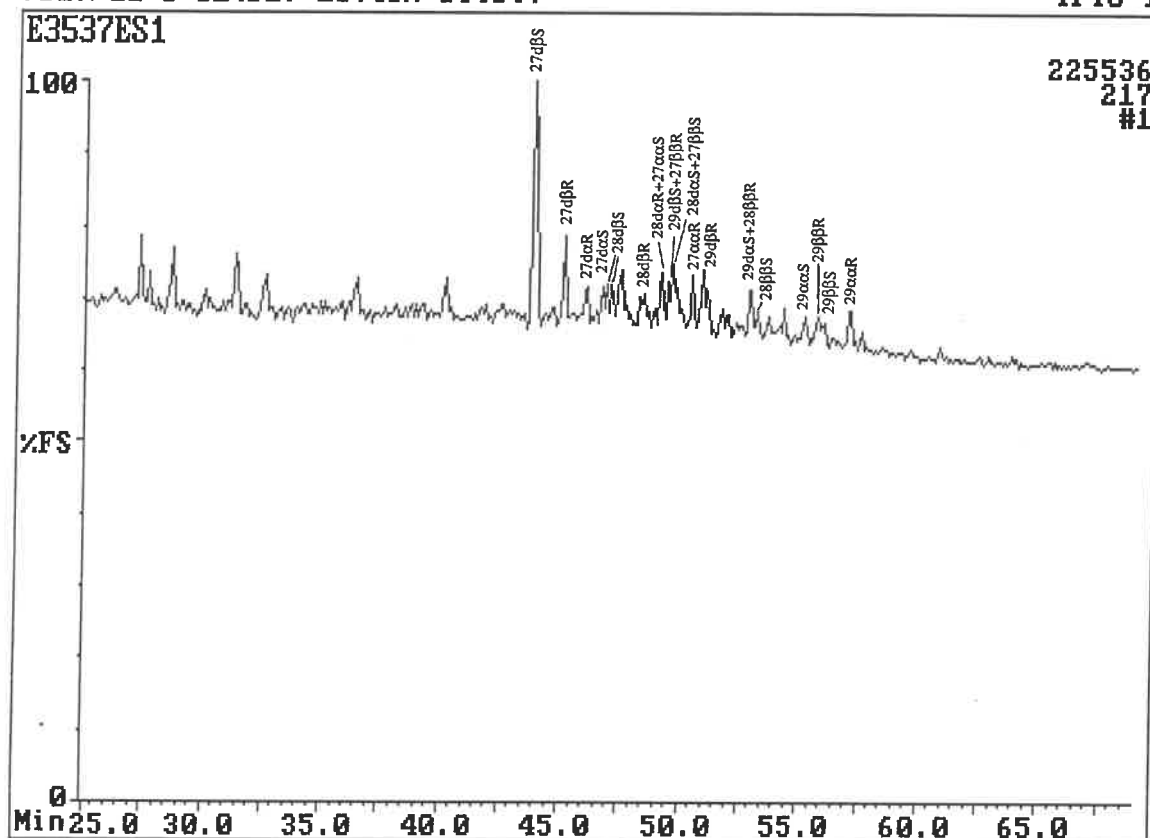
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7616/11-U-01(C1) 65.08m Sst.

Trio-1



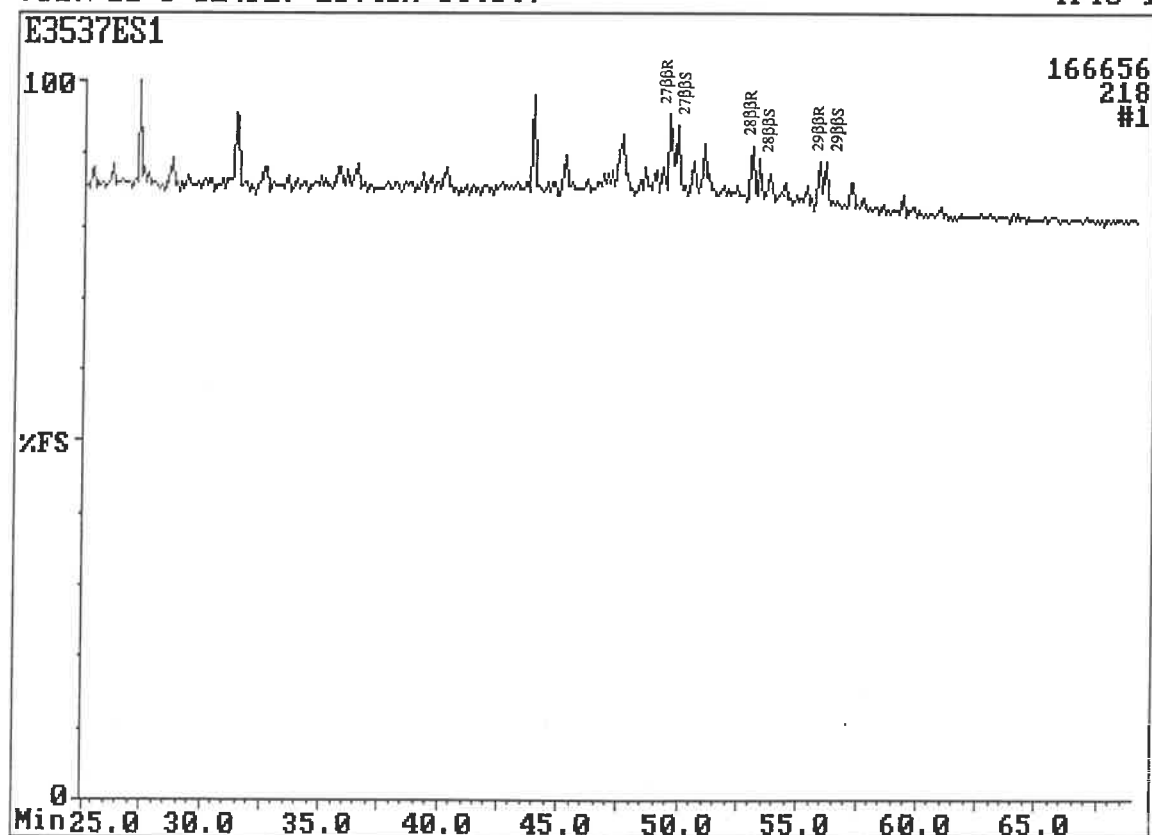
Fisons Instruments TRIO-1000 LAB BASE Data System
7617/11-U-02(D2) 23.45m Slstst.

Trio-1



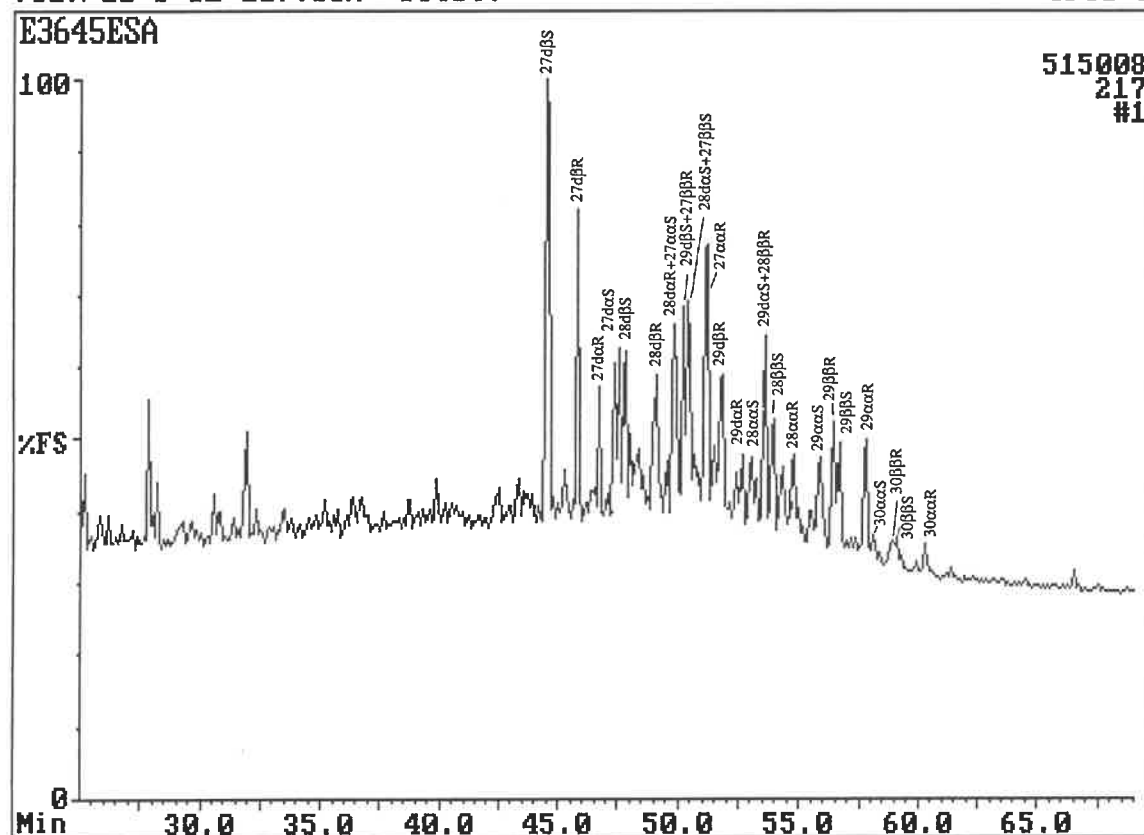
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7617/11-U-02(D2) 23.45m Slstst.

Trio-1



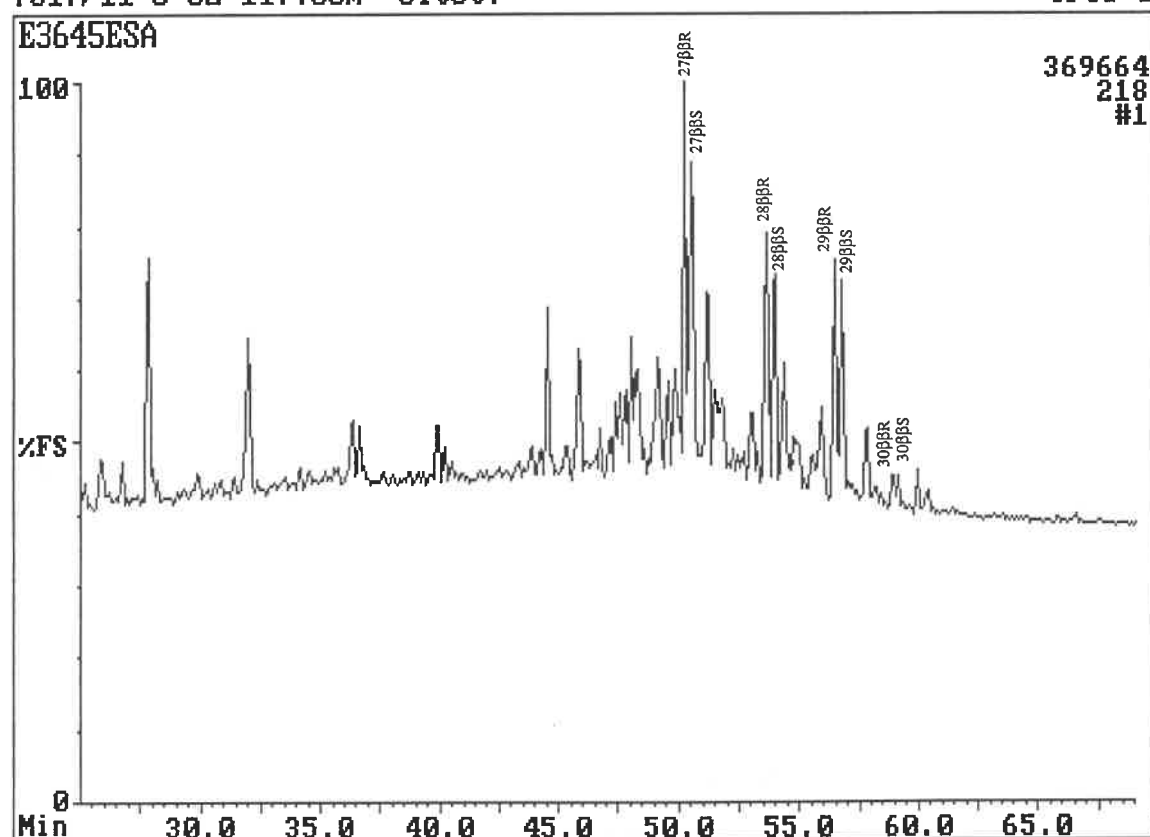
Fisons Instruments TRIO-1000 LAB BASE Data System
7617/11-U-02 117.80m Slstst.

Trio-1



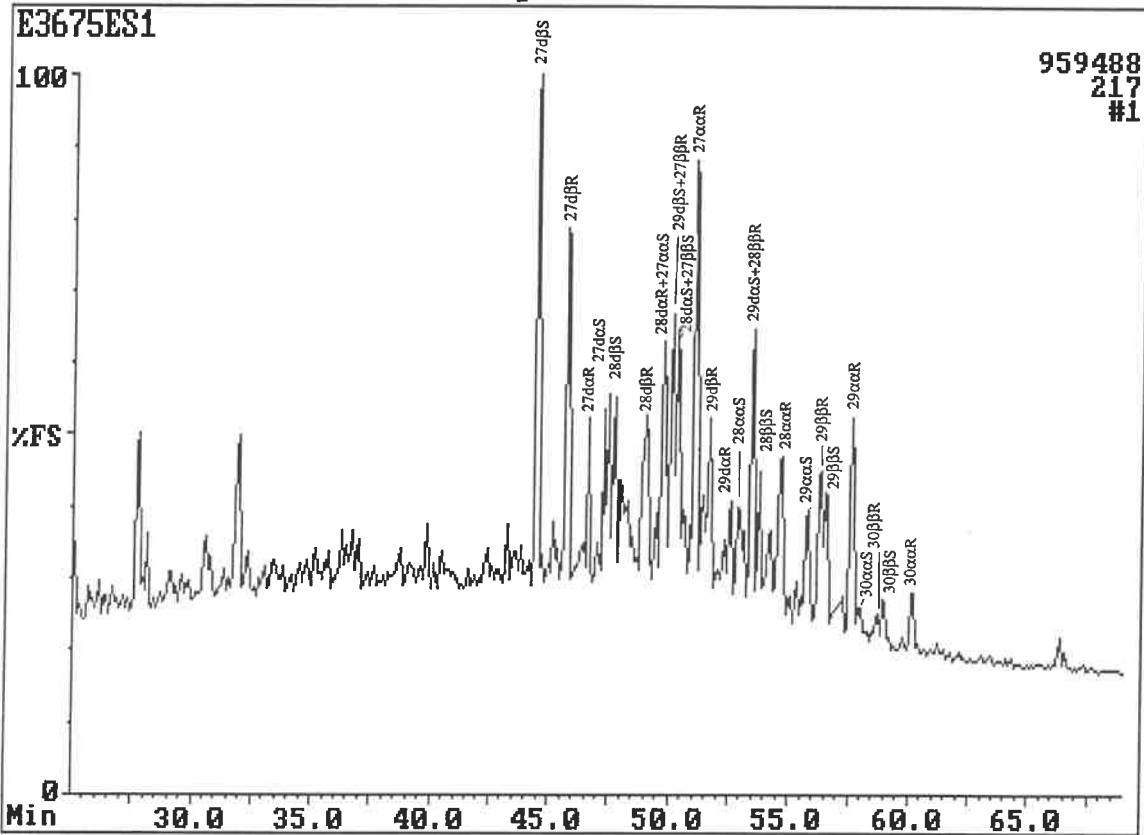
Fisons Instruments TRIO-1000 LAB BASE Data System
7617/11-U-02 117.80m Slstst.

Trio-1



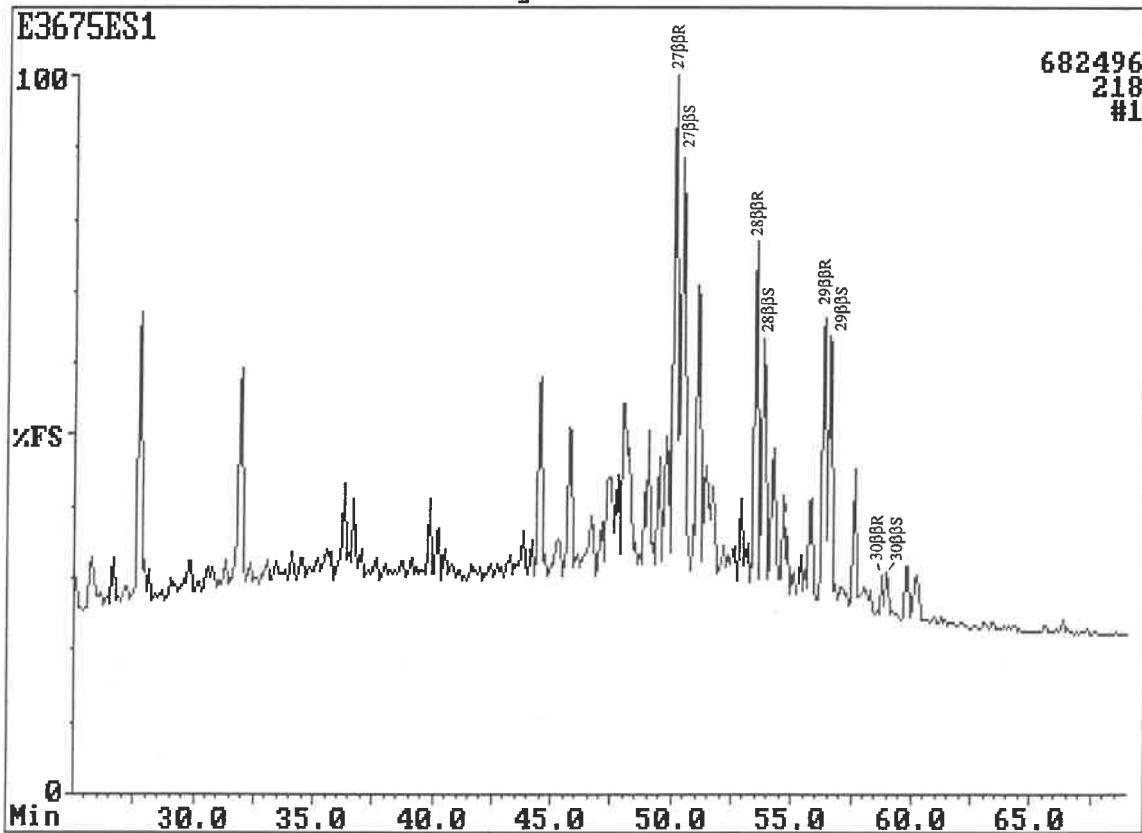
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7617/11-U-02 147.00m Clst,slty.

Trio-1



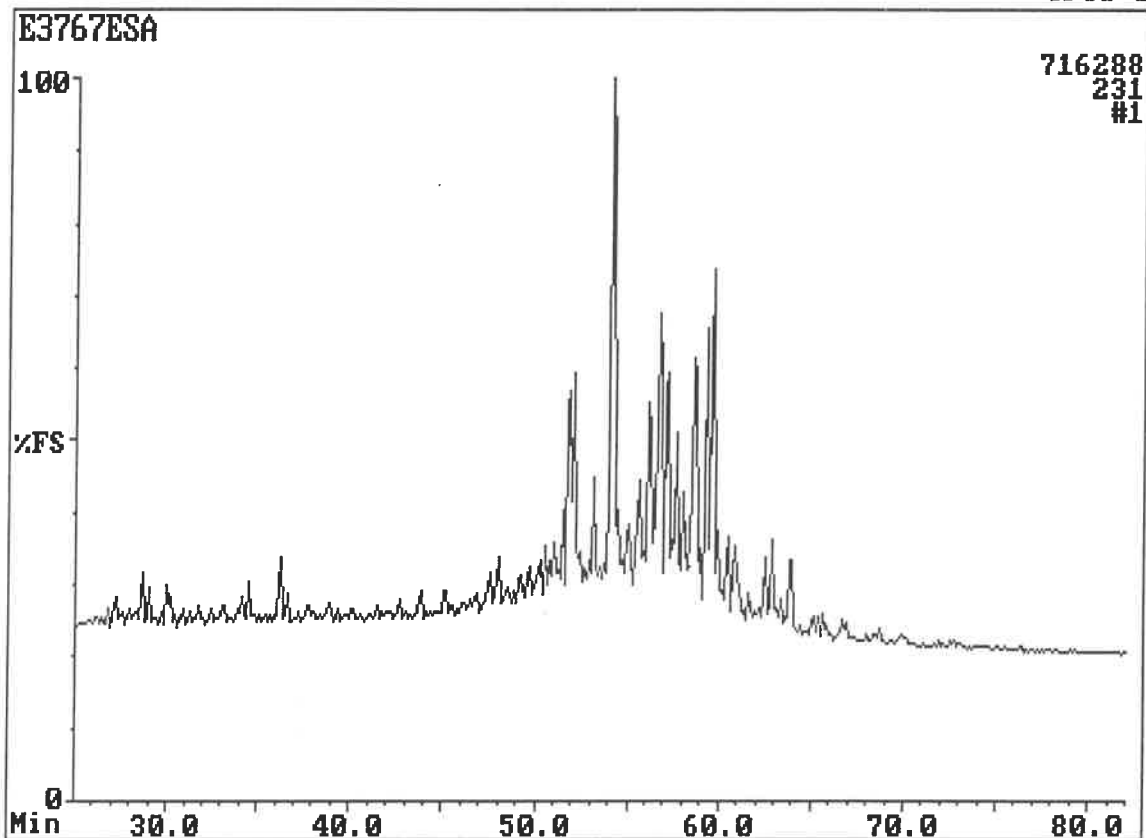
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Trio-1



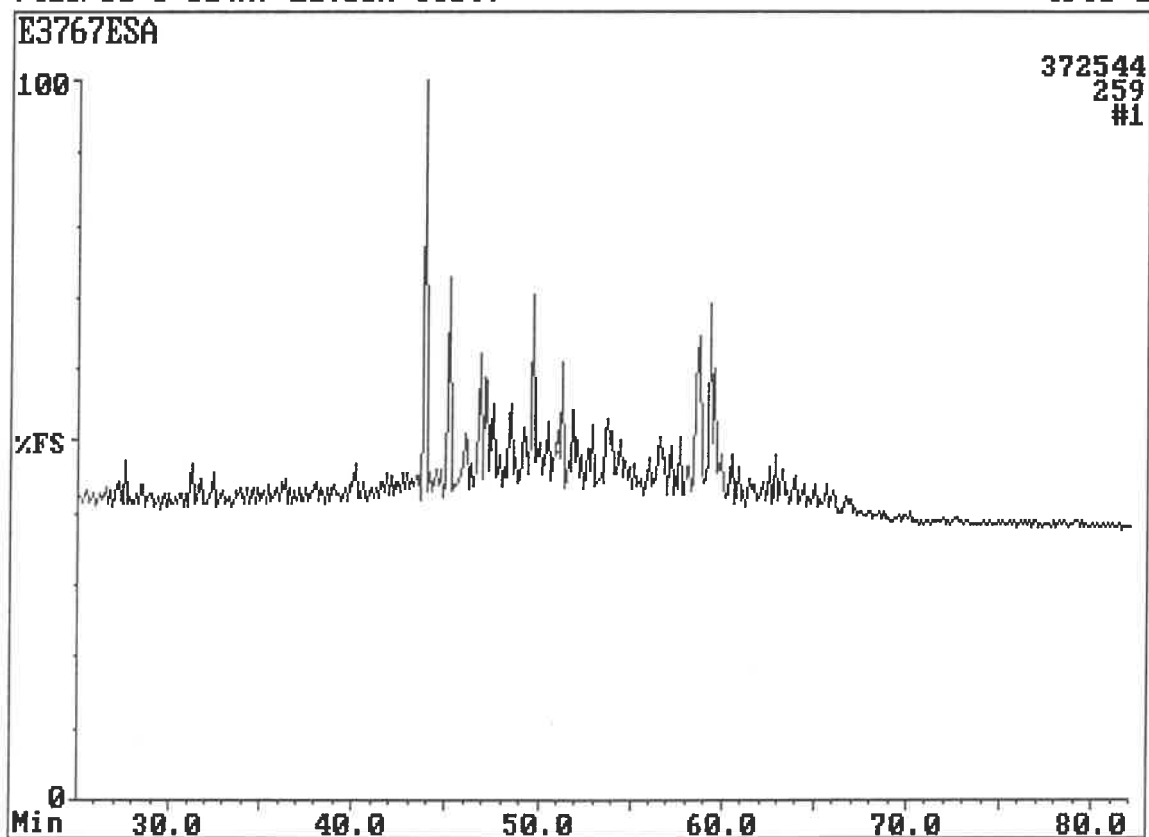
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01(A) 21.68m Clst.

Trio-1



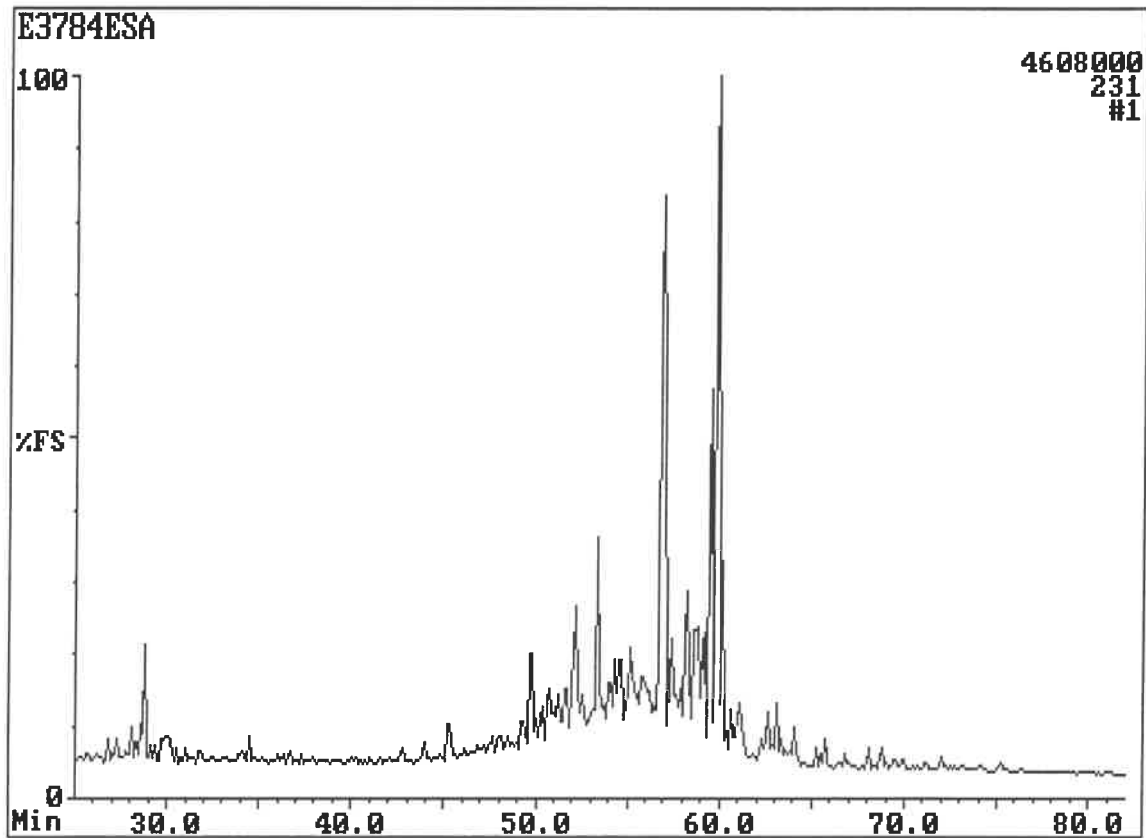
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7418/01-U-01(A) 21.68m Clst.

Trio-1



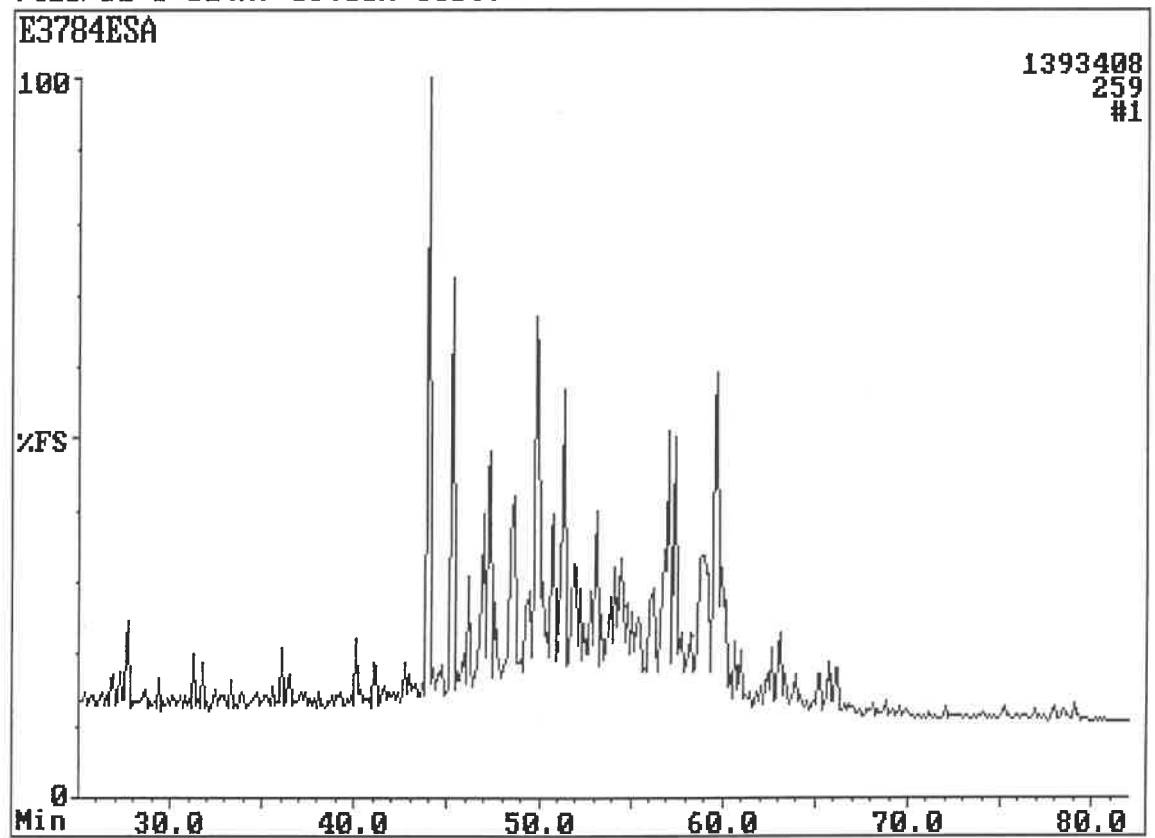
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01(A) 39.36m Clst.

Trio-1



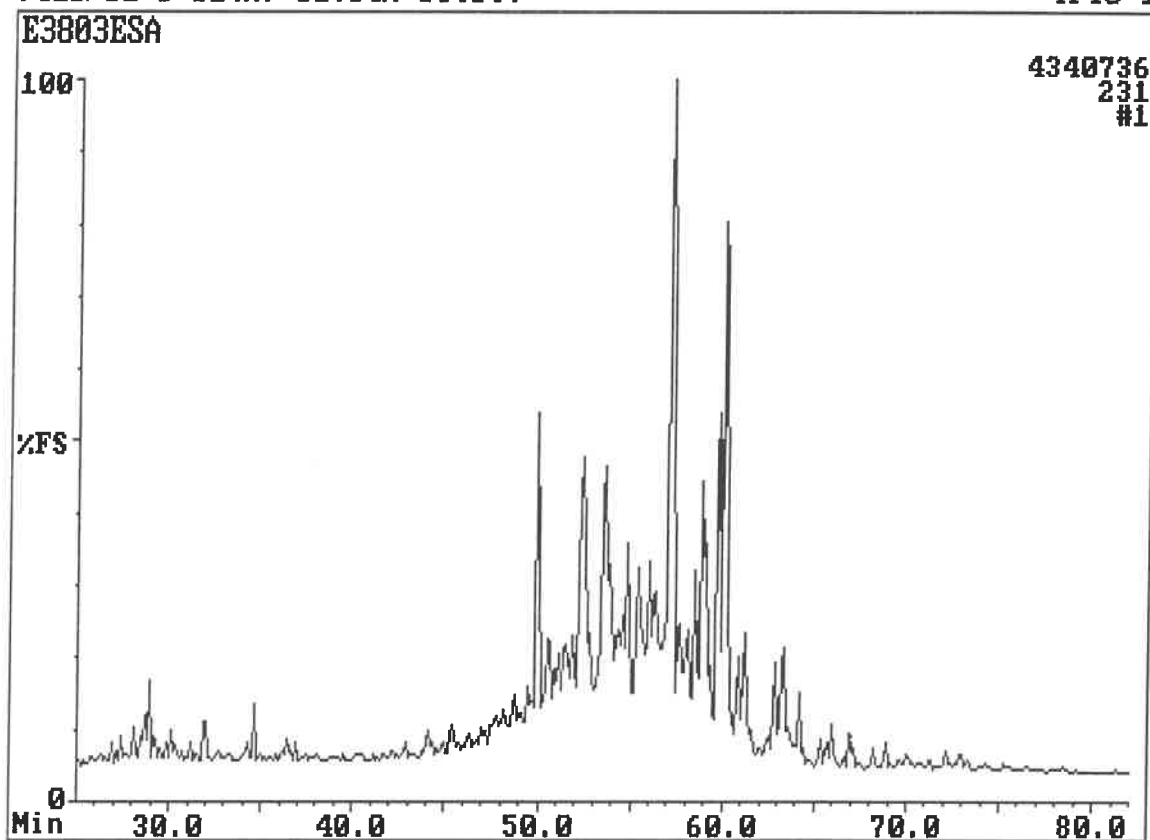
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7418/01-U-01(A) 39.36m Clst.

Trio-1



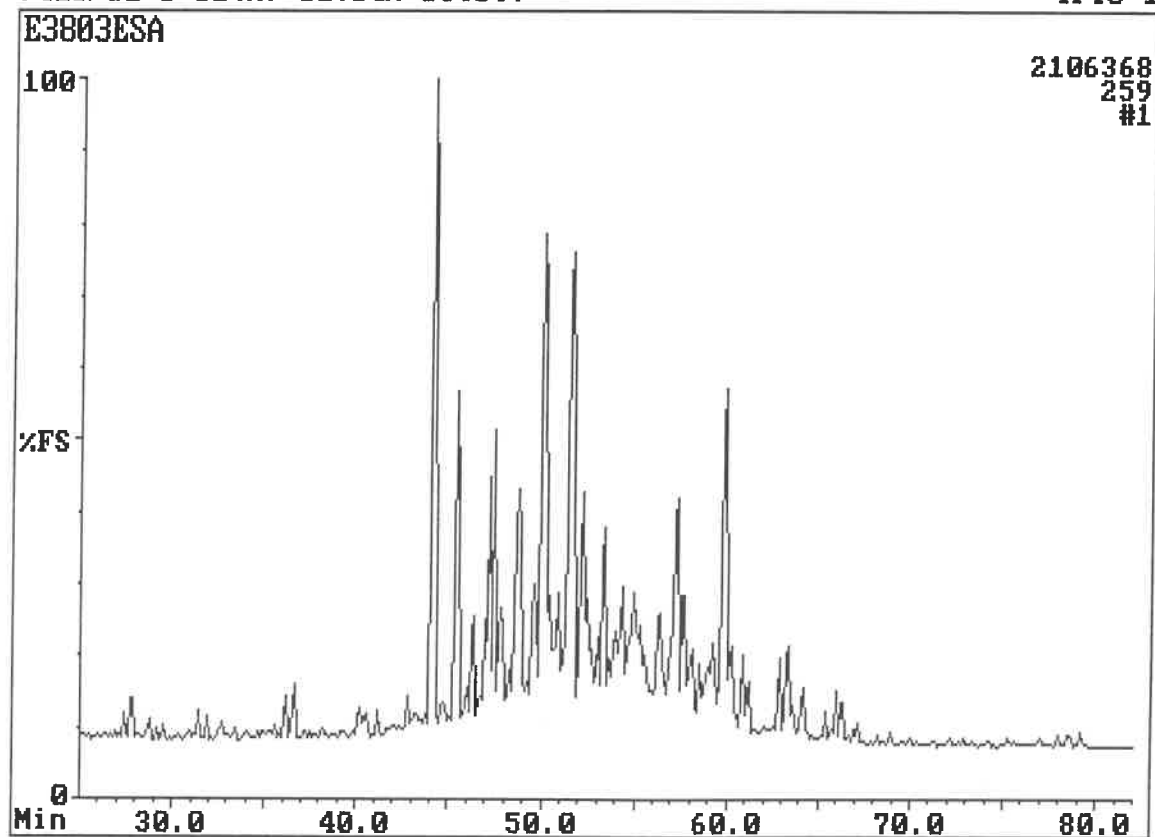
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01(A) 61.34m Sltst.

Trio-1



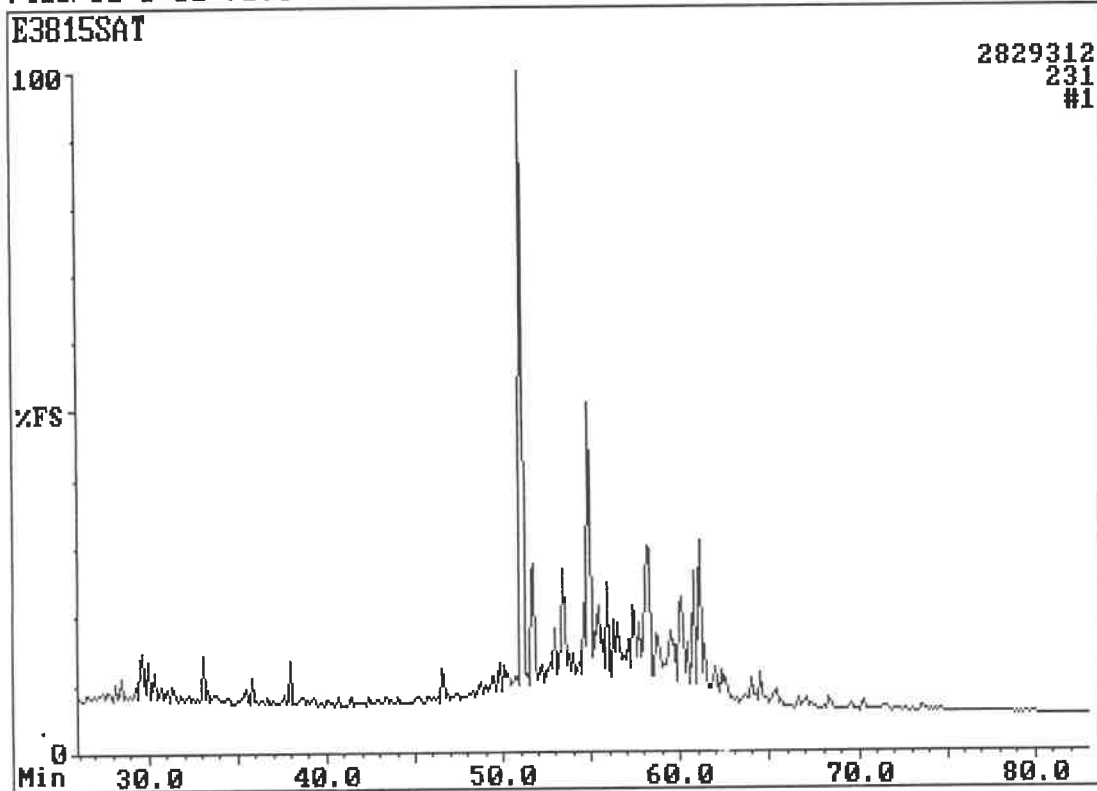
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7418/01-U-01(A) 61.34m Sltst.

Trio-1



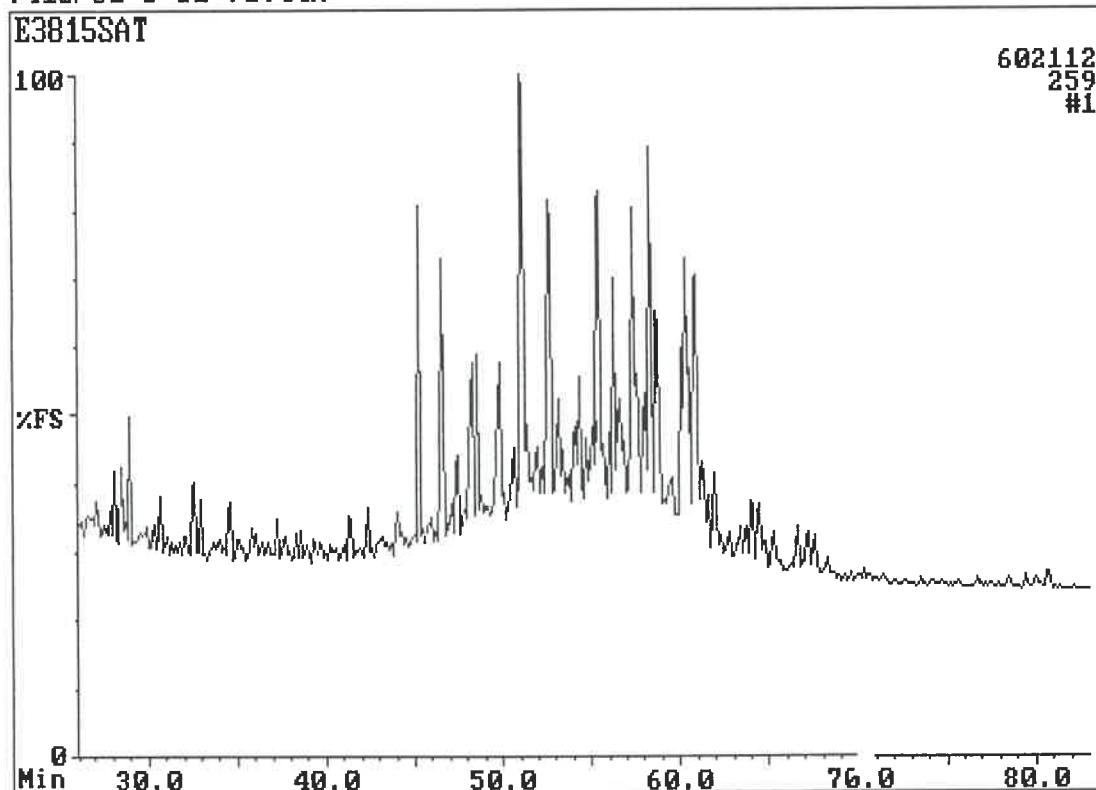
Fisons Instruments
7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



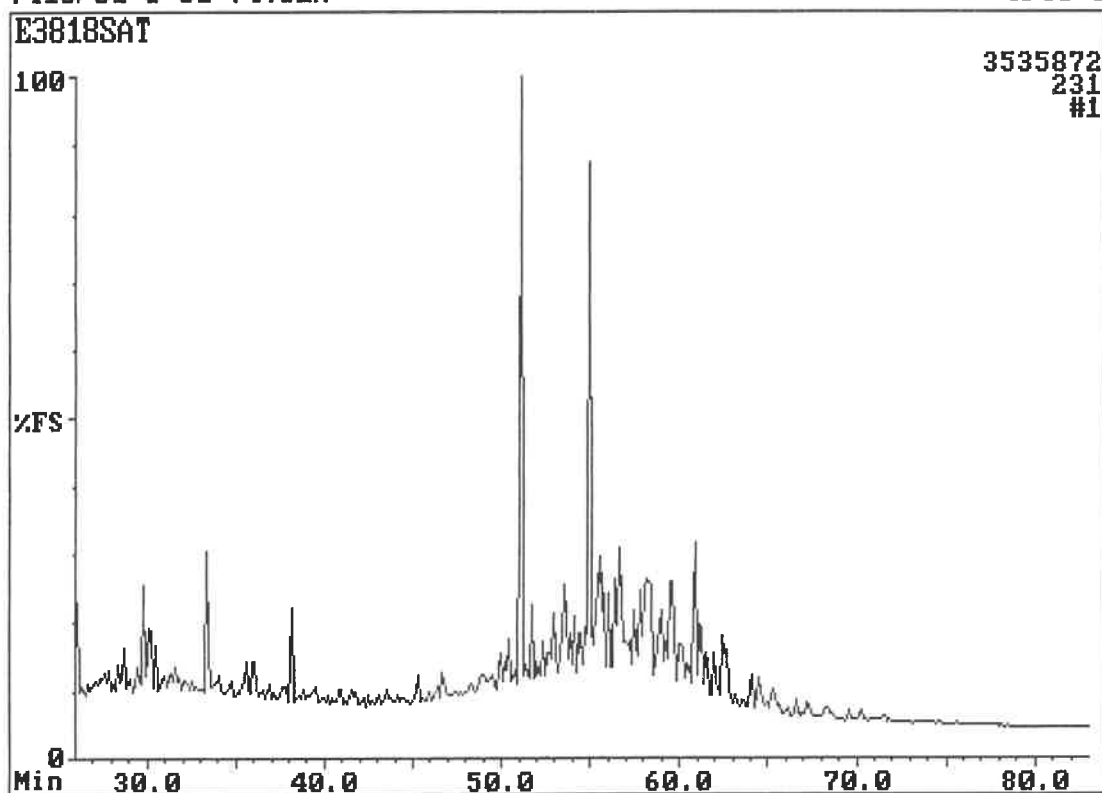
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7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



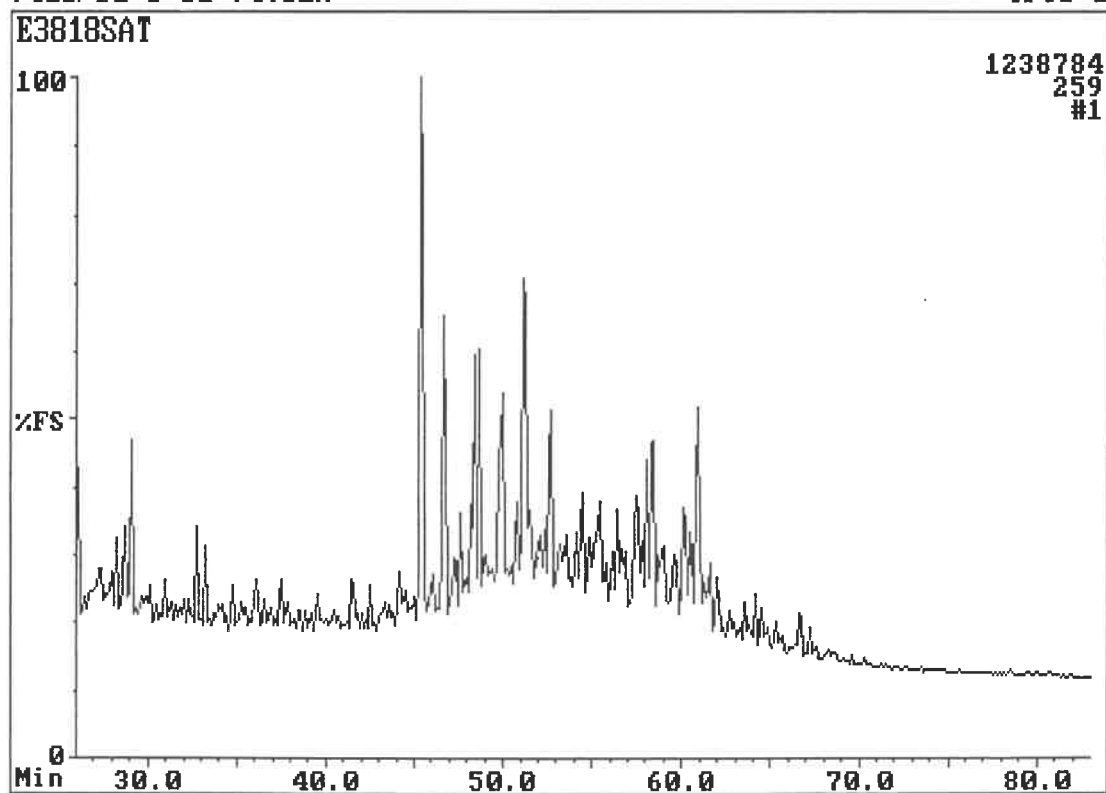
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7418/01-U-01 74.62m

Trio-1



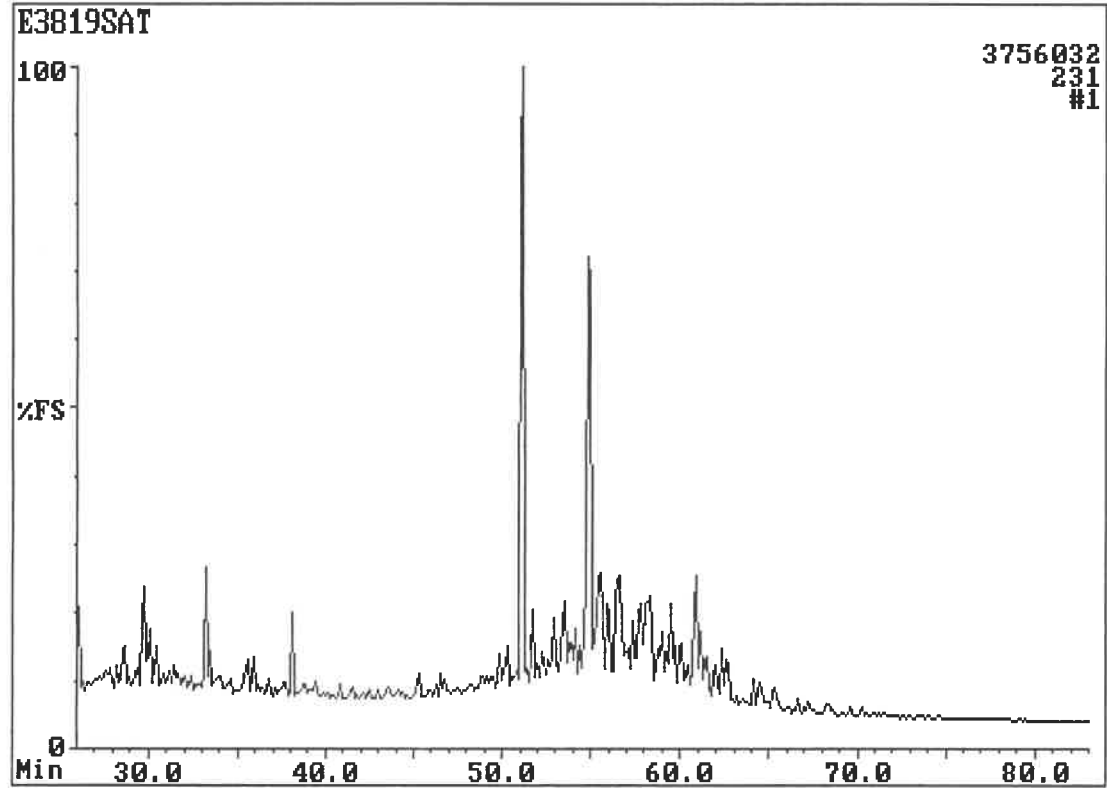
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7418/01-U-01 74.62m

Trio-1



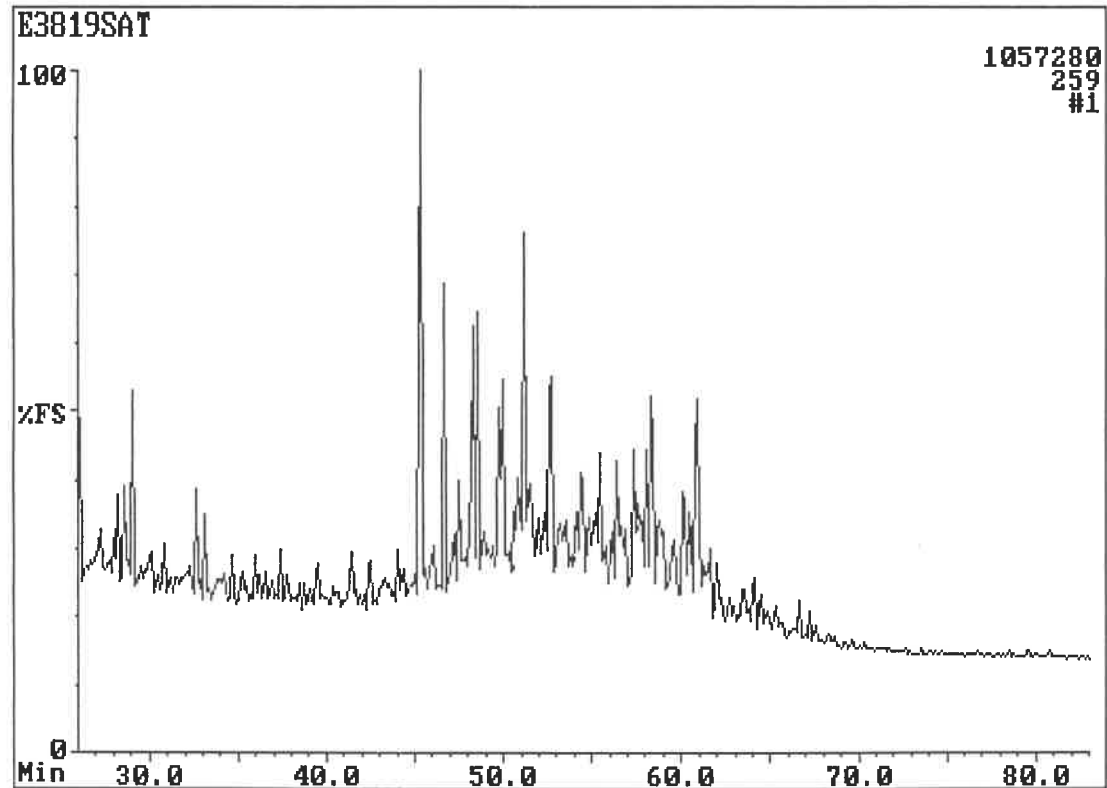
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7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
Trio-1



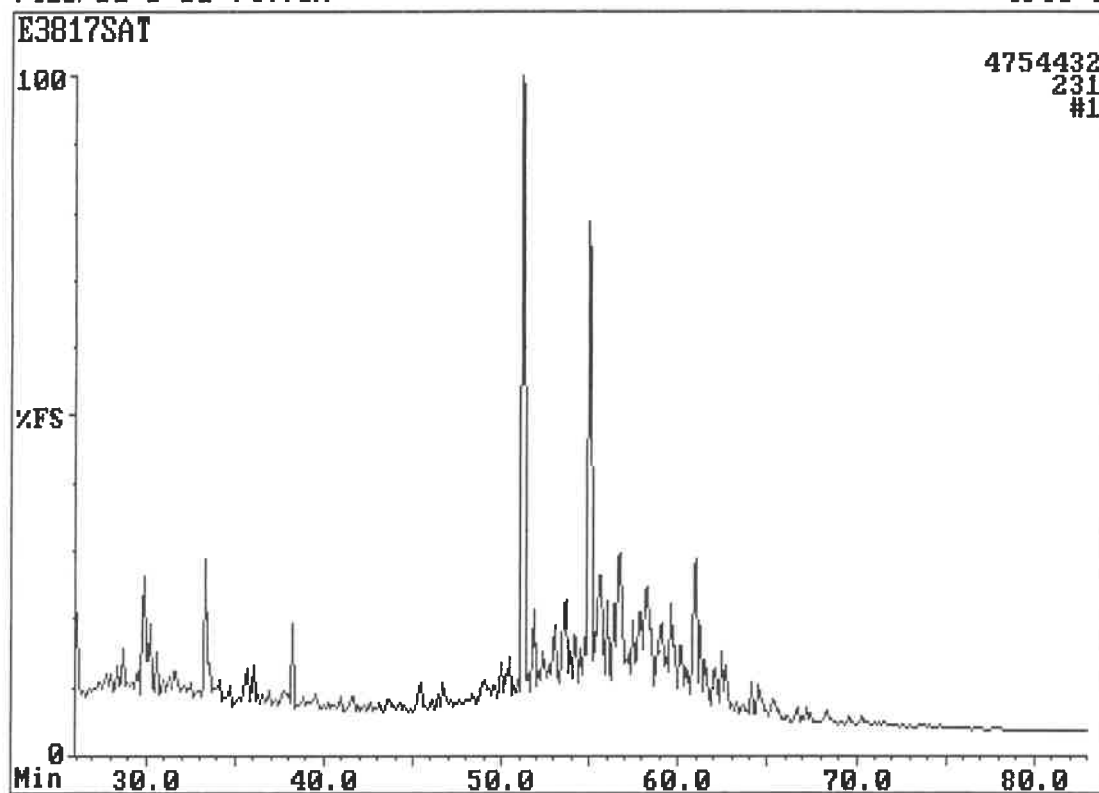
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7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
Trio-1



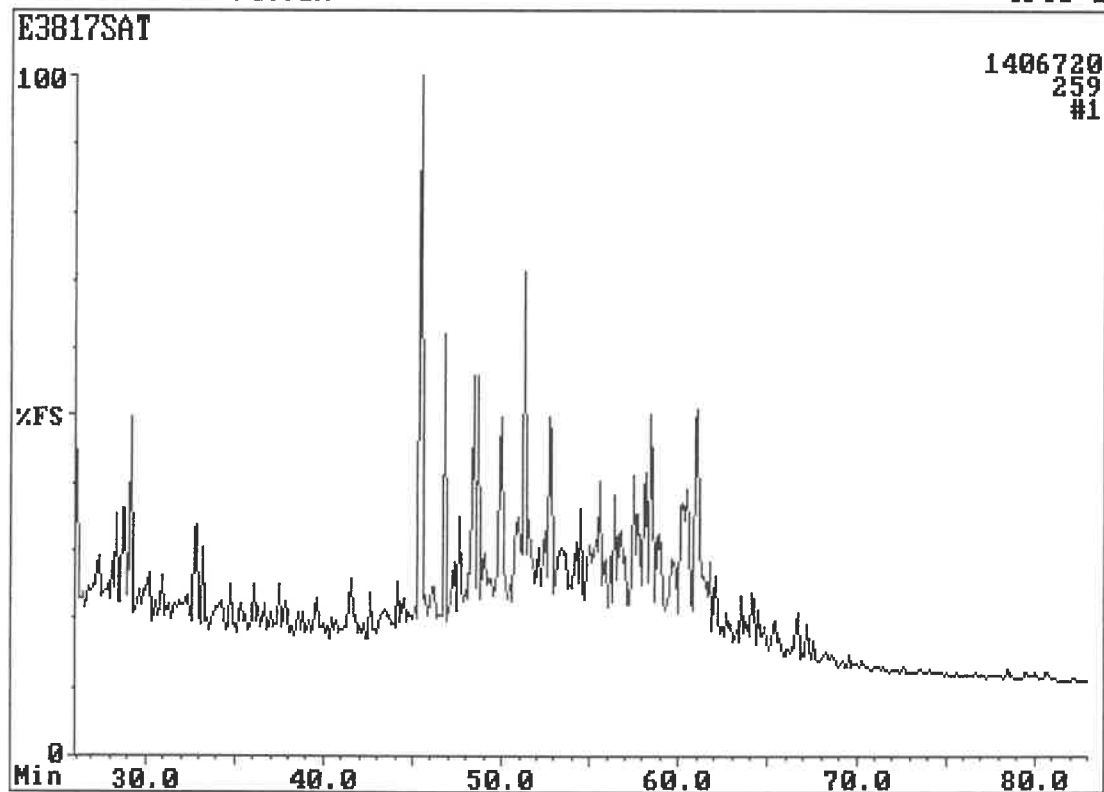
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7418/01-U-01 74.70m

Trio-1



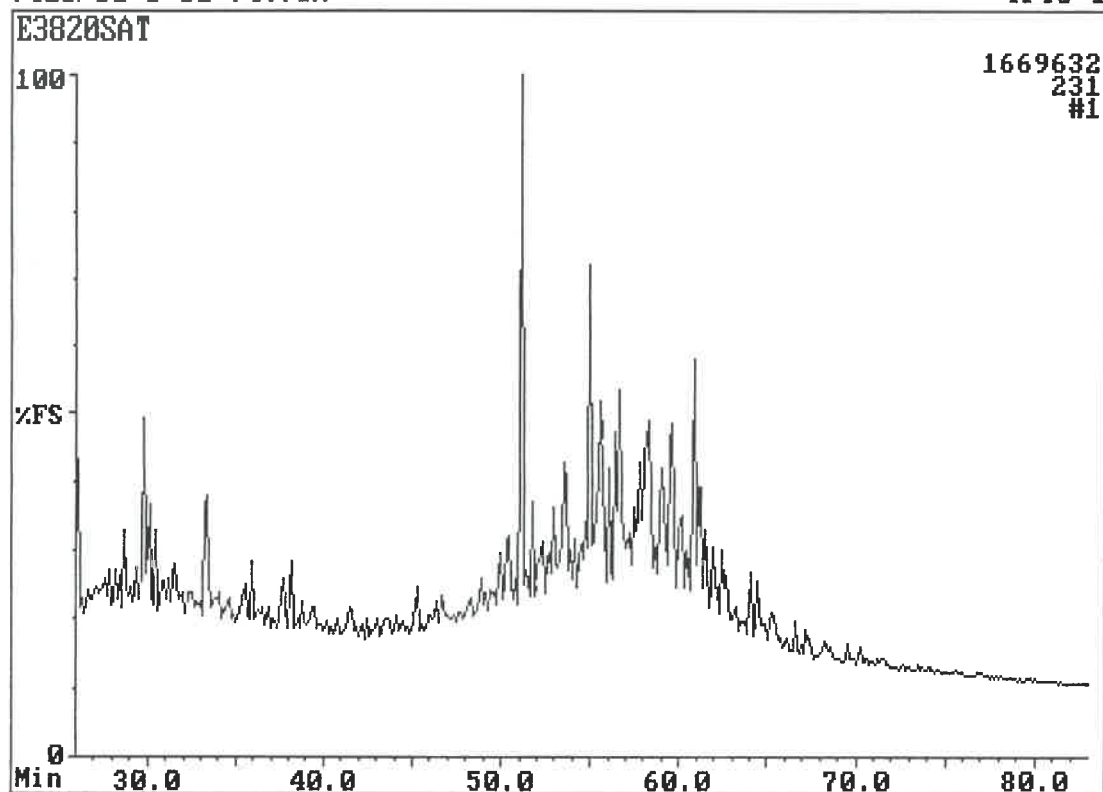
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



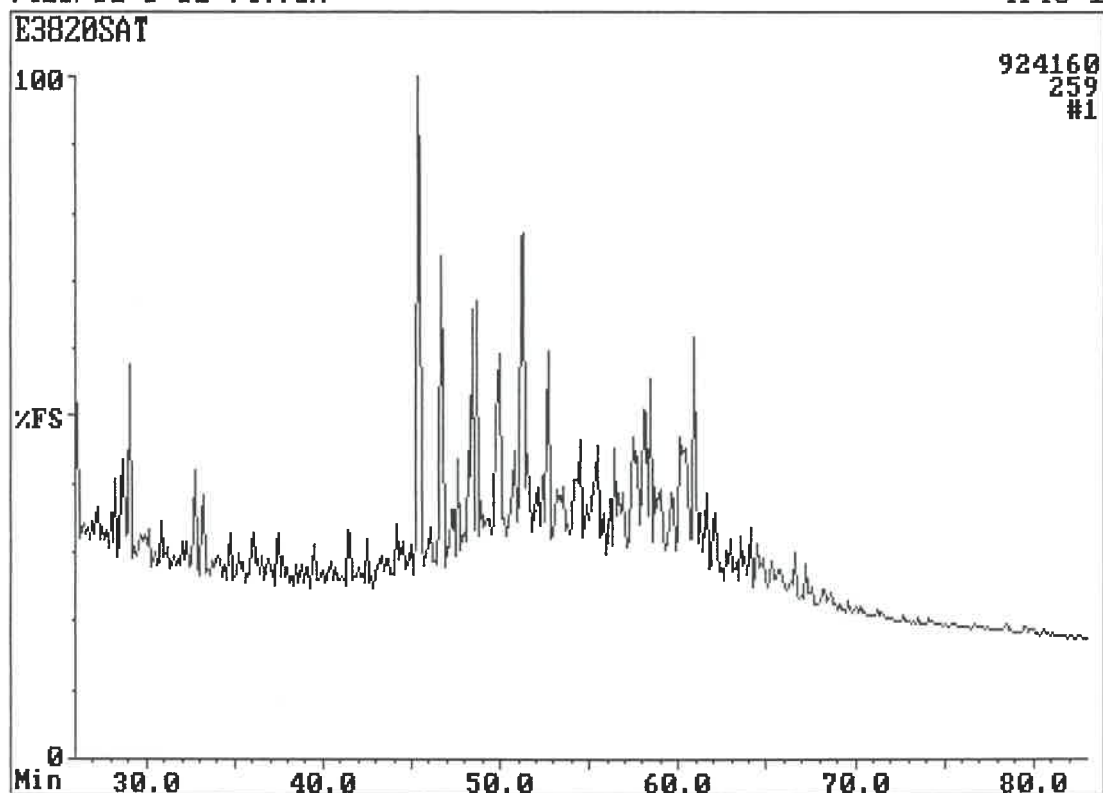
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



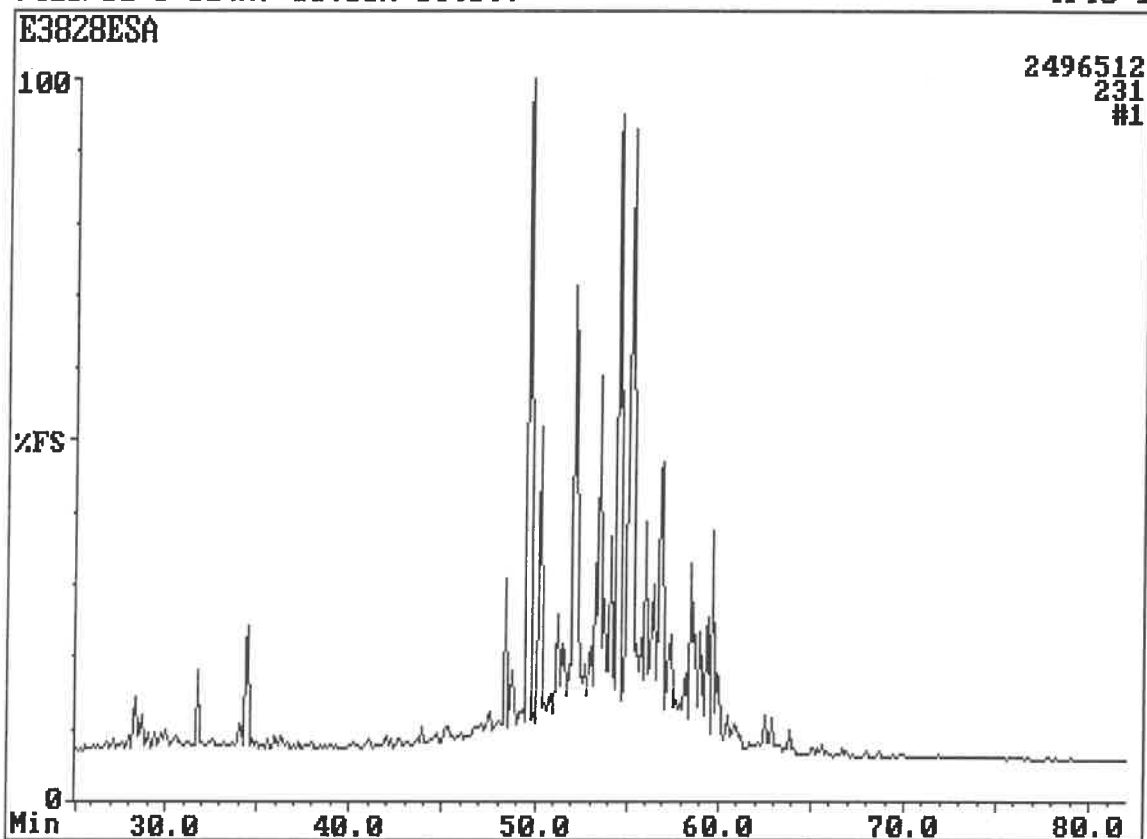
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7418/01-U-01 74.73m

Trio-1



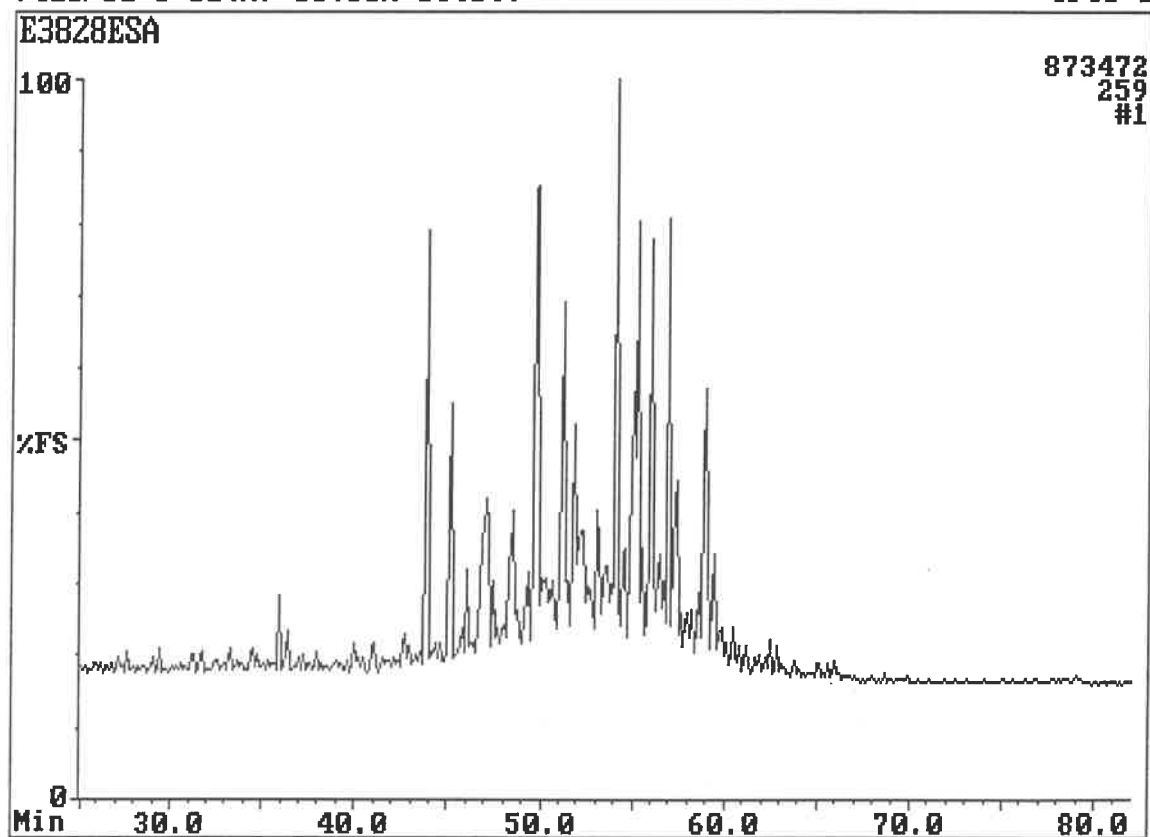
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01(A) 85.00m Slst.

Trio-1



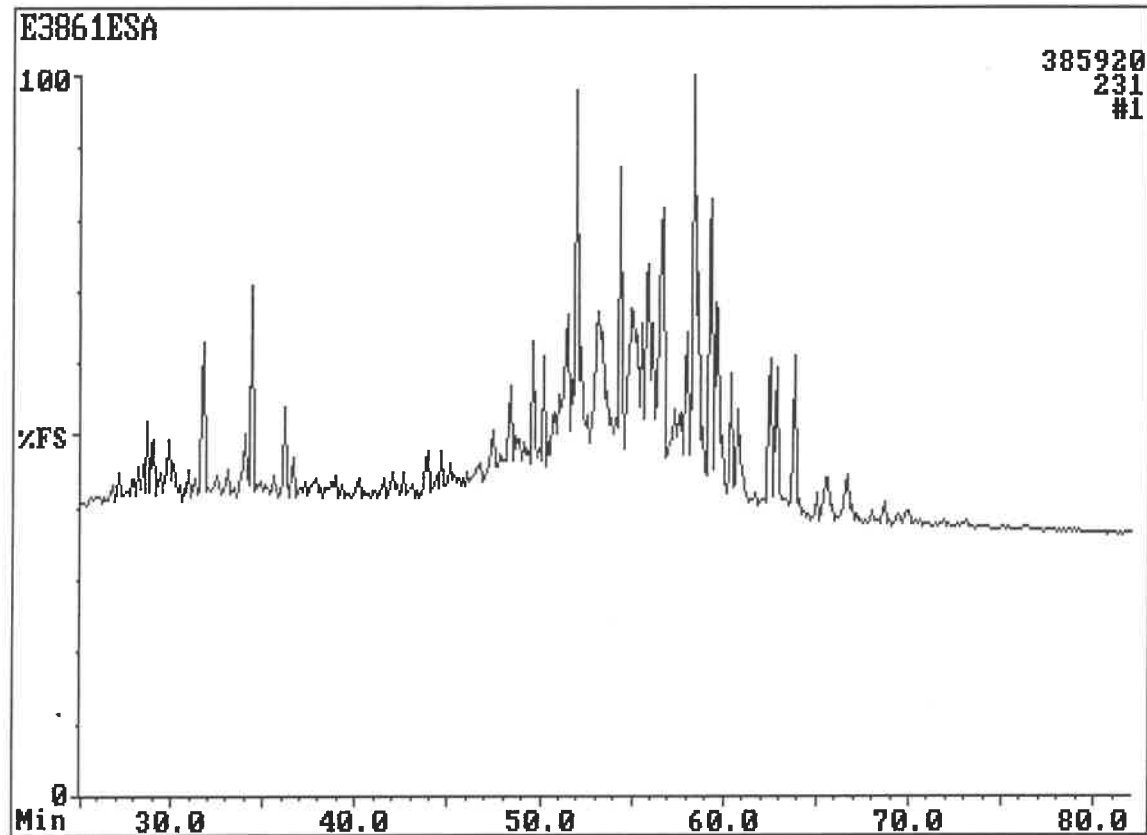
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7418/01-U-01(A) 85.00m Slst.

Trio-1



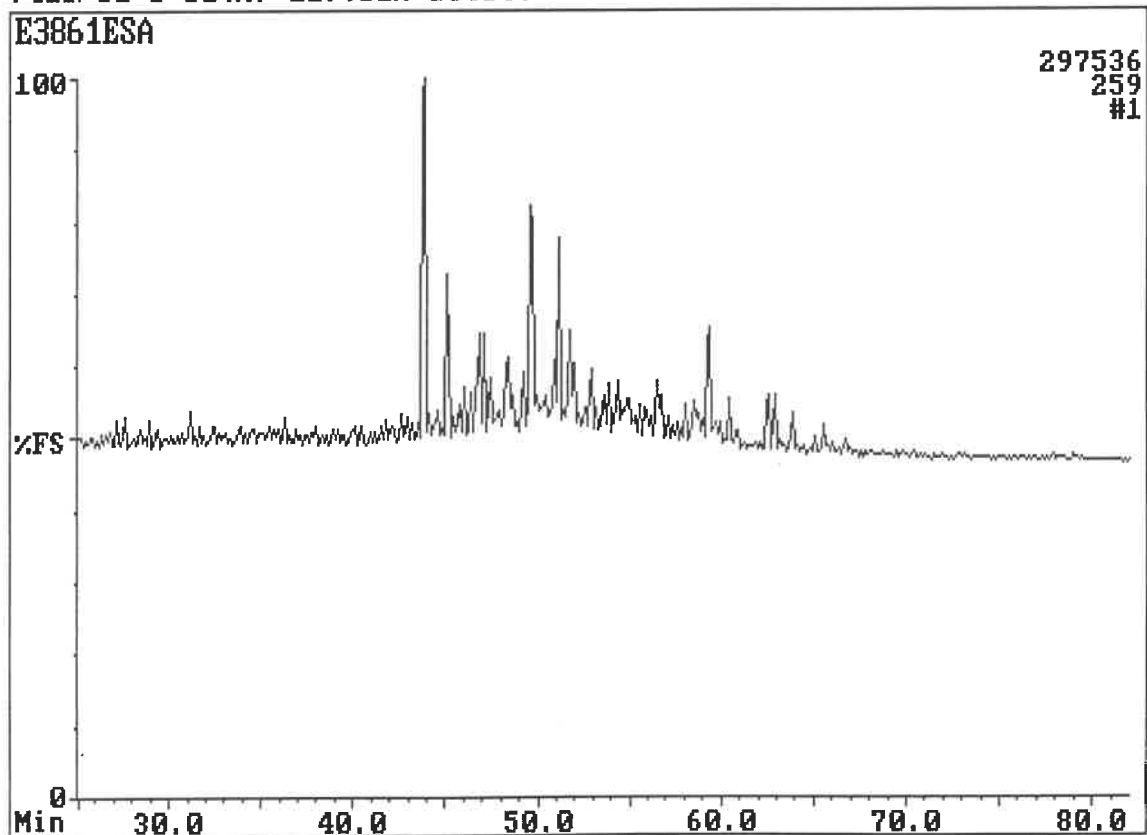
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01(A) 117.81m Sltst.

Trio-1



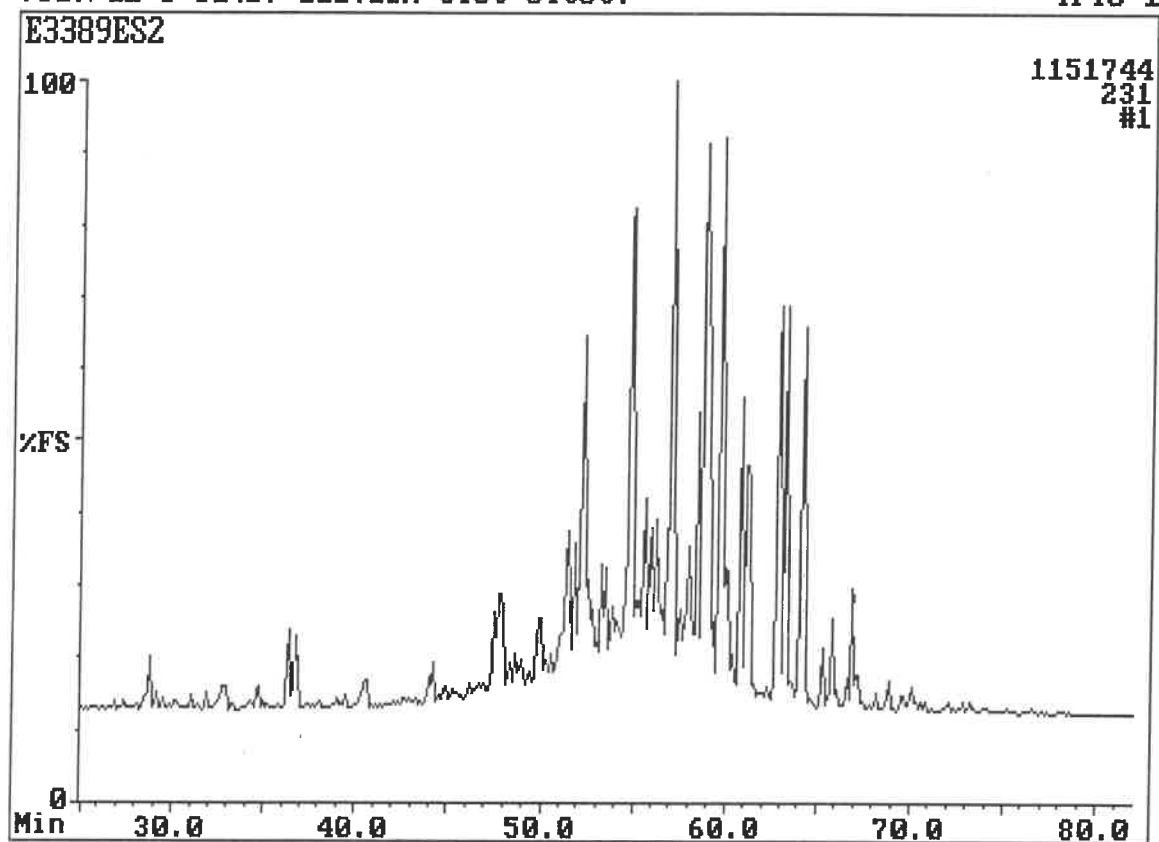
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7418/01-U-01(A) 117.81m Sltst.

Trio-1



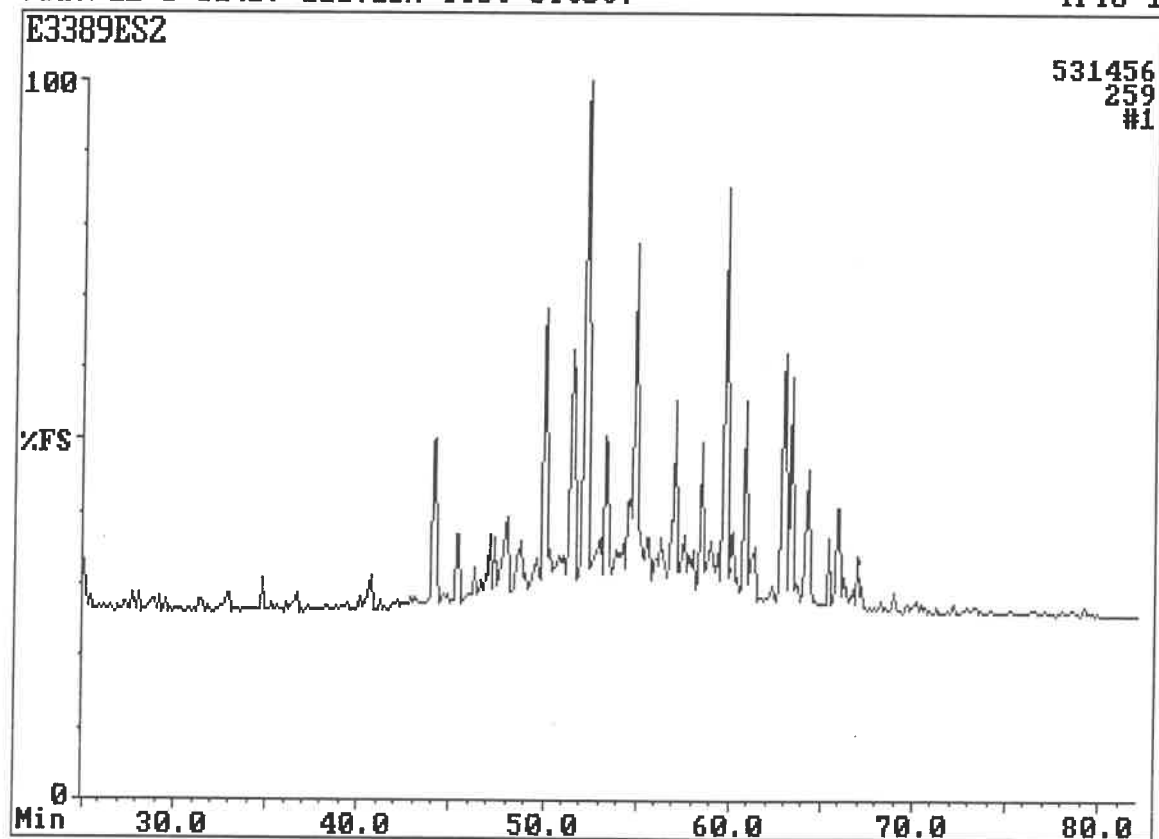
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7517/12-U-01(B) 111.15m Clst-sltst.

Trio-1



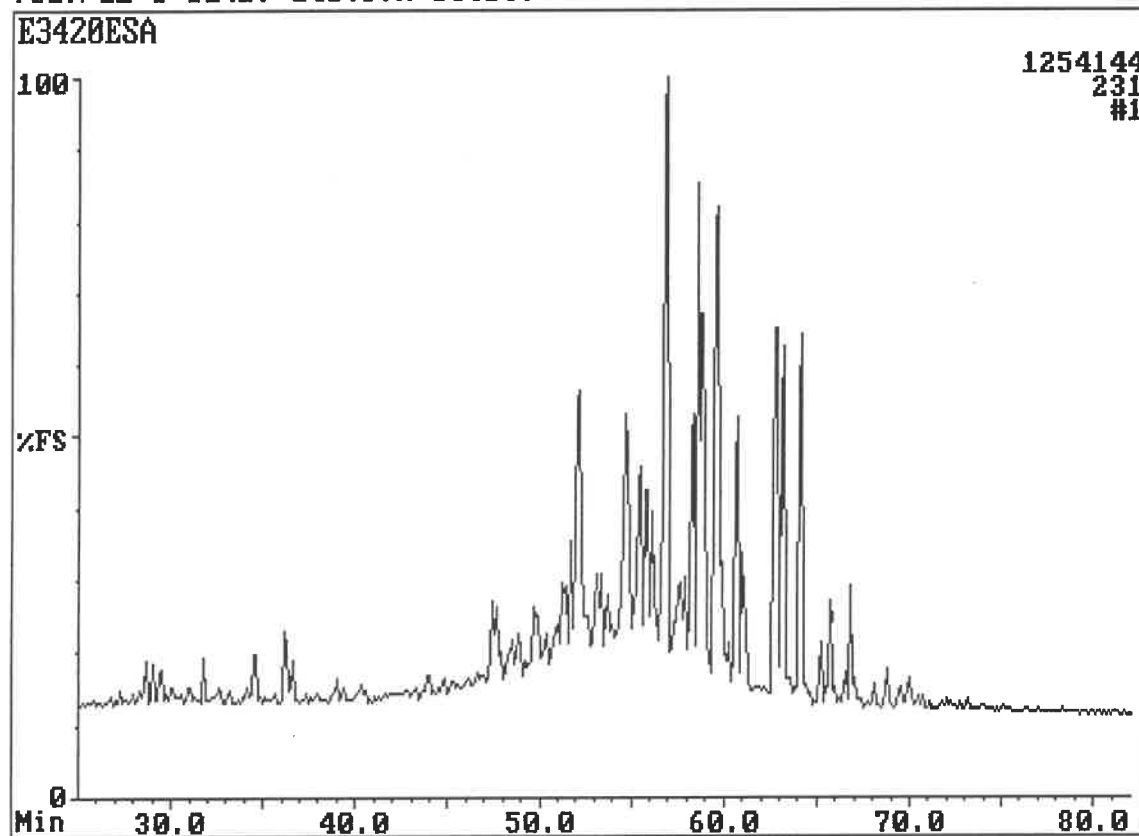
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7517/12-U-01(B) 111.15m Clst-sltst.

Trio-1



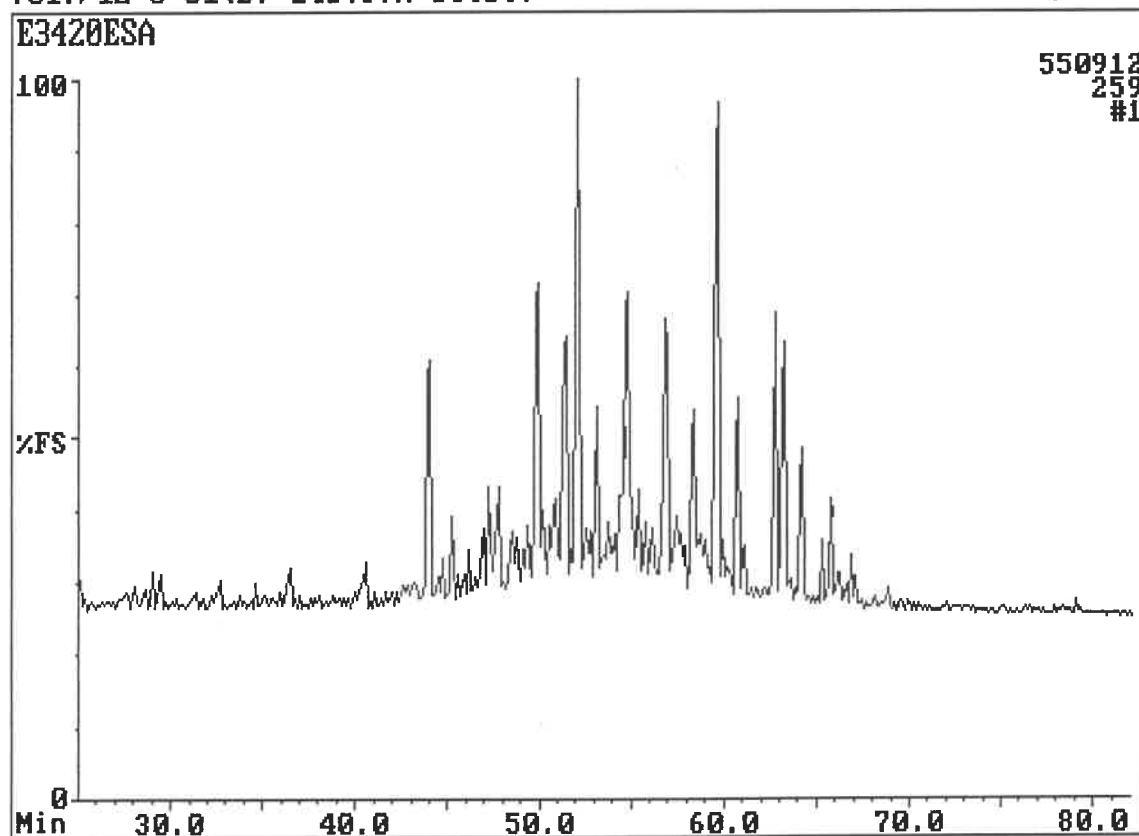
Fisons Instruments TRIO-1000 LAB BASE Data System
7517/12-U-01(B) 143.97m Slstst.

Trio-1



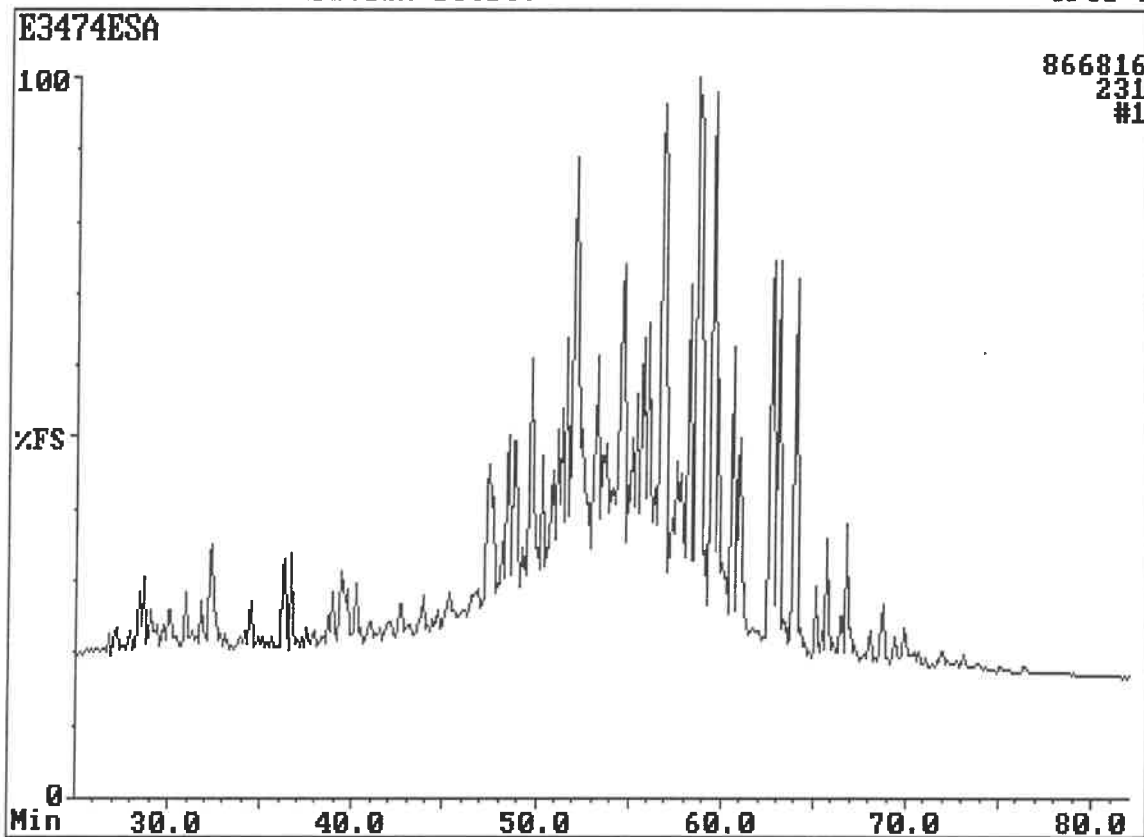
Fisons Instruments TRIO-1000 LAB BASE Data System
7517/12-U-01(B) 143.97m Slstst.

Trio-1



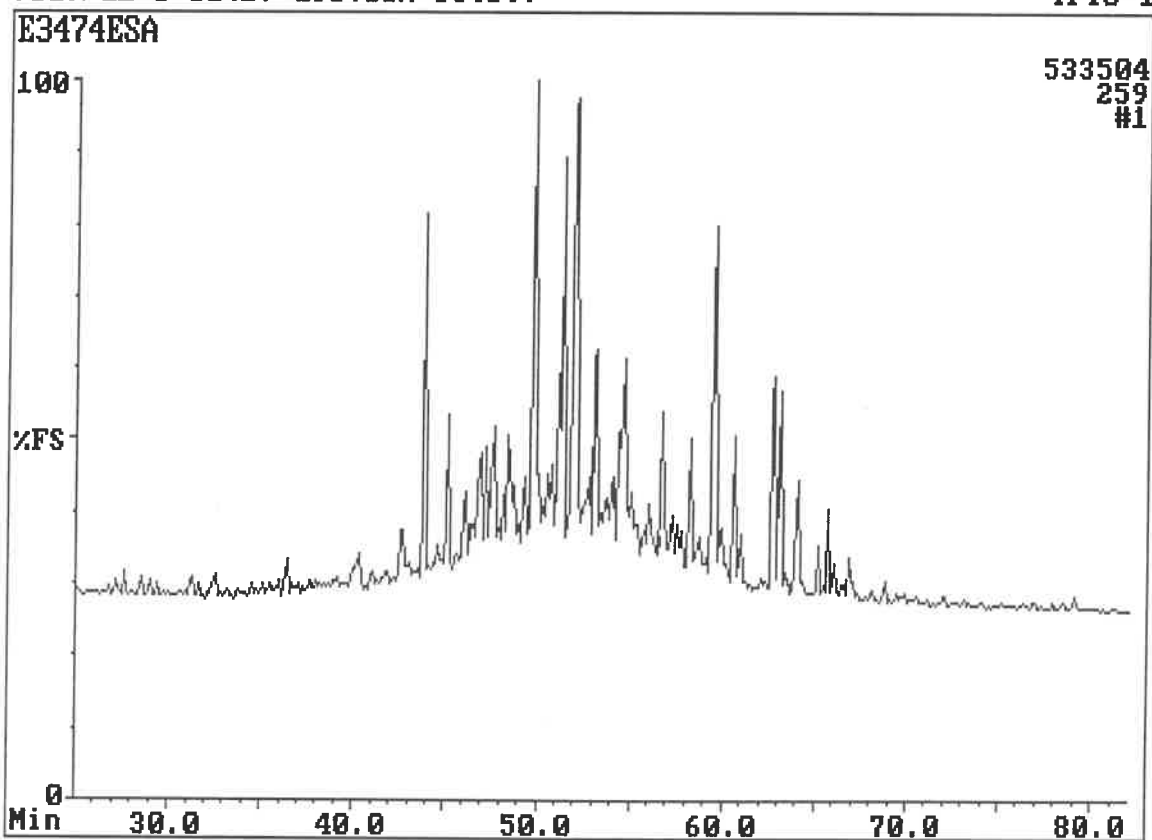
Fisons Instruments TRIO-1000 LAB BASE Data System
7517/12-U-01(B) 198.68m Sltst.

Trio-1



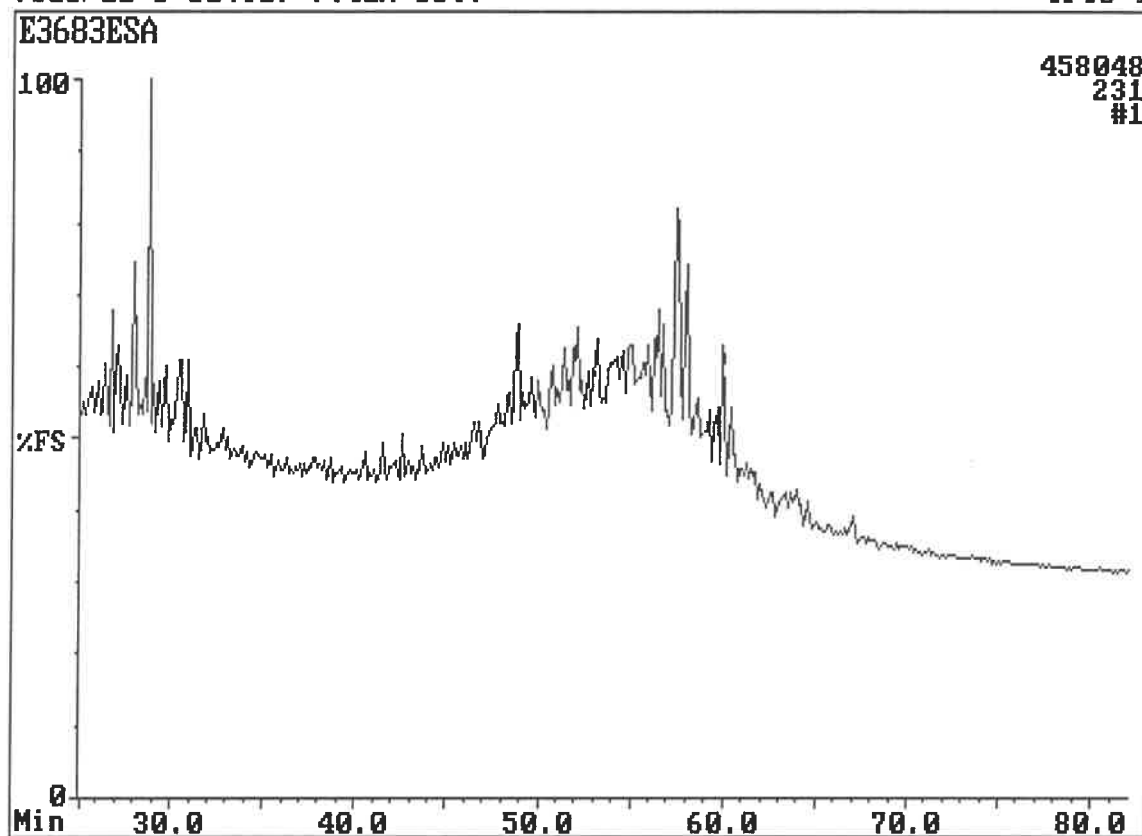
Fisons Instruments TRIO-1000 LAB BASE Data System
7517/12-U-01(B) 198.68m Sltst.

Trio-1



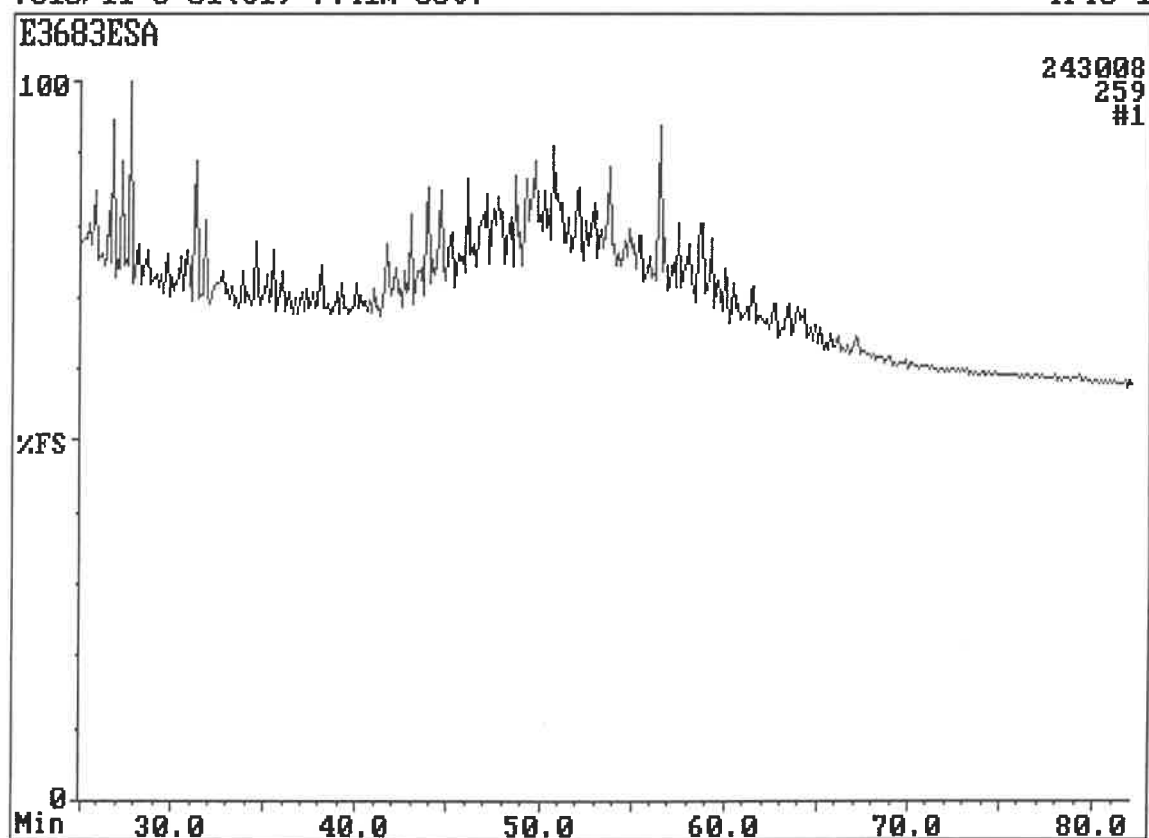
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 7.41m Sst.

Trio-1



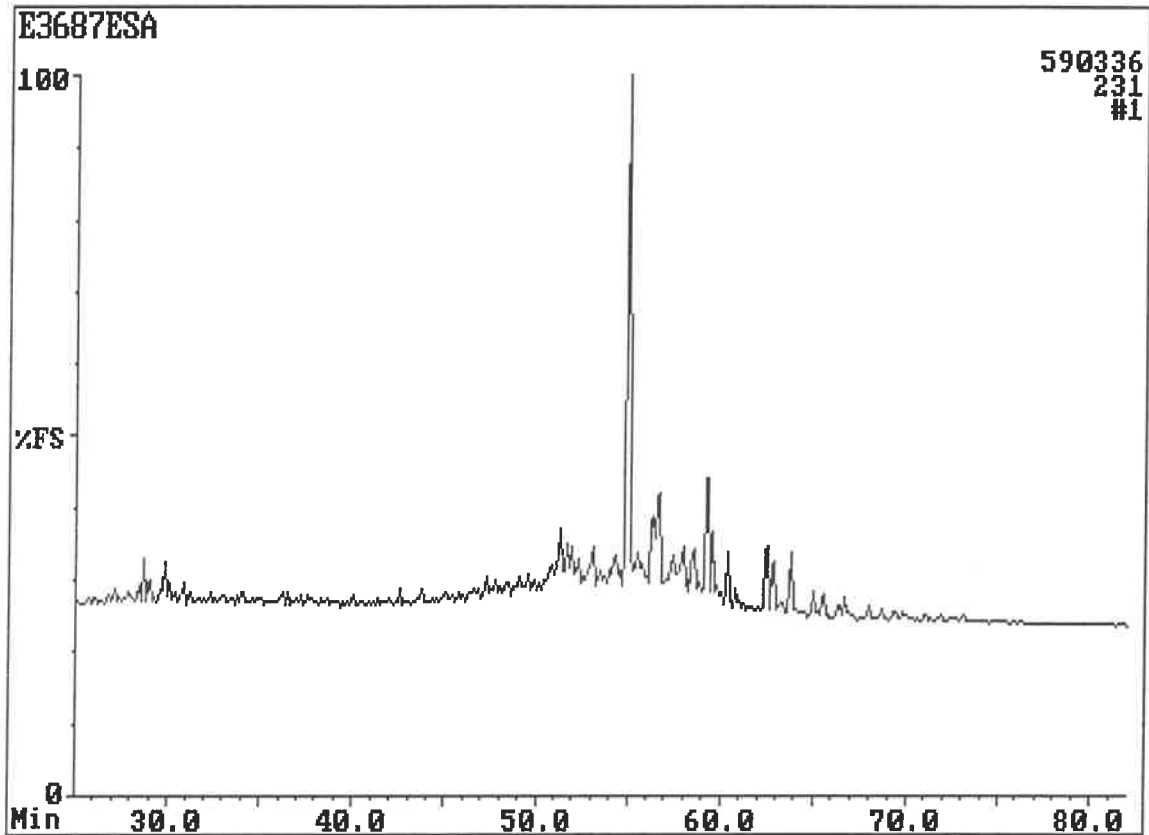
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 7.41m Sst.

Trio-1



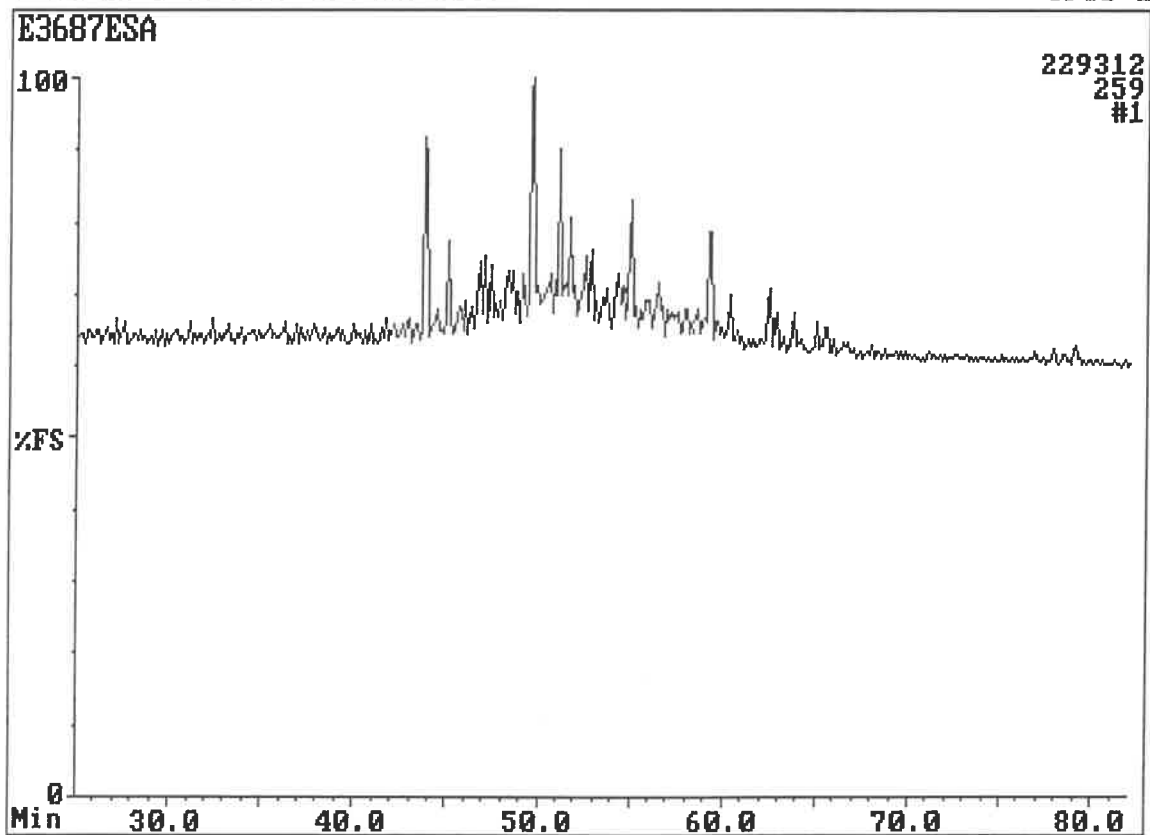
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 13.15m Sst.

Trio-1



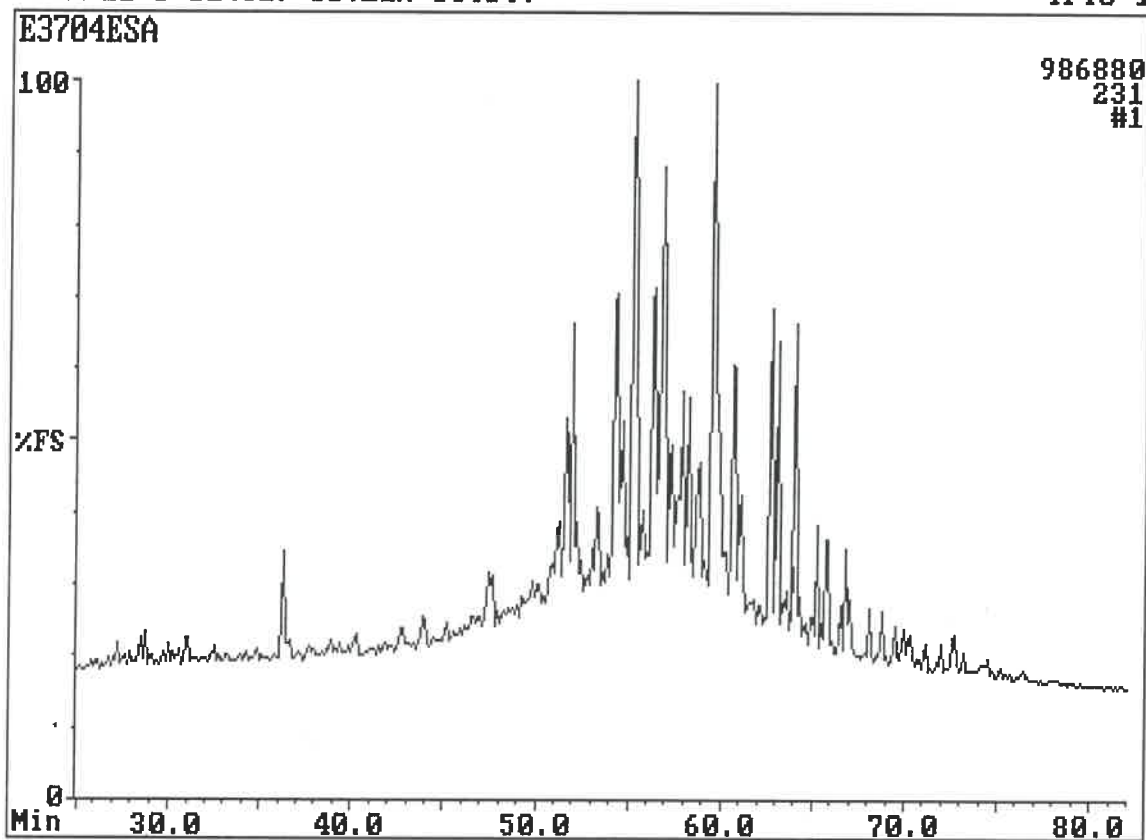
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7616/11-U-01(C1) 13.15m Sst.

Trio-1



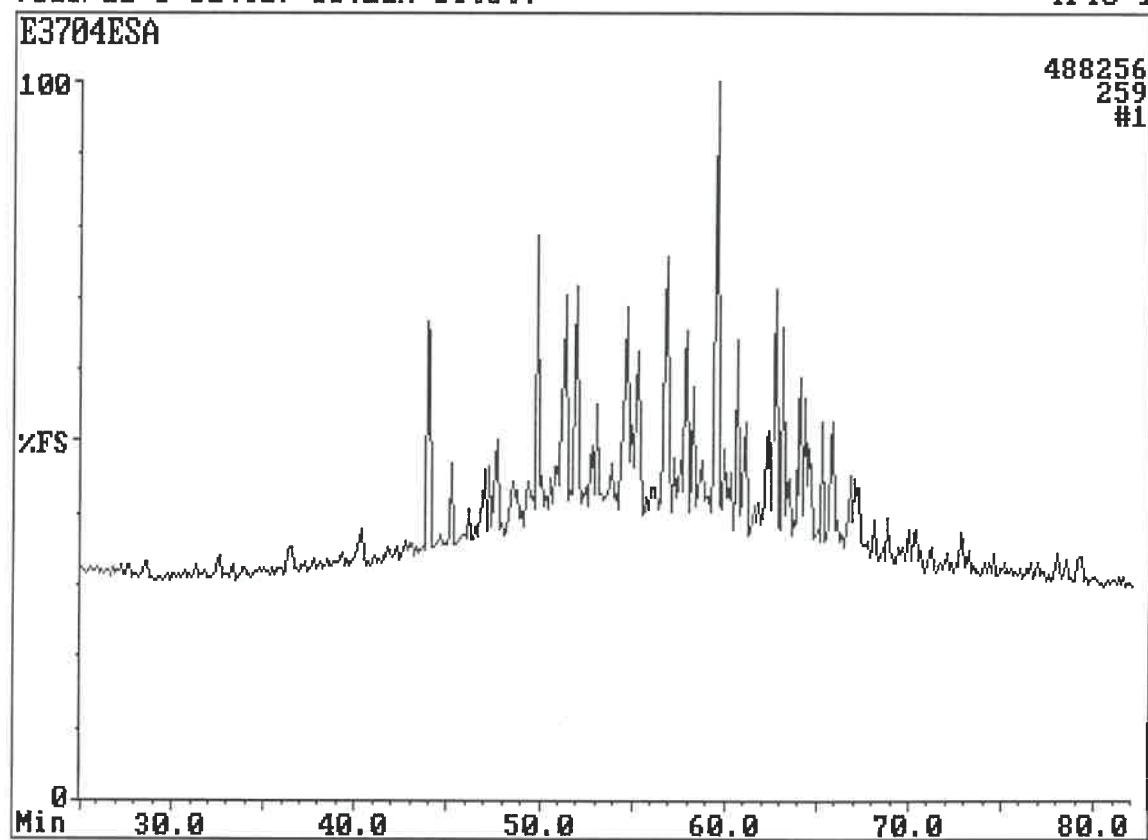
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 36.21m Slstst.

Trio-1



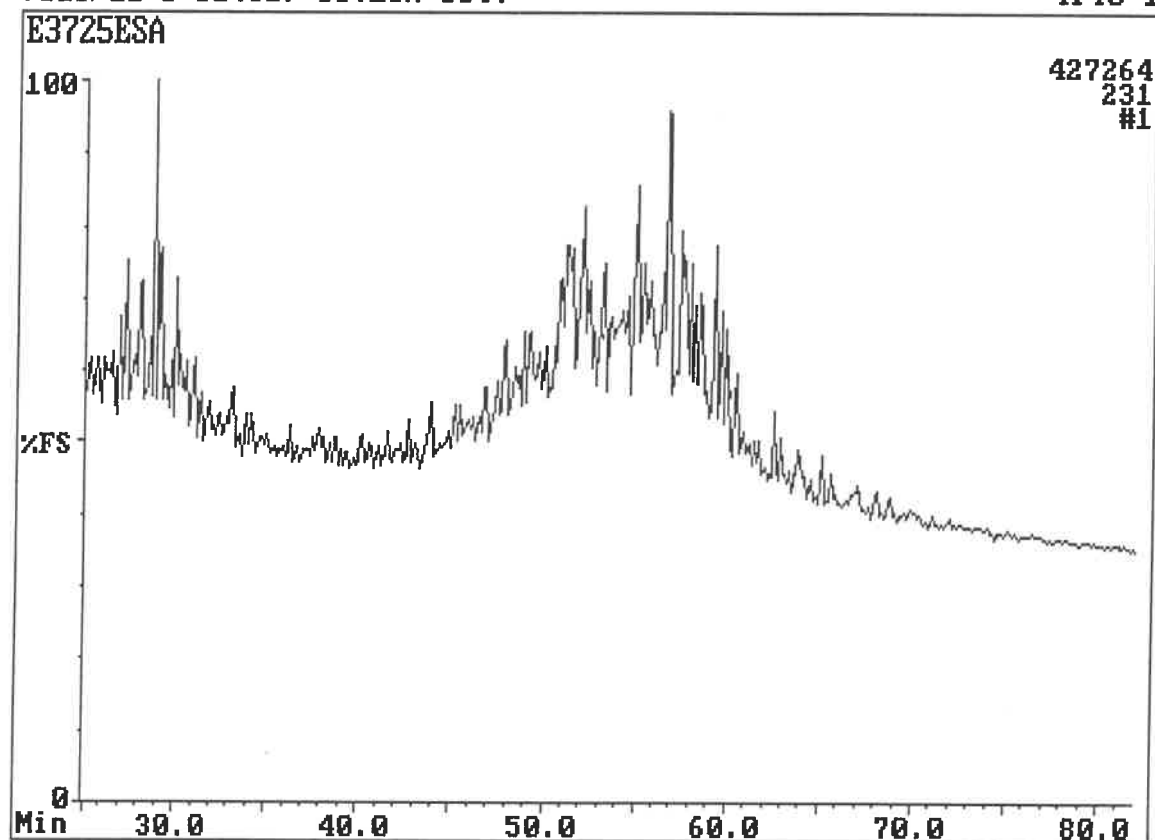
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 36.21m Slstst.

Trio-1



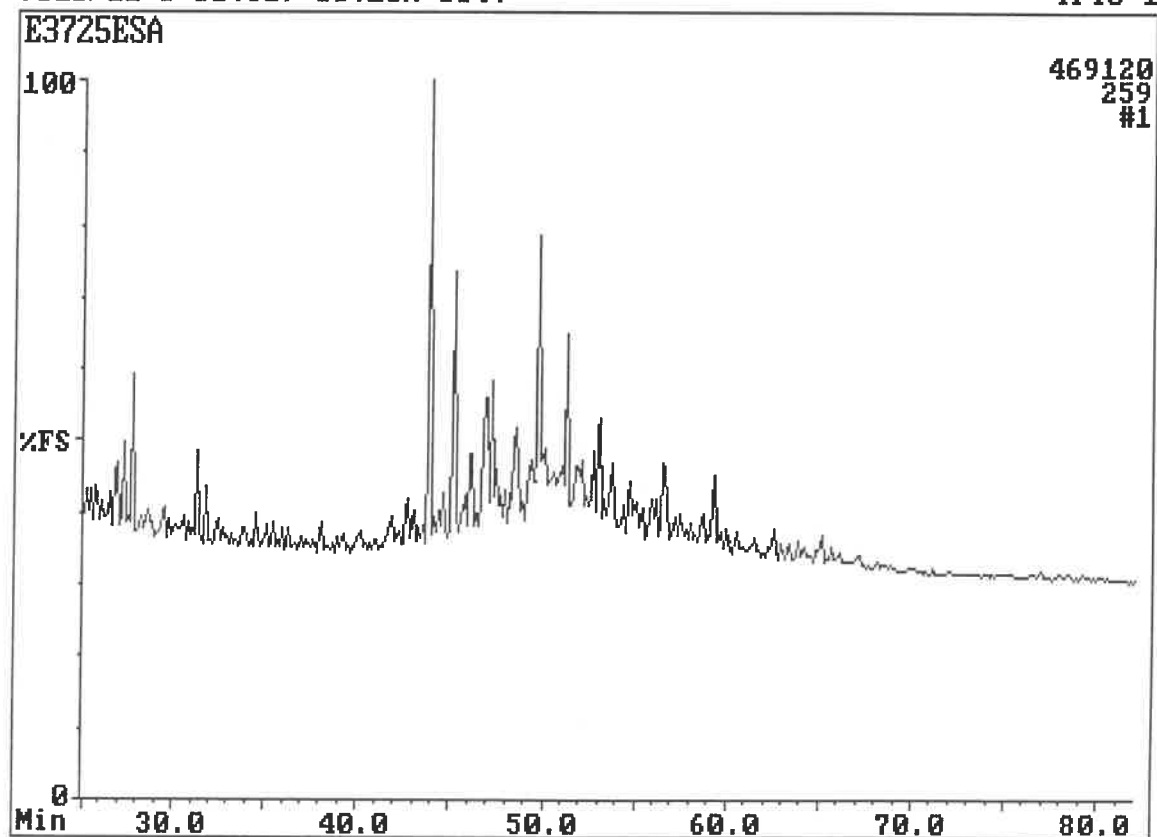
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 56.25m Sst.

Trio-1



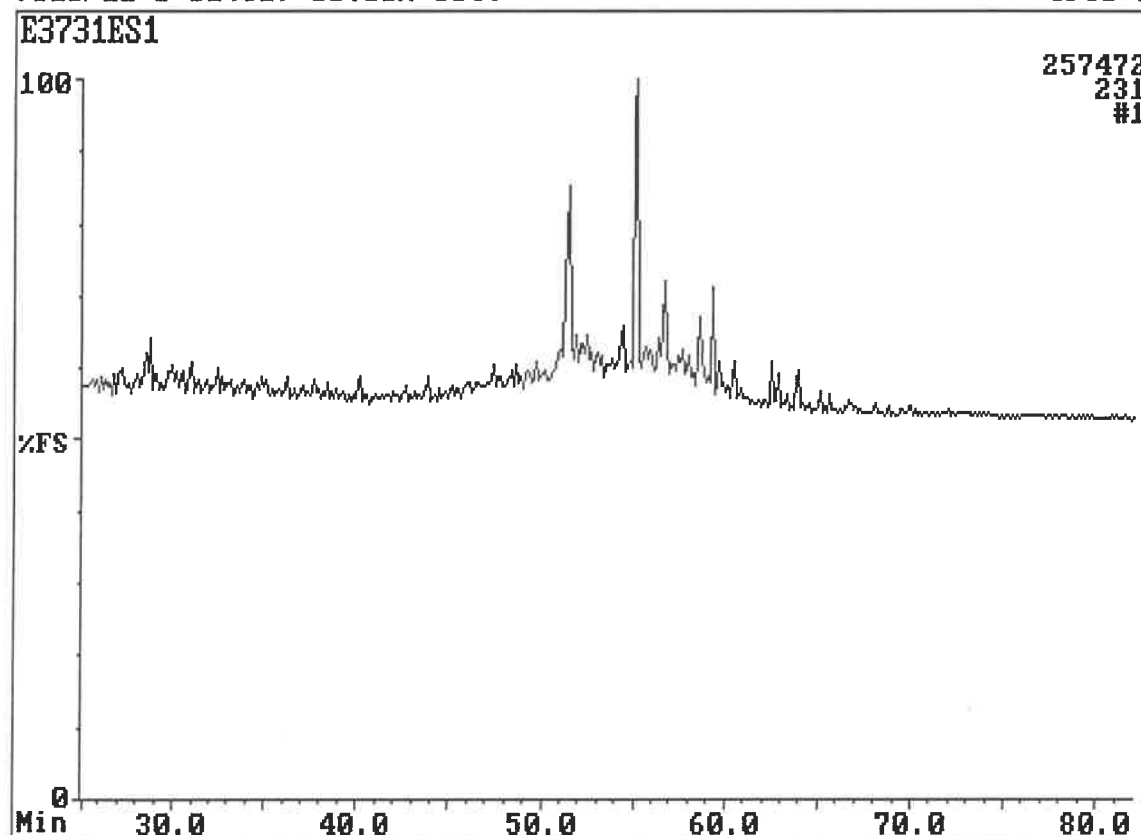
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 56.25m Sst.

Trio-1



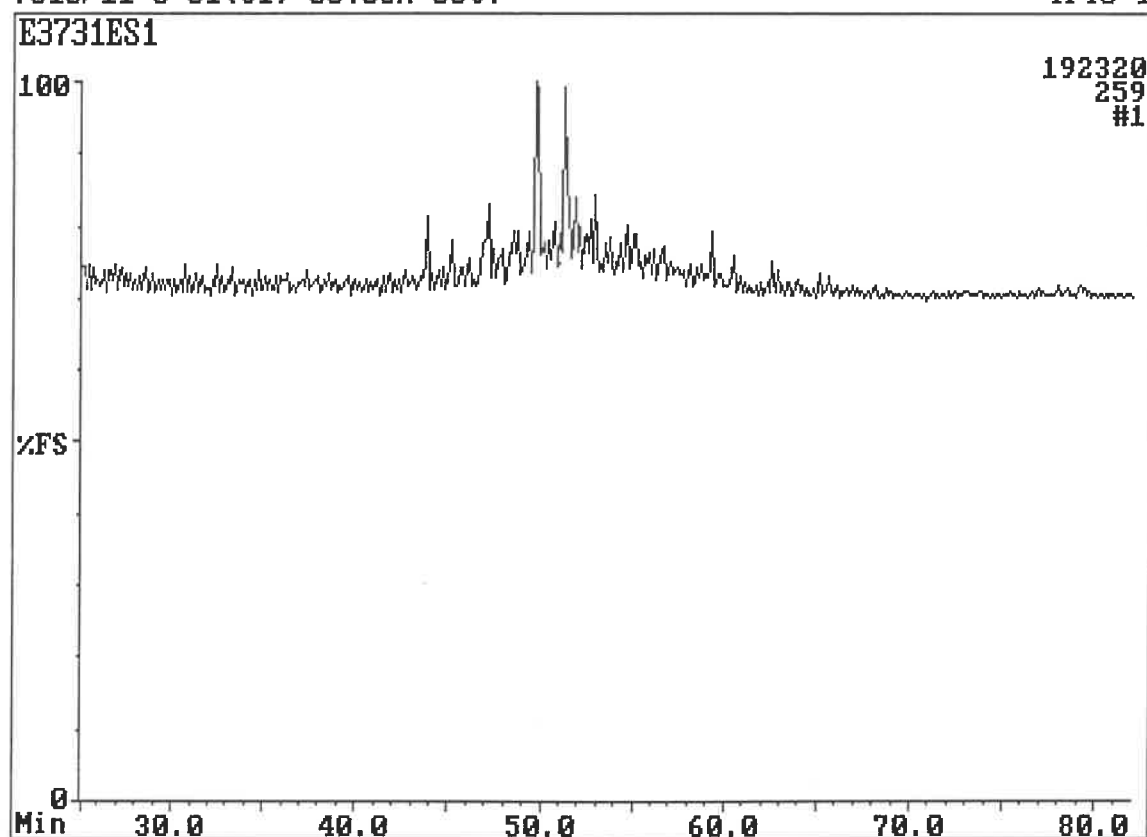
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 65.08m Sst.

Trio-1



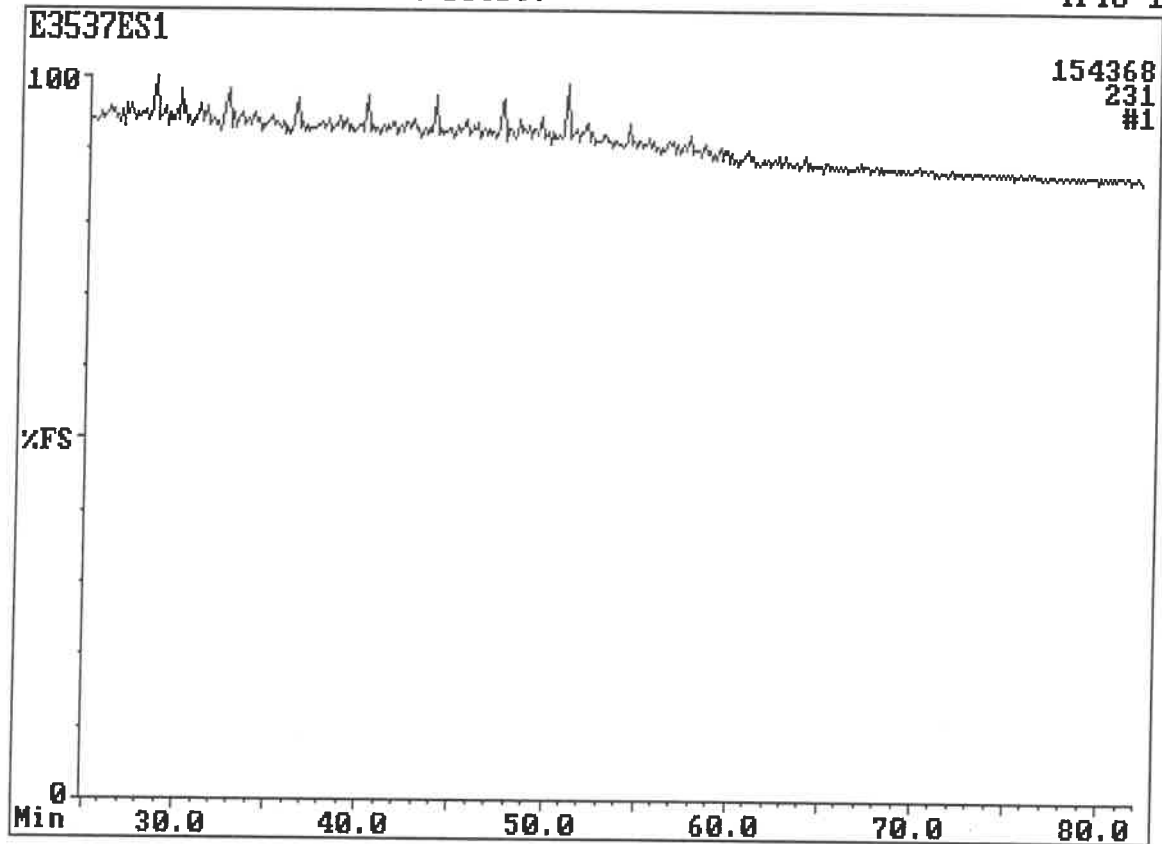
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7616/11-U-01(C1) 65.08m Sst.

Trio-1



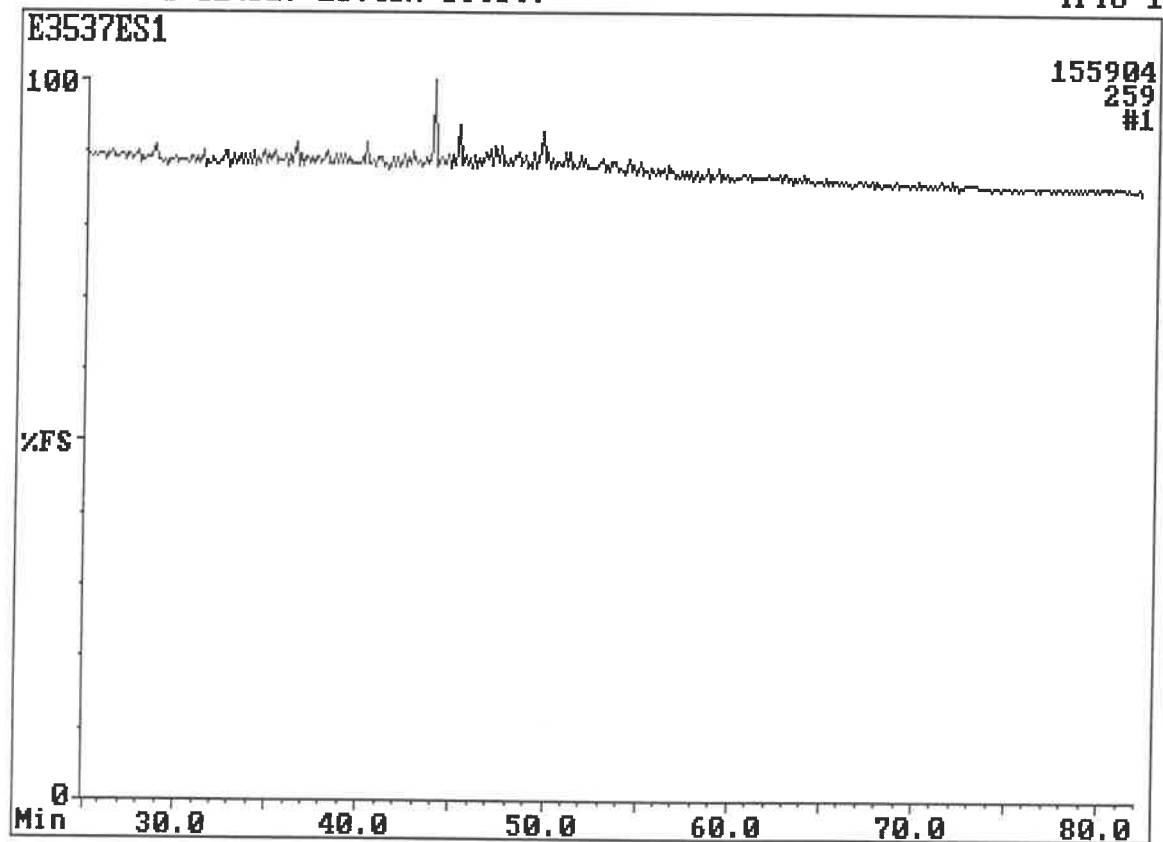
Fisons Instruments TRIO-1000 LAB BASE Data System
7617/11-U-02(D2) 23.45m Slstst.

Trio-1



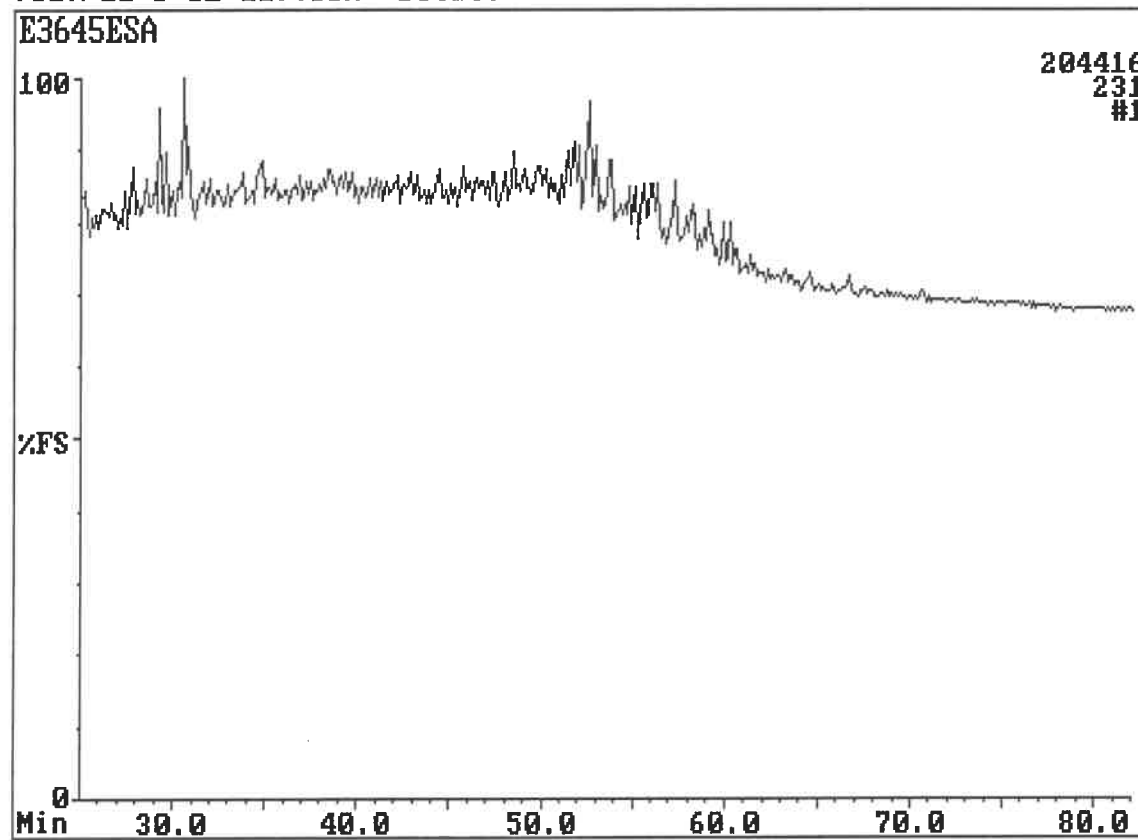
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7617/11-U-02(D2) 23.45m Slstst.

Trio-1



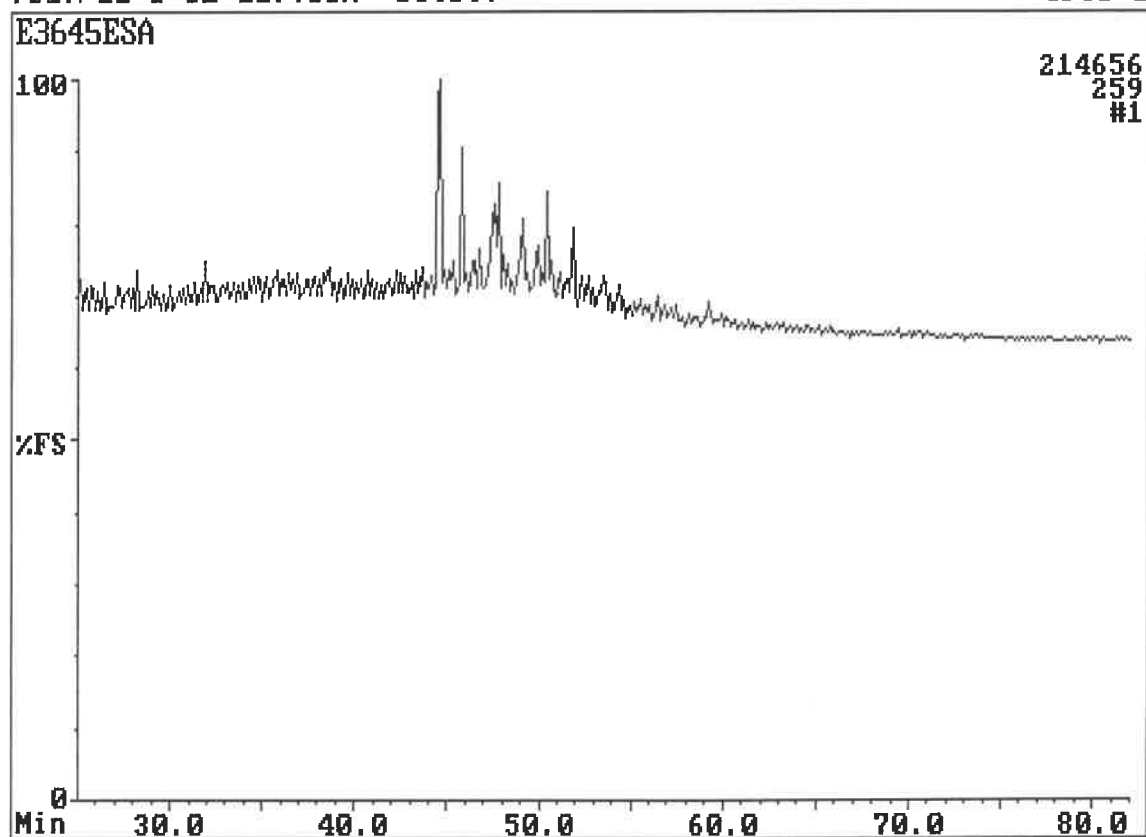
Fisons Instruments TRIO-1000 LAB BASE Data System
7617/11-U-02 117.80m Sl1st.

Trio-1



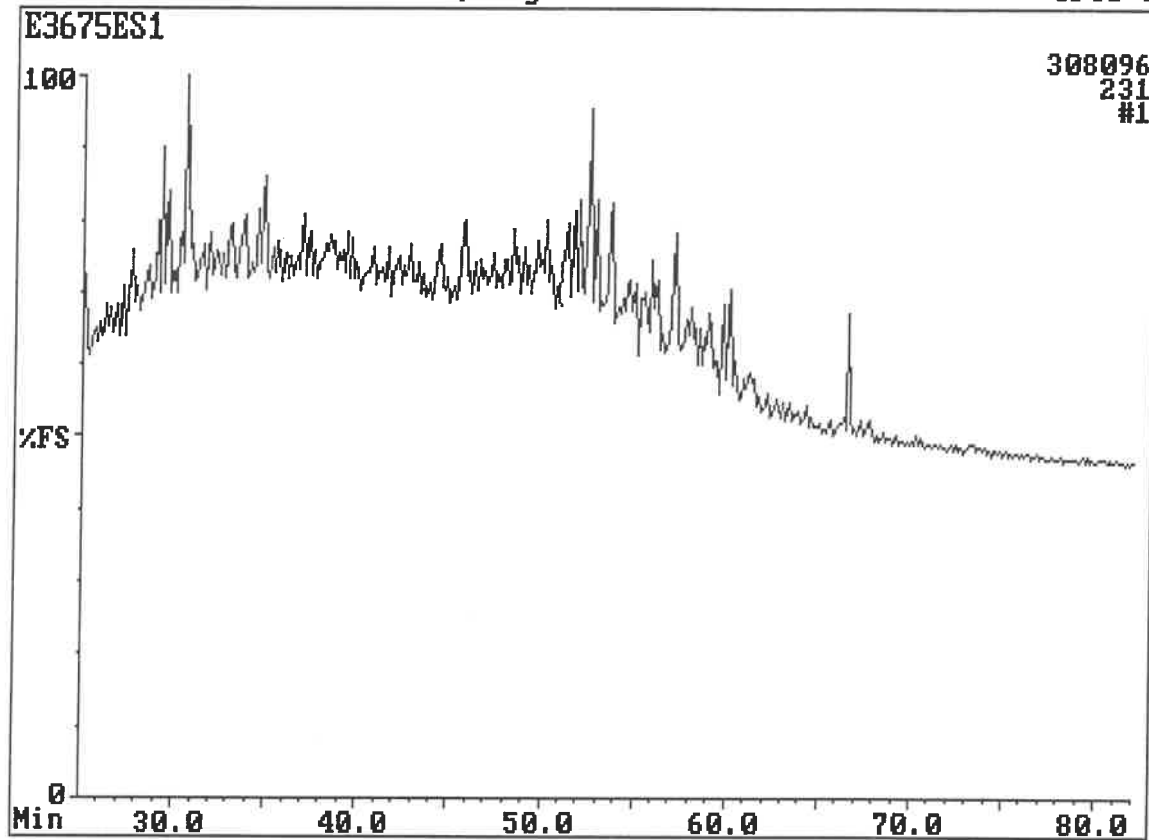
Fisons Instruments TRIO-1000 LAB BASE Data System
7617/11-U-02 117.80m Sl1st.

Trio-1



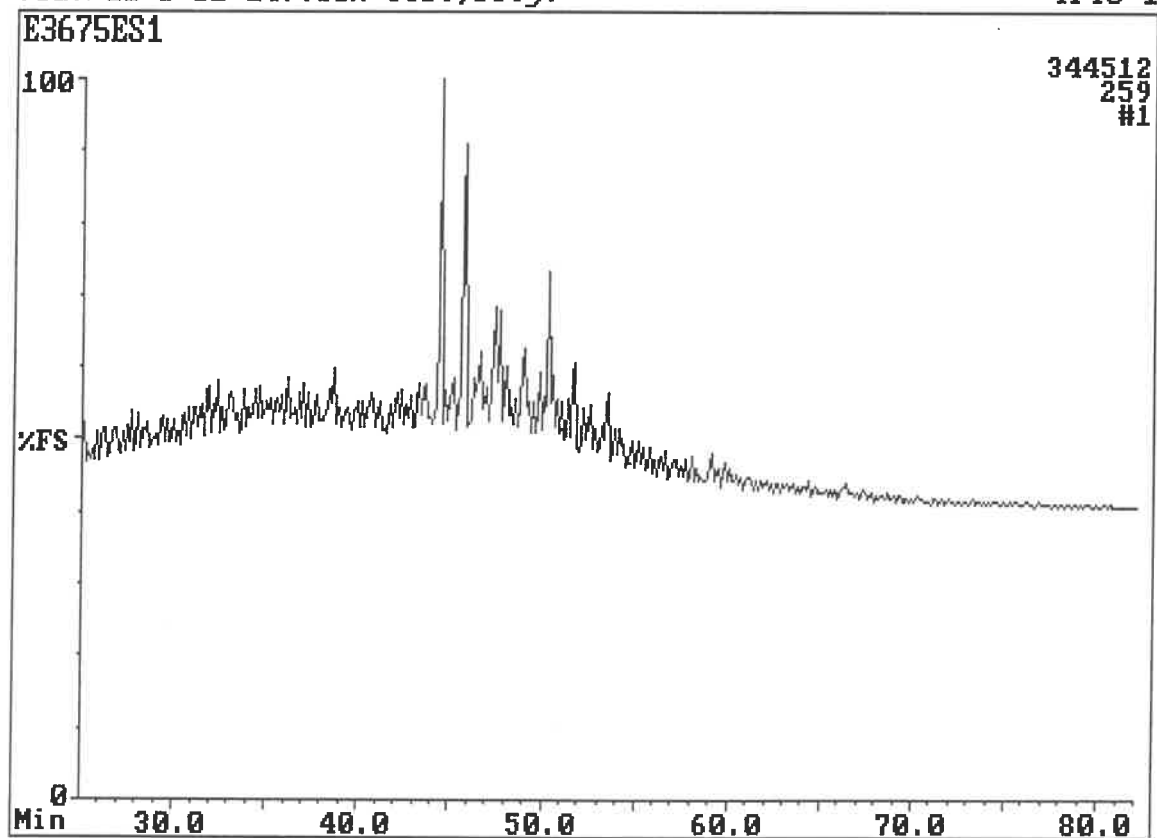
Fisons Instruments TRI0-1000 LAB BASE Data System
7617/11-U-02 147.00m Clst,slty.

Trio-1



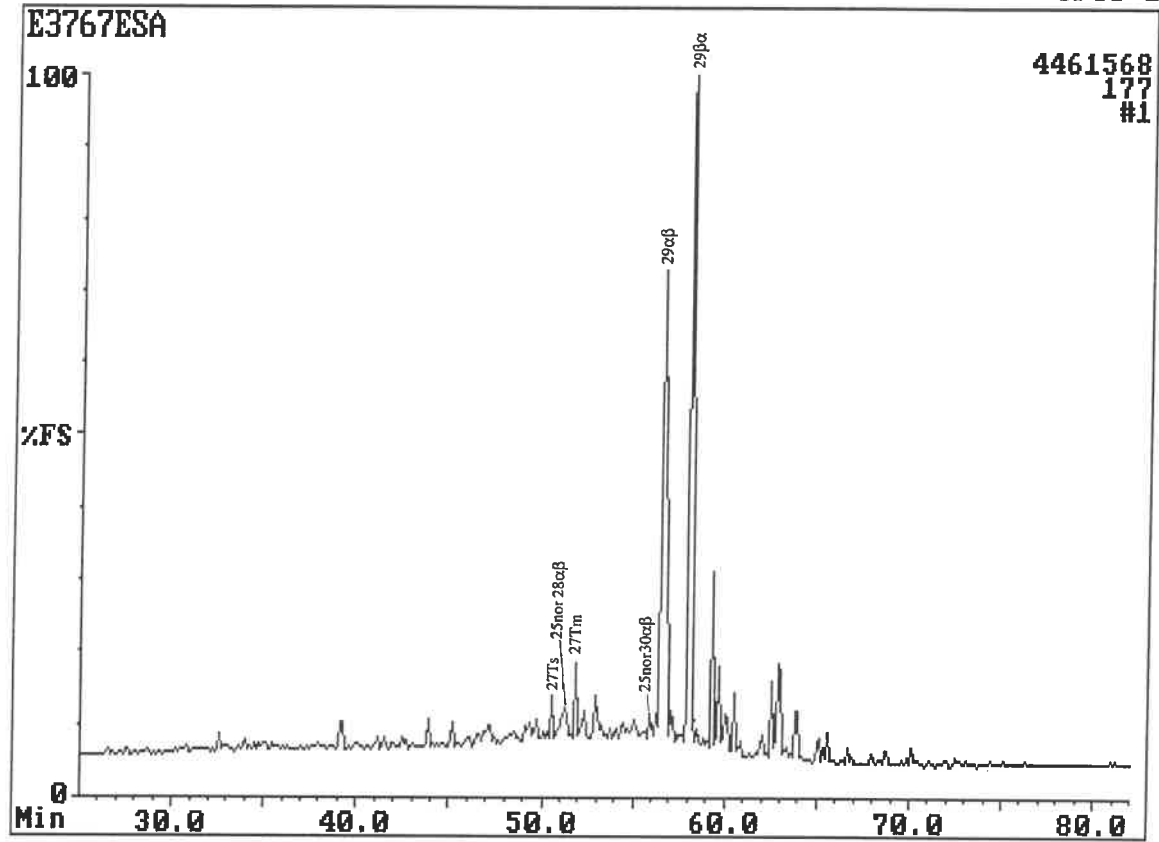
Fisons Instruments TRI0-1000 LAB BASE Data System
7617/11-U-02 147.00m Clst,slty.

Trio-1



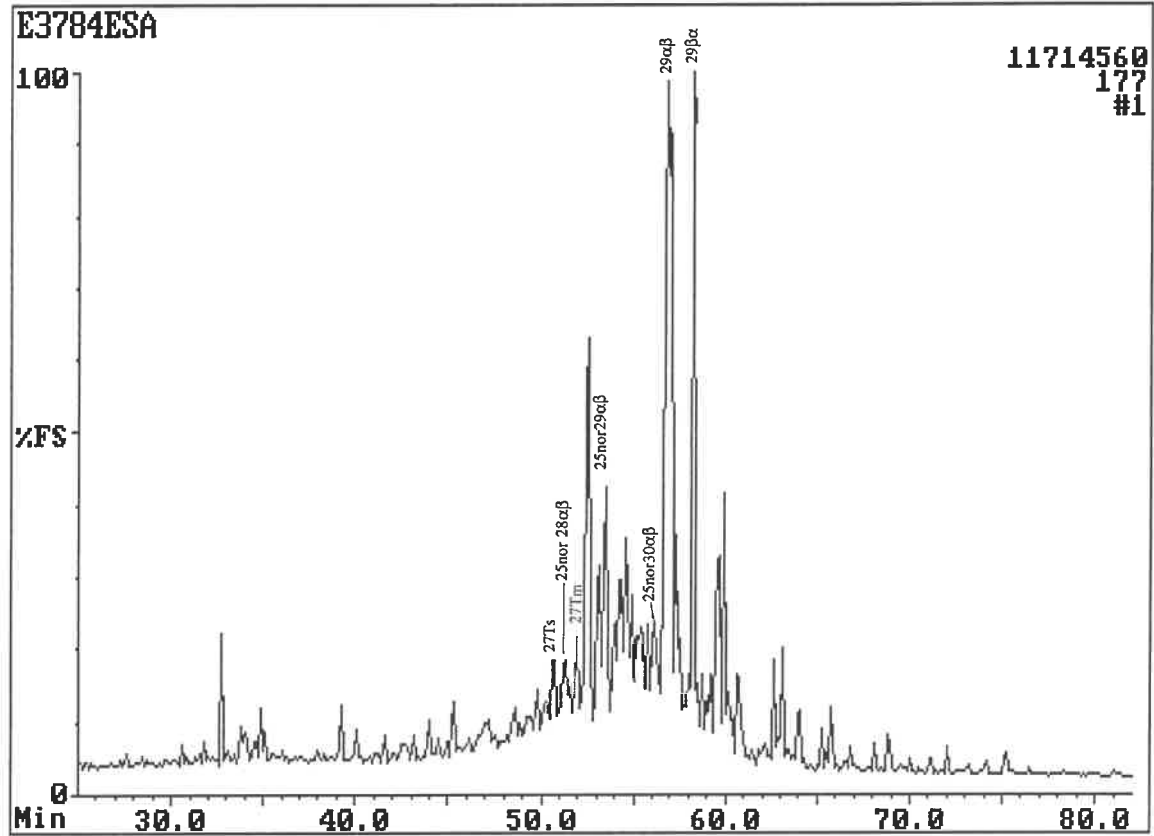
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01(A) 21.68m Clst.

Trio-1



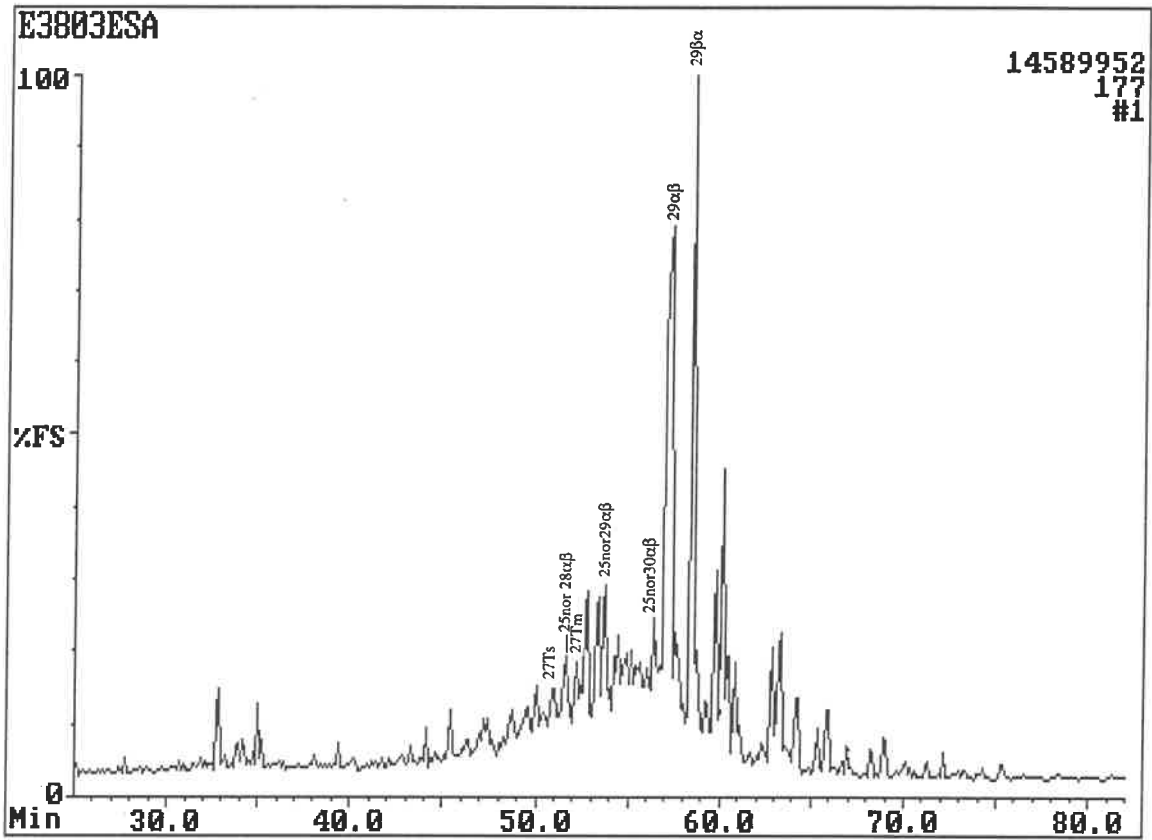
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7418/01-U-01(A) 39.36m Clst.

Trio-1

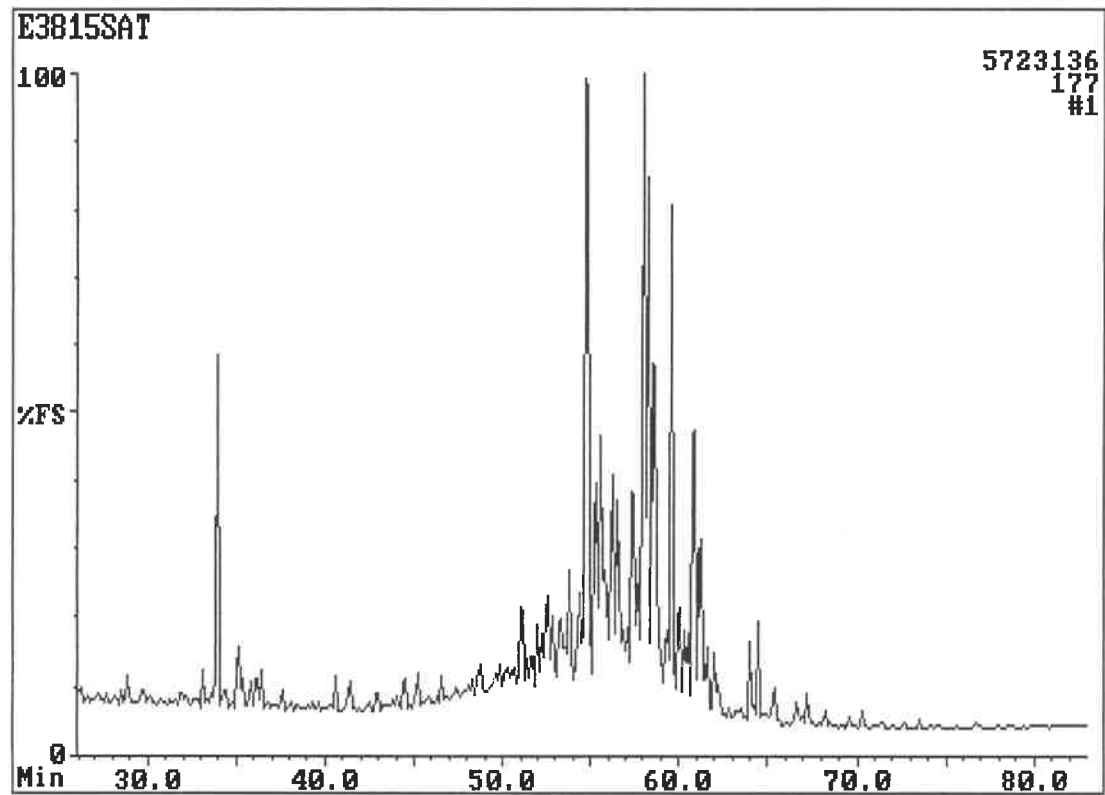


Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01(A) 61.34m Sltst.

Trio-1

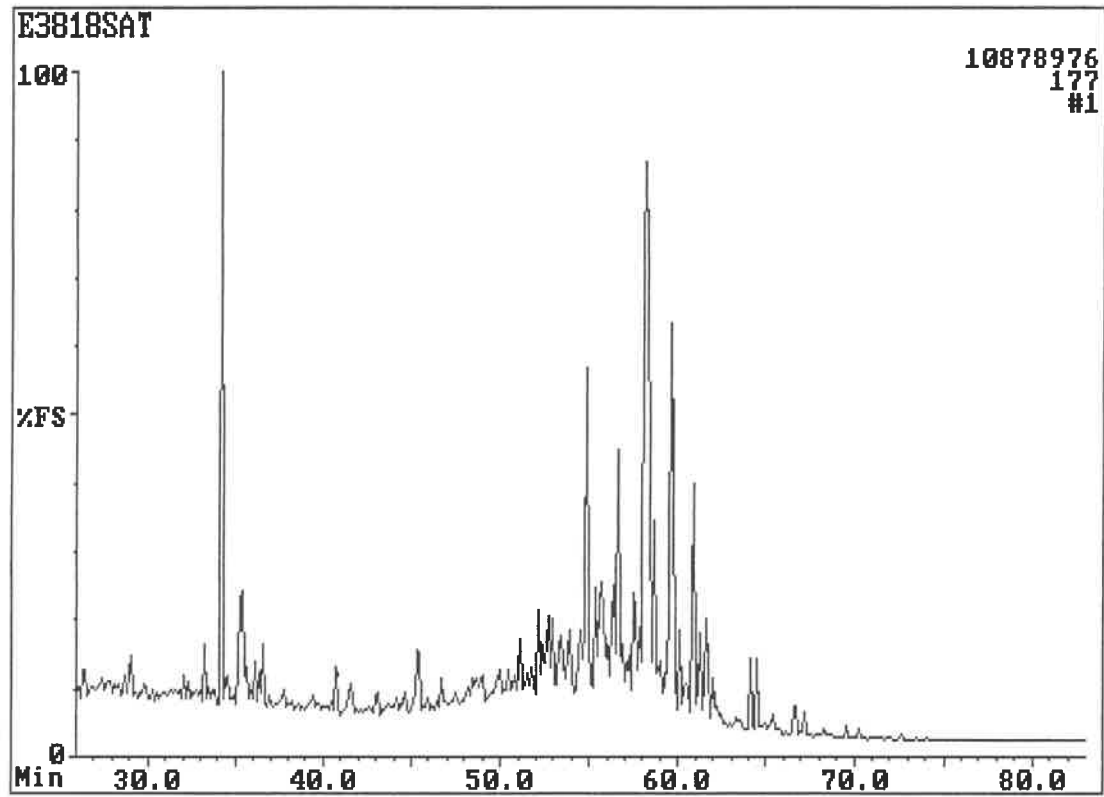


Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 71.44m Trio-1

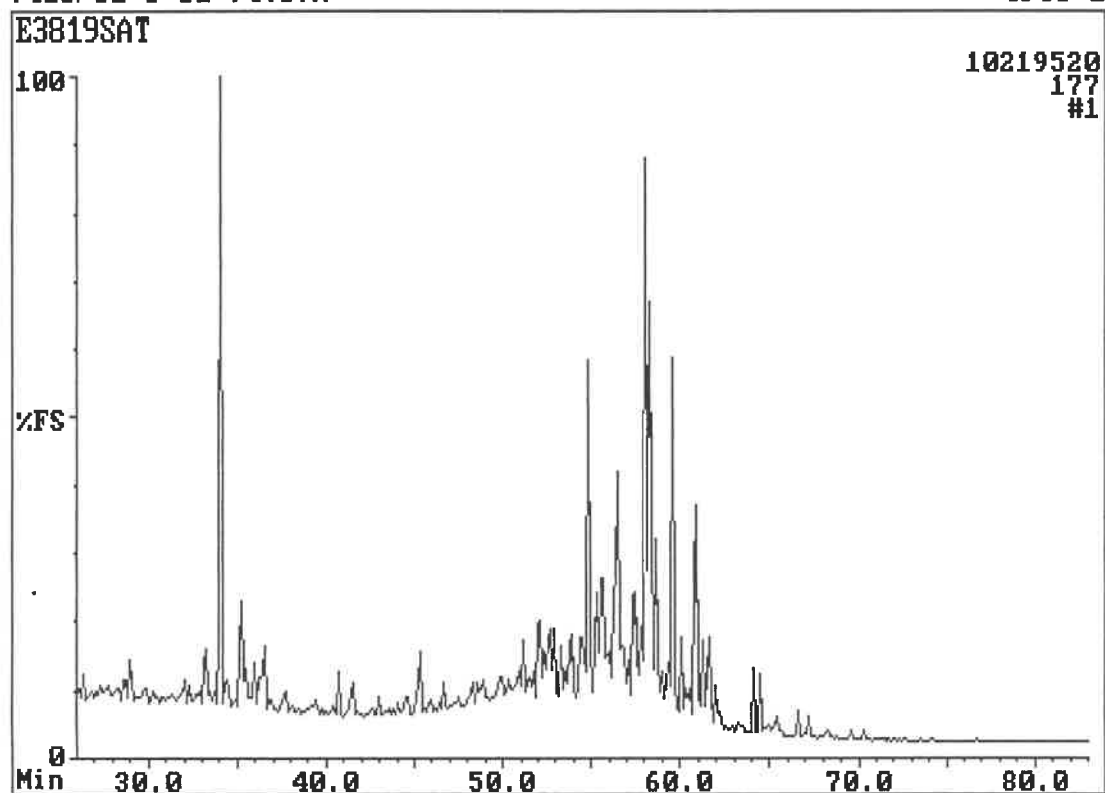


Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1

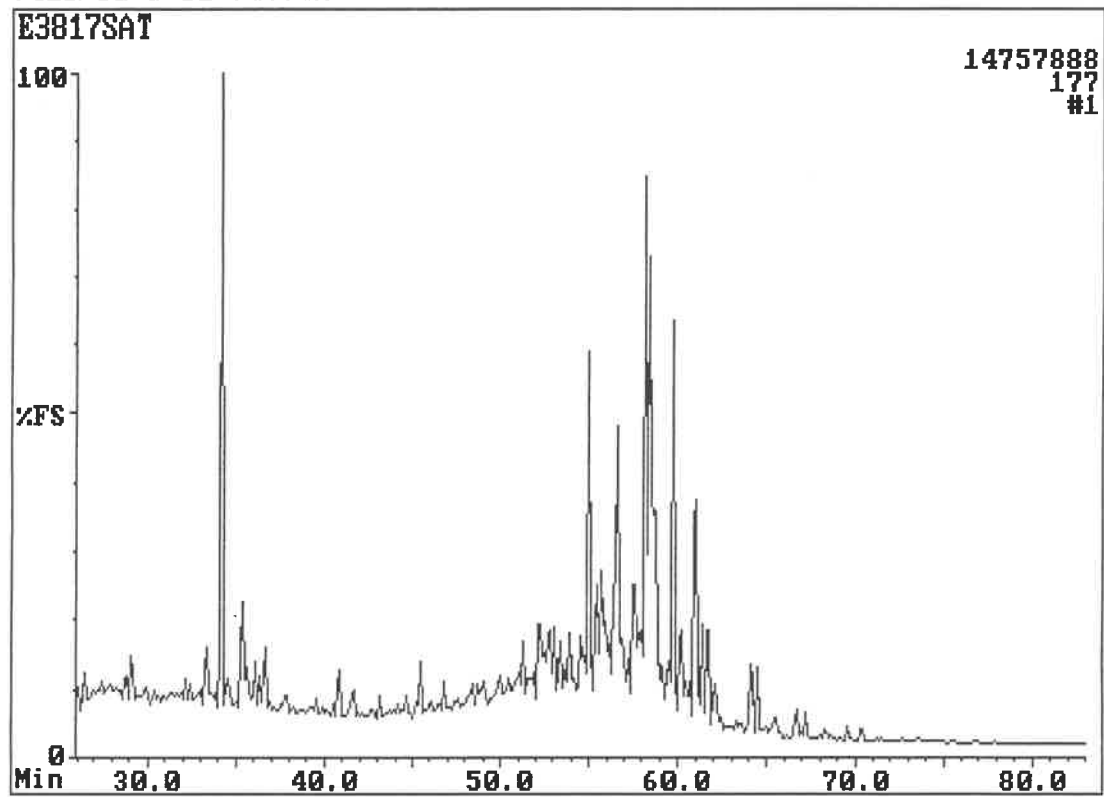


Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.67m Trio-1



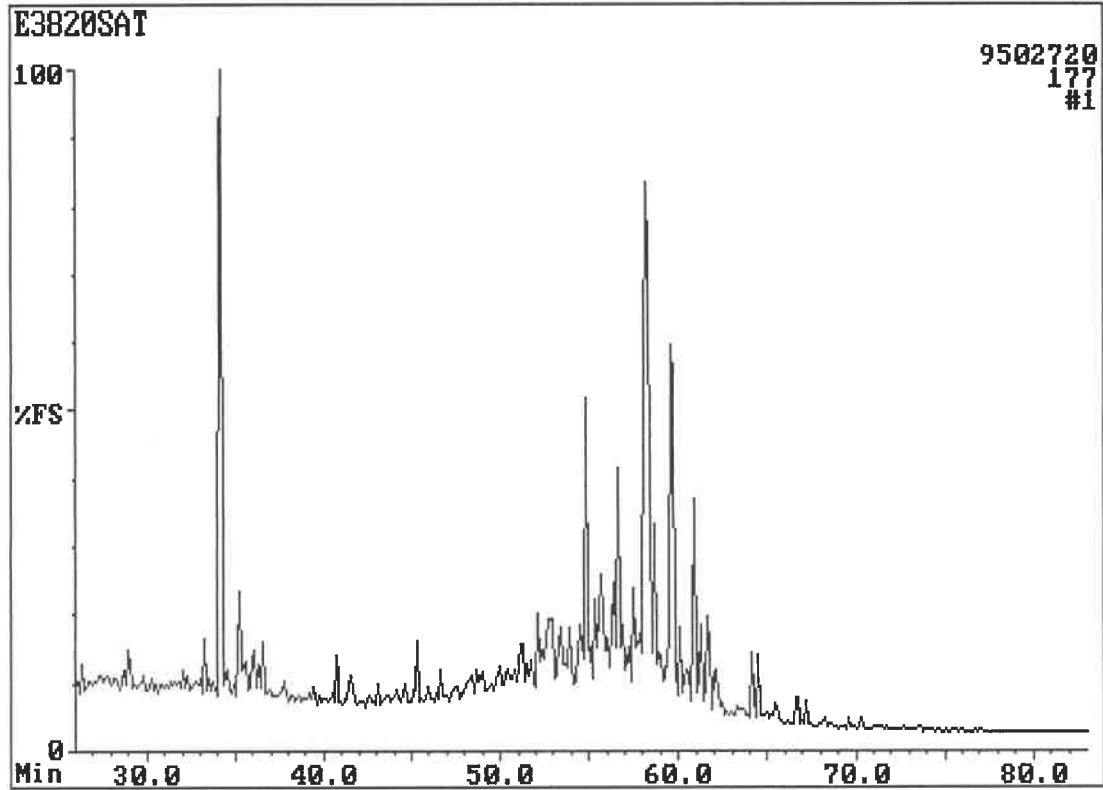
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



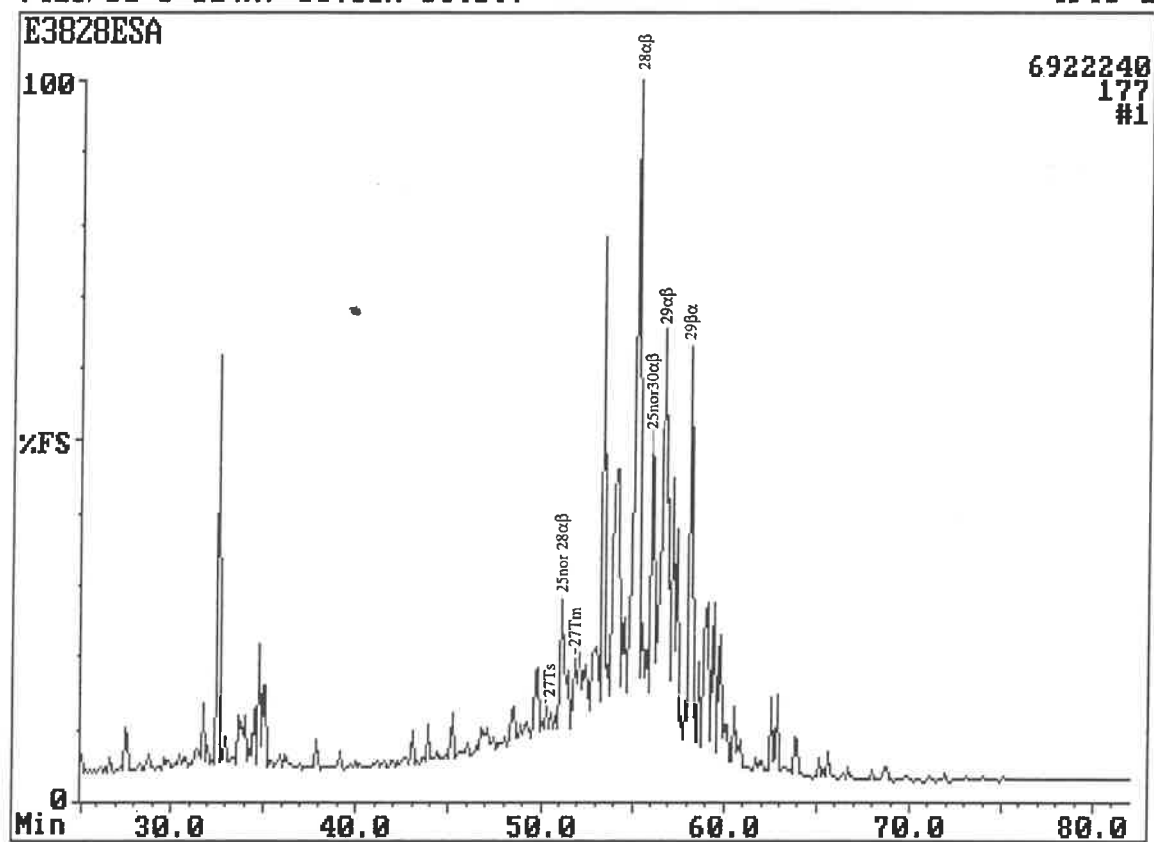
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



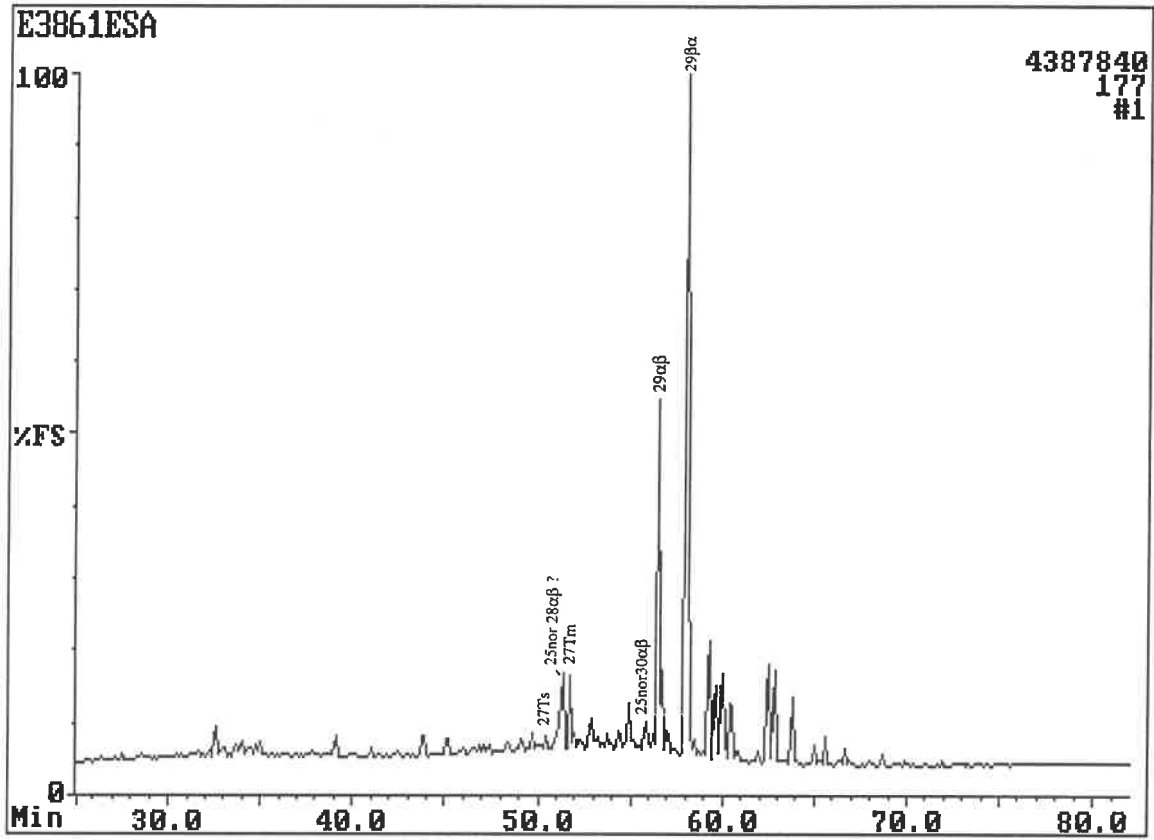
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01(A) 85.00m Slitst.

Trio-1



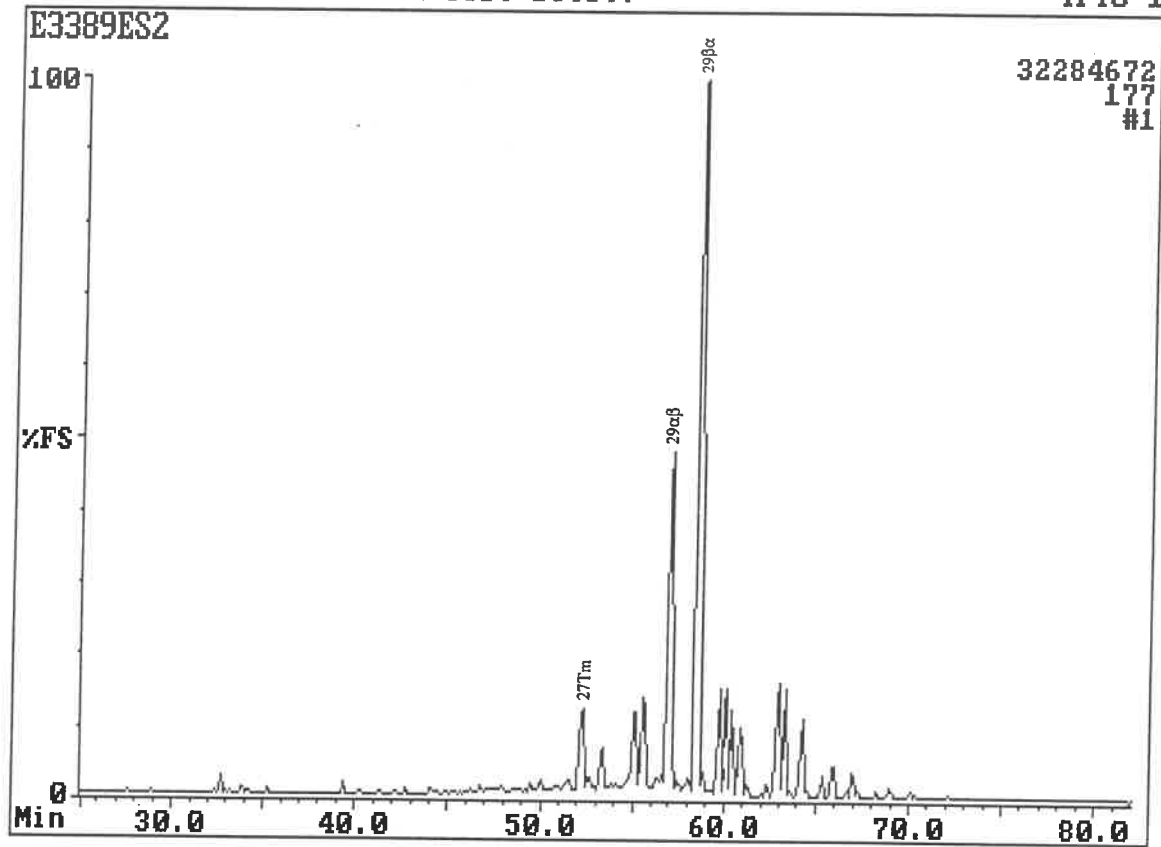
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01(A) 117.81m Slst.

Trio-1



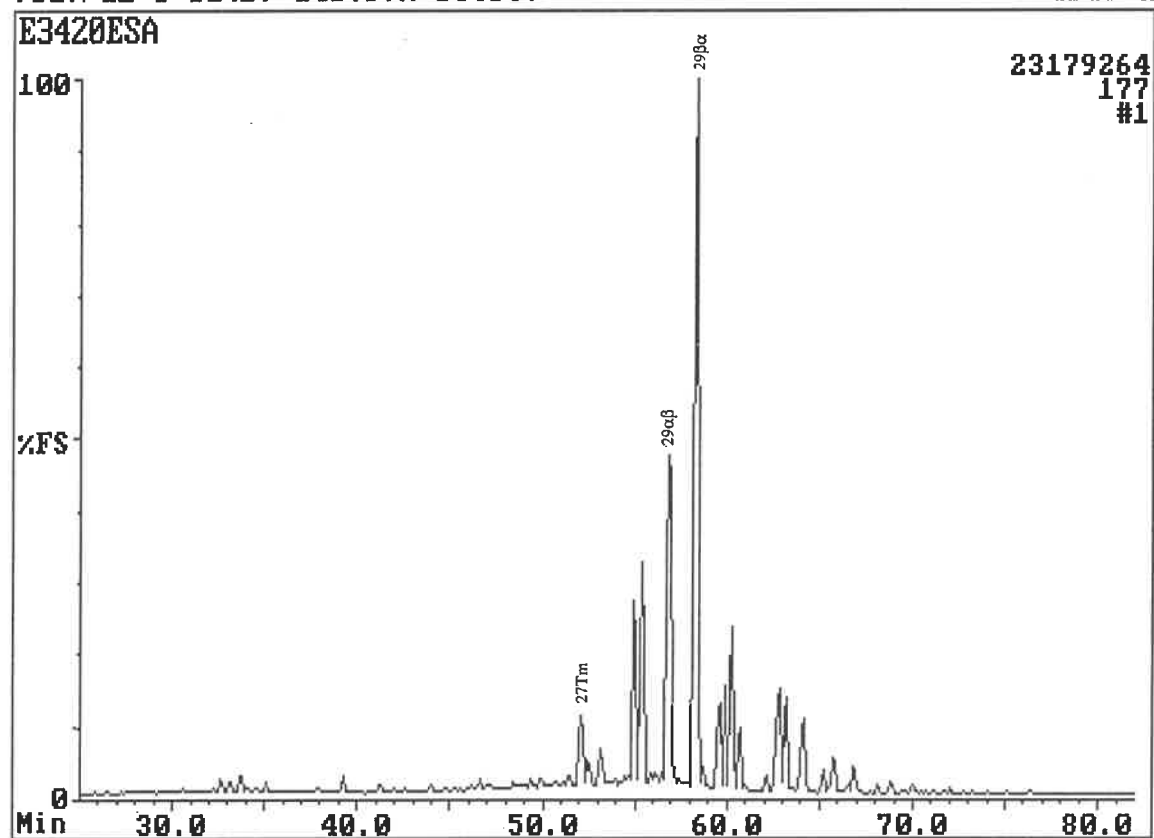
Fisons Instruments TRIO-1000 LAB BASE Data System
7517/12-U-01(B) 111.15m Clst-sltst.

Trio-1



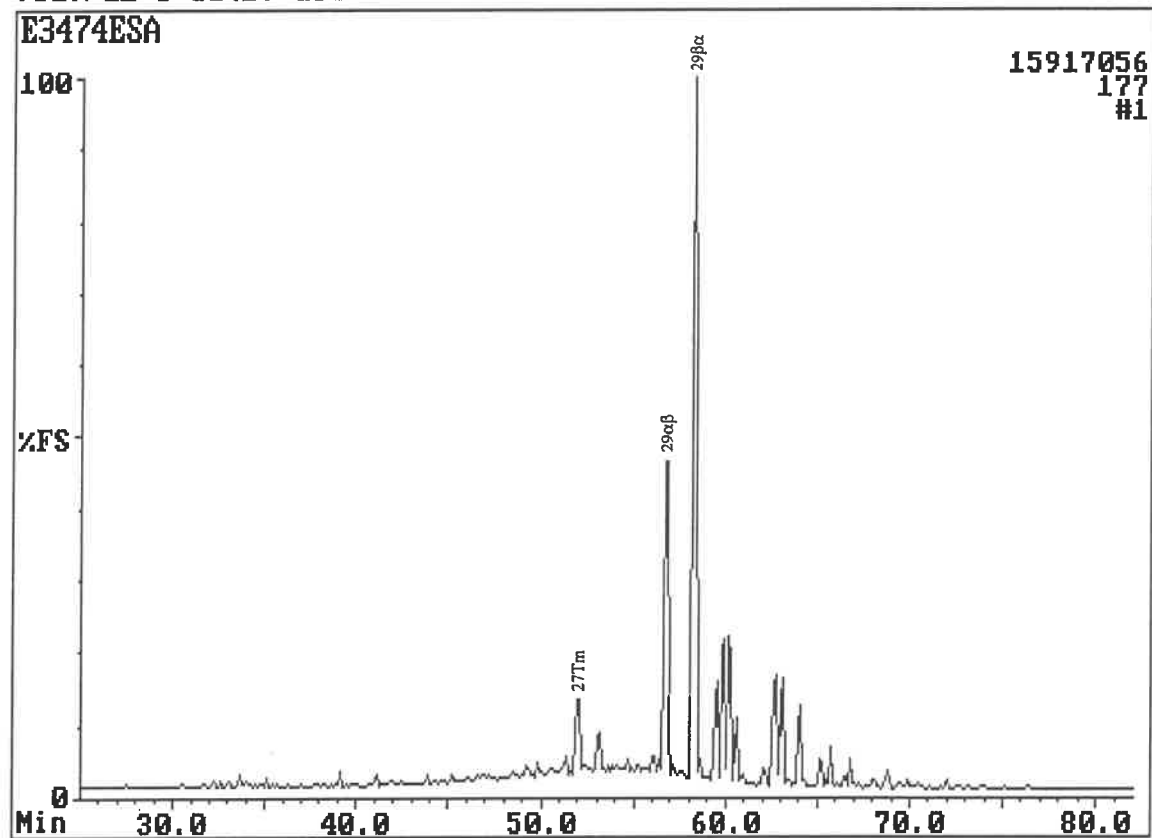
Fisons Instruments TRI0-1000 LAB BASE Data System
7517/12-U-01(B) 143.97m Sltst.

Trio-1



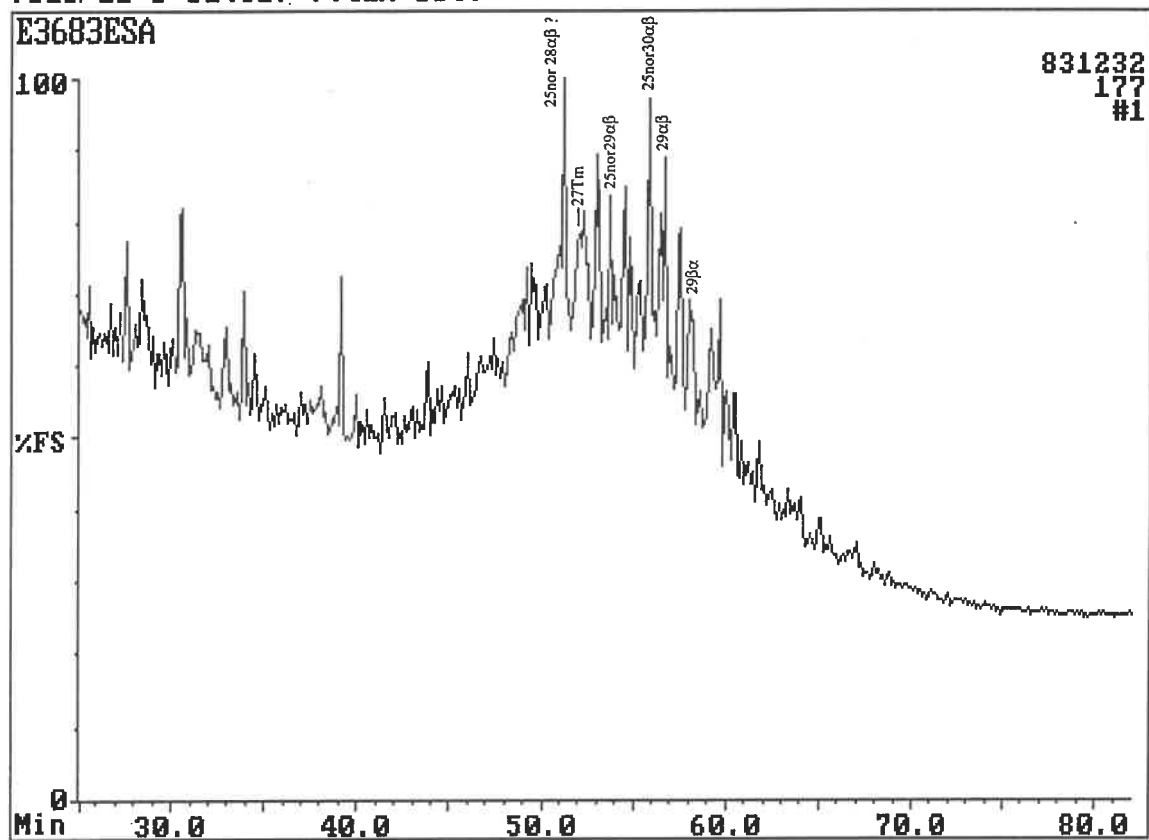
Fisons Instruments TRIO-1000 LAB BASE Data System
7517/12-U-01(B) 198.68m Sltst.

Trio-1



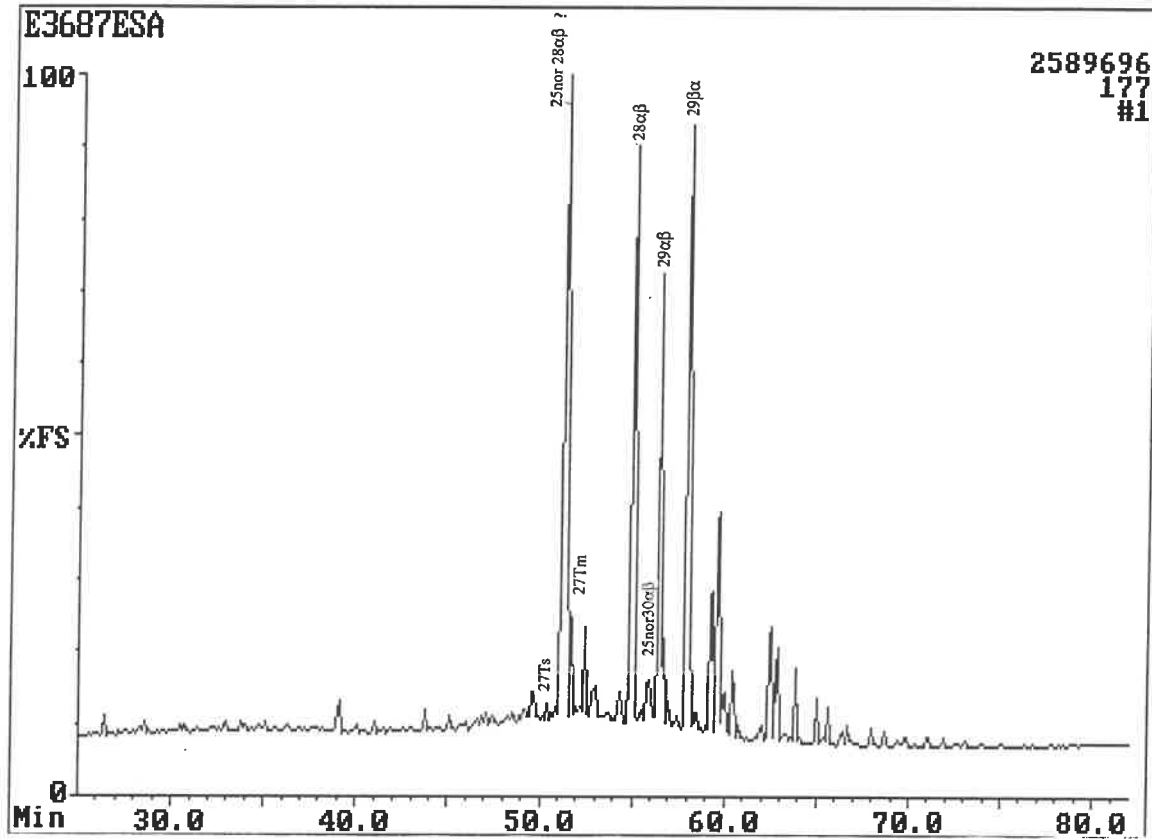
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 7.41m Sst.

Trio-1



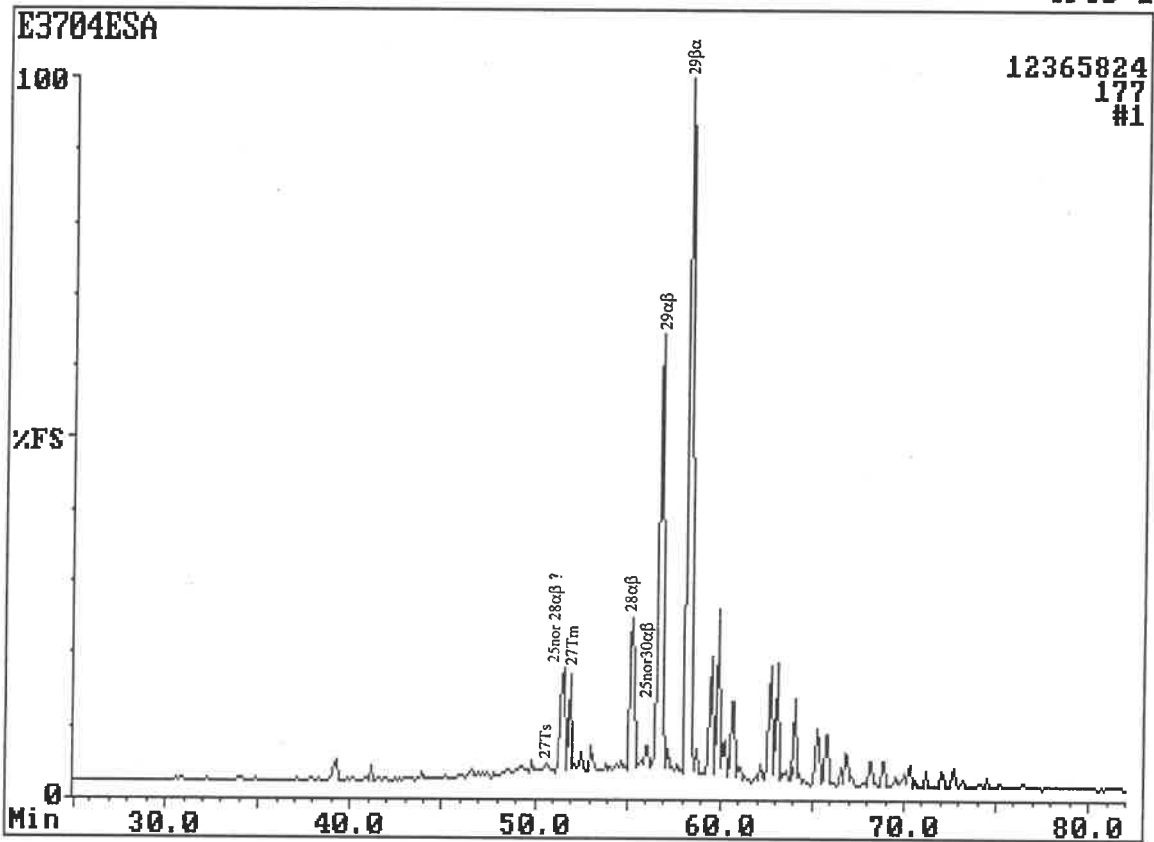
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 13.15m Sst.

Trio-1



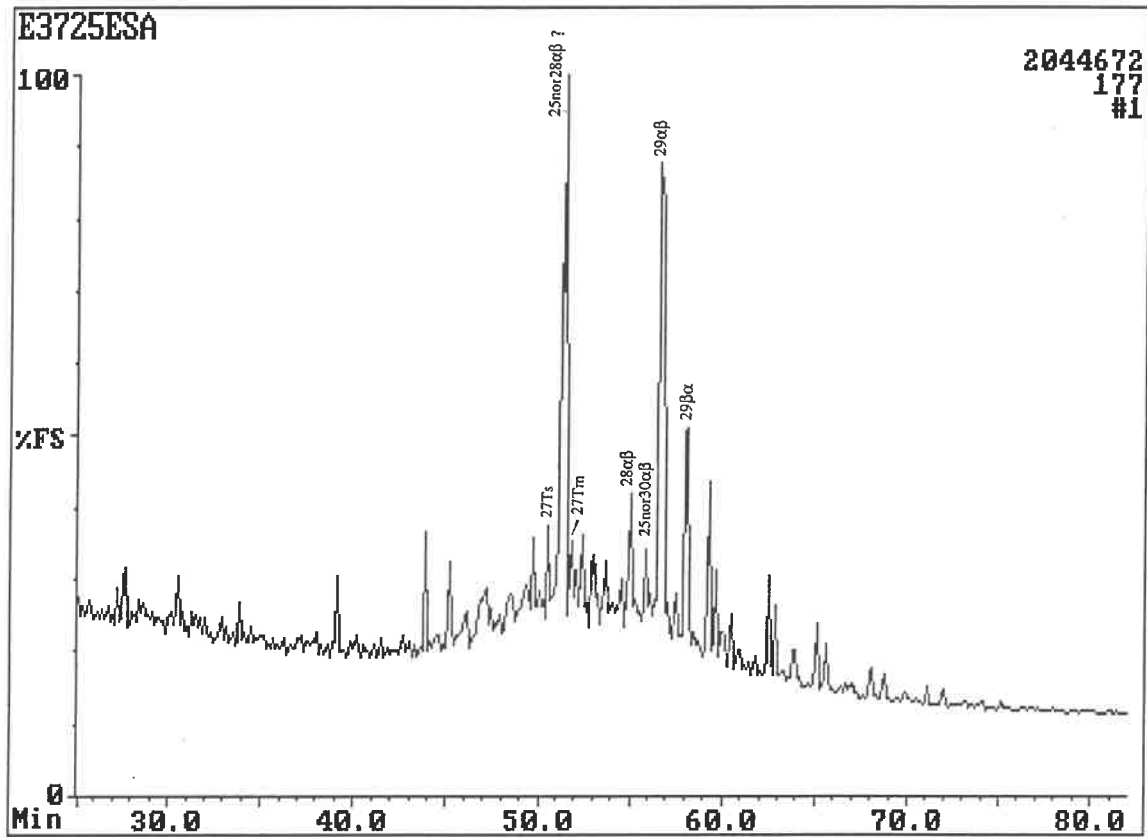
Fisons Instruments TRIO-1000 LAB BASE Data System
7616/11-U-01(C1) 36.21m Slstst.

Trio-1



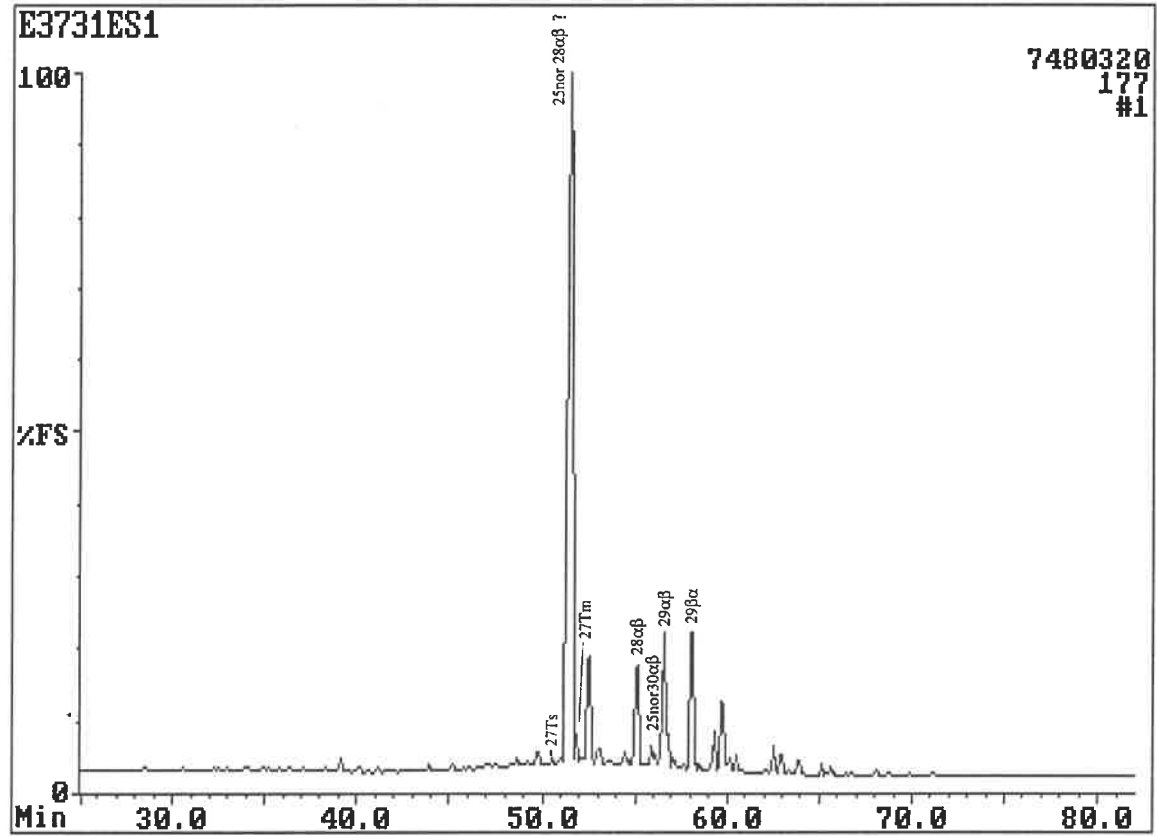
Fisons Instruments TRI0-1000 LAB BASE Data System
7616/11-U-01(C1) 56.25m Sst.

Trio-1



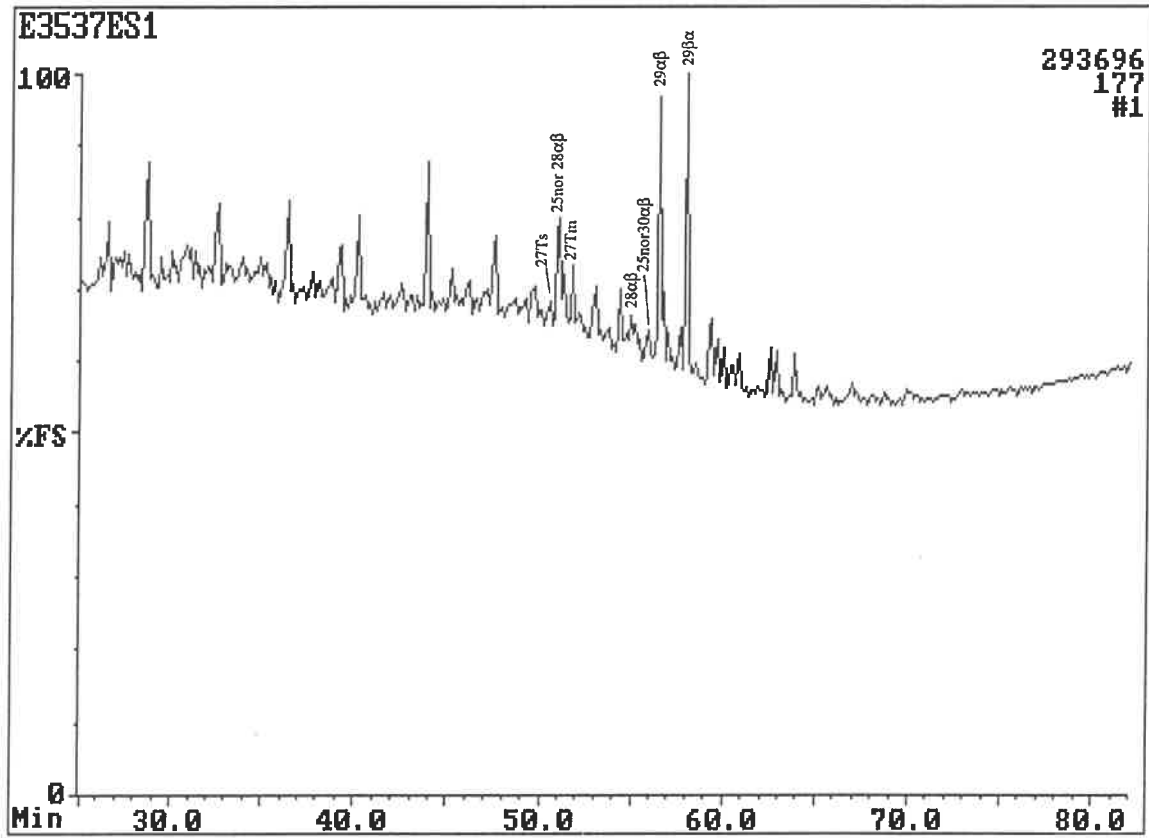
Fisons Instruments TRI0-1000 LAB BASE Data System
7616/11-U-01(C1) 65.08m Sst.

Trio-1



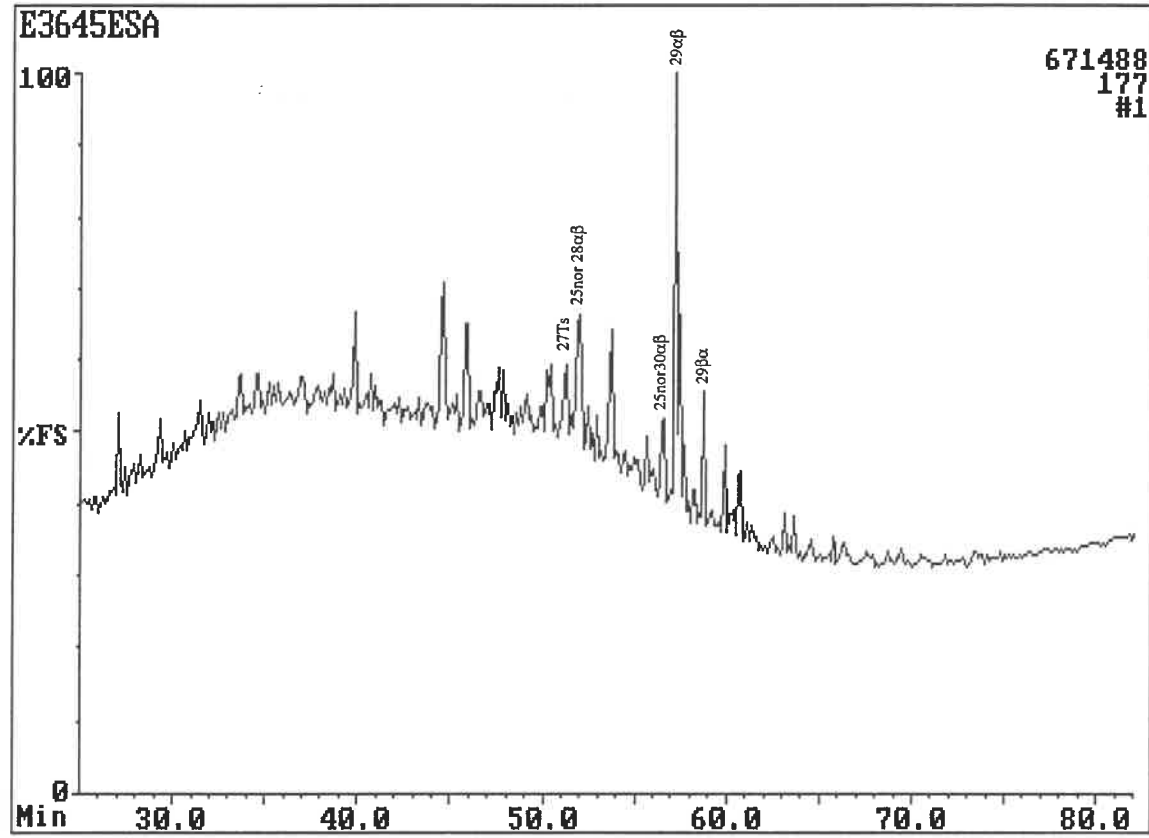
Fisons Instruments TRIO-1000 LAB BASE Data System
7617/11-U-02(D2) 23.45m Slst.

Trio-1



Fisons Instruments TRI0-1000 LAB BASE Data System
7617/11-U-02 117.80m Sl1st.

Trio-1



Fisons Instruments TRIO-1000 LAB BASE Data System
7617/11-U-02 147.00m Clst,slty.

Trio-1

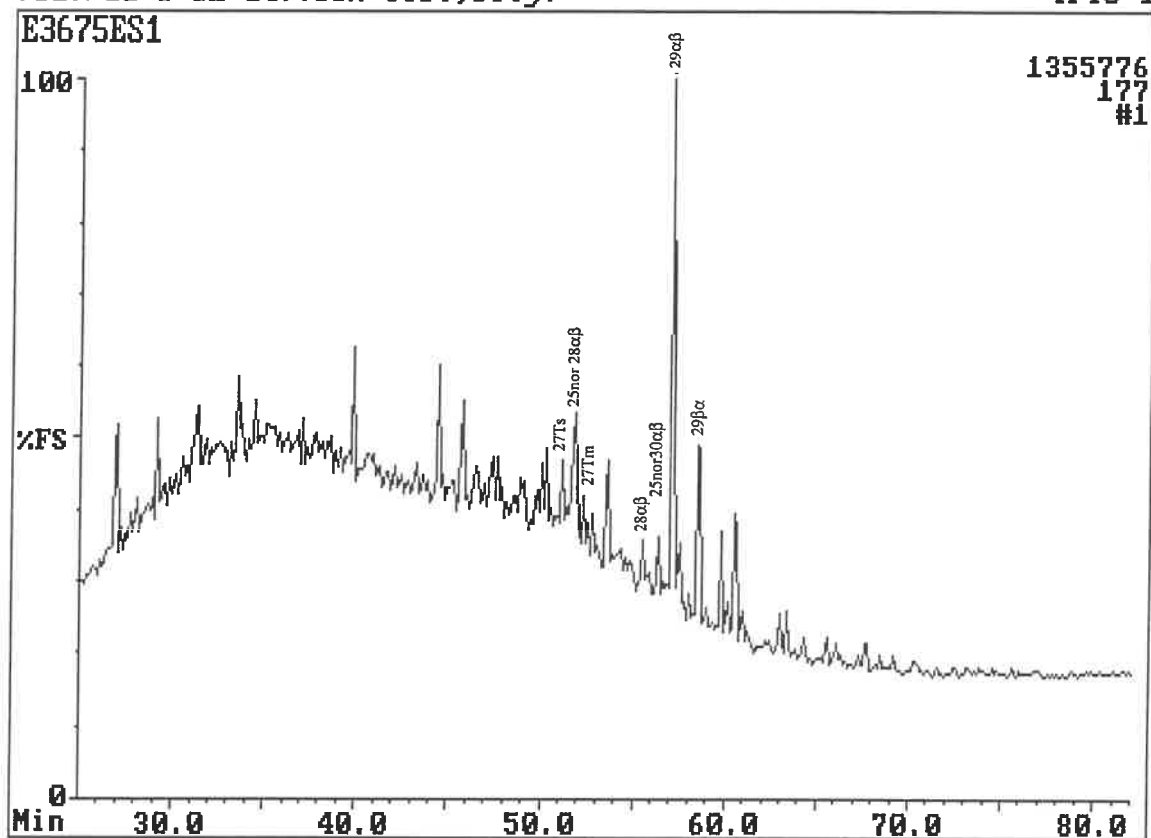


Figure A.6

GC-MS Fragmentograms

of

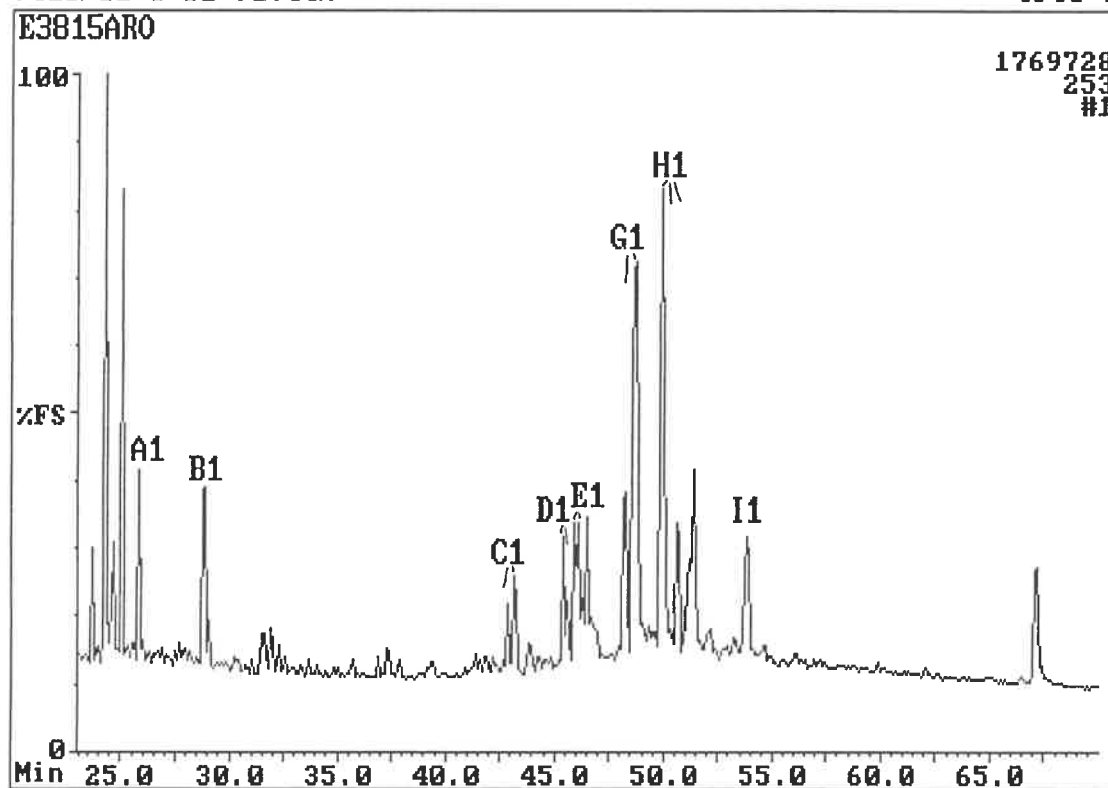
Aromatic Hydrocarbons

(m/z 142, 156, 178, 184, 192, 198, 231, 253)

Peak code	Identification
Key for m/z 231 (tri-aromatic steroids):	
a1	C ₂₀ tri-aromatic steroid
b1	C ₂₁ tri-aromatic steroid
c1	C ₂₆ tri-aromatic steroid
d1	C ₂₆ +C ₂₇ tri-aromatic steroids
e1	C ₂₈ tri-aromatic steroid
f1	C ₂₇ tri-aromatic steroid
g1	C ₂₈ tri-aromatic steroid
Key for m/z 253 (mono-aromatic steroids):	
A1	C ₂₁ mono-aromatic steroid
B1	C ₂₂ mono-aromatic steroid
C1	C ₂₇ mono-aromatic steroid
D1	C ₂₇ mono-aromatic steroid
E1	C ₂₈ mono-aromatic steroid
F1	C ₂₇ +C ₂₈ mono-aromatic steroids
G1	C ₂₈ +C ₂₉ mono-aromatic steroids
H1	C ₂₈ +C ₂₉ mono-aromatic steroids
I1	C ₂₉ mono-aromatic steroid

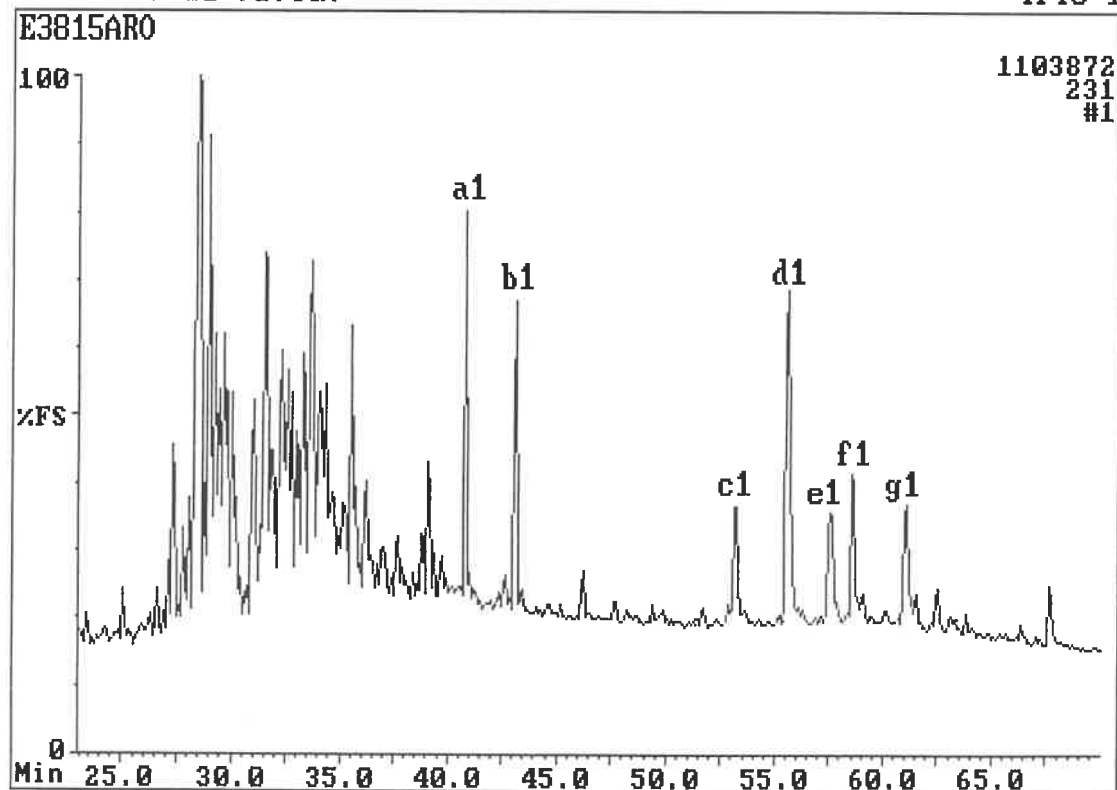
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 71.44m

Trio-1



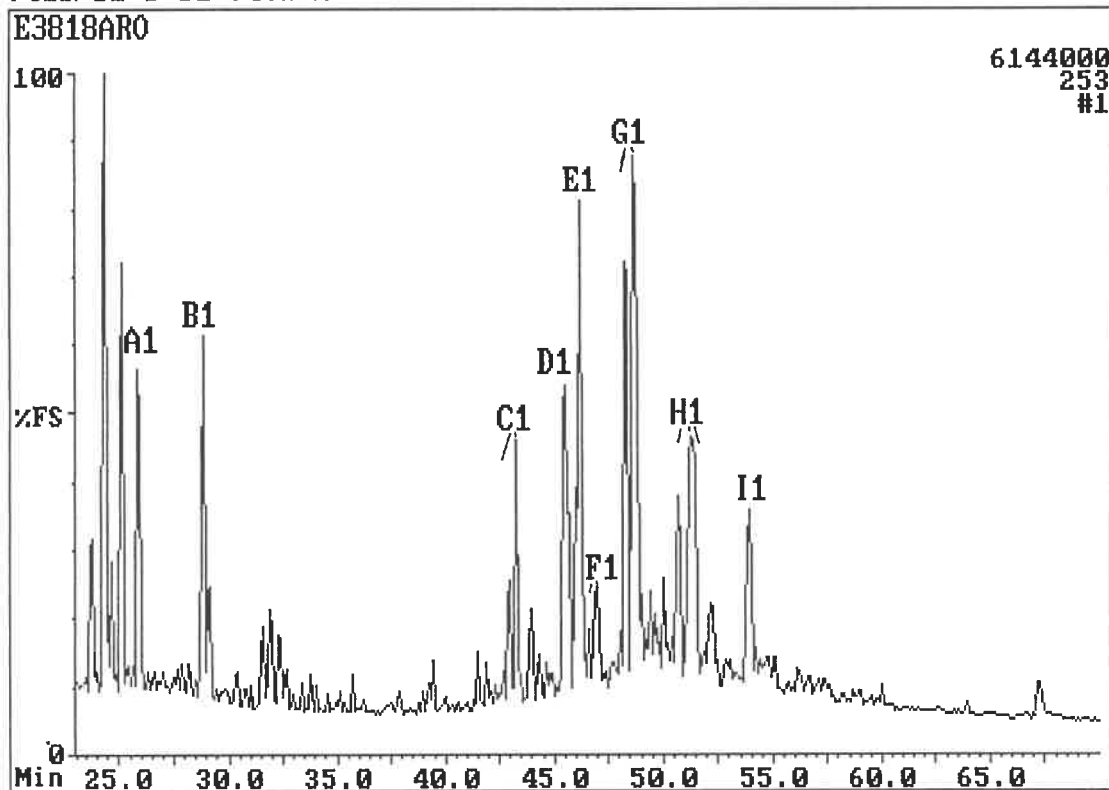
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 71.44m

Trio-1



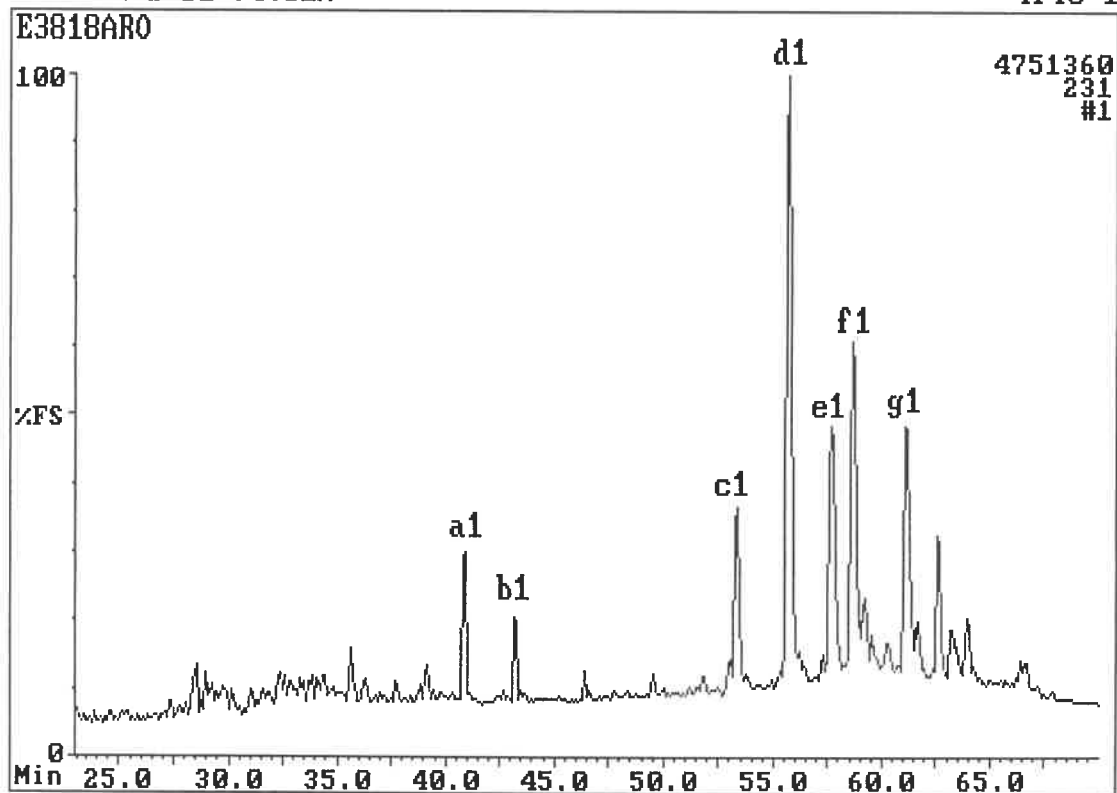
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



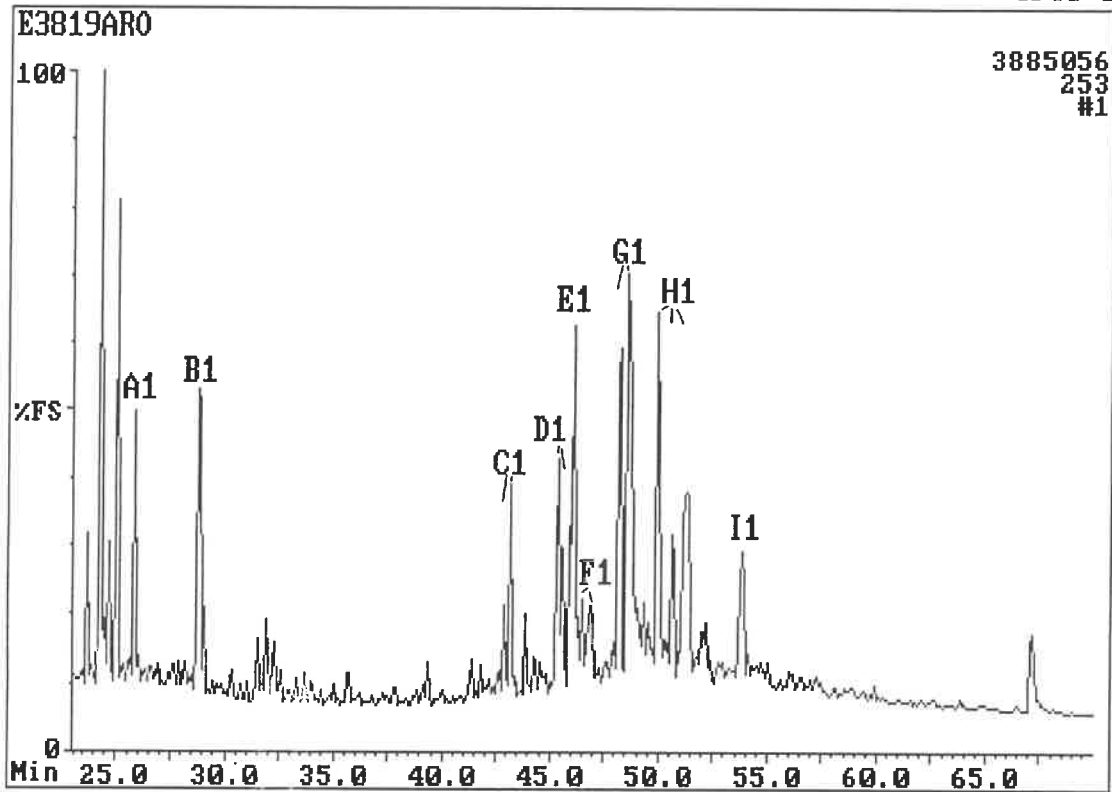
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



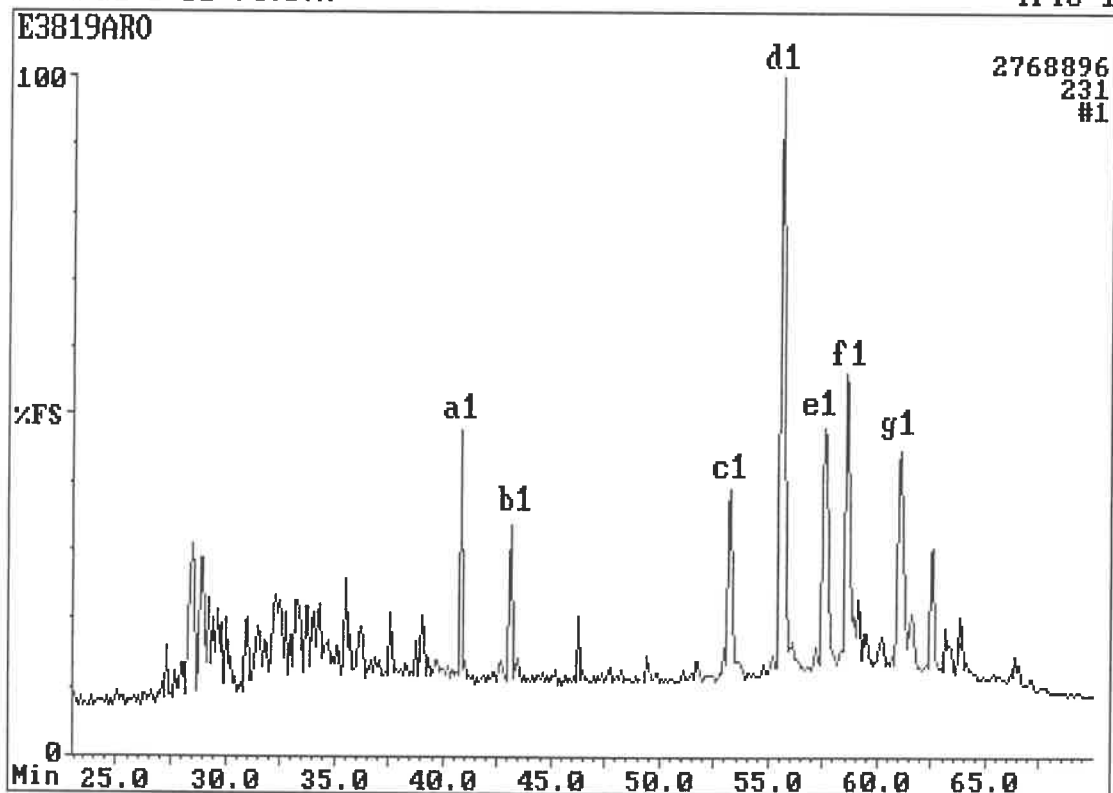
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.67m

Trio-1



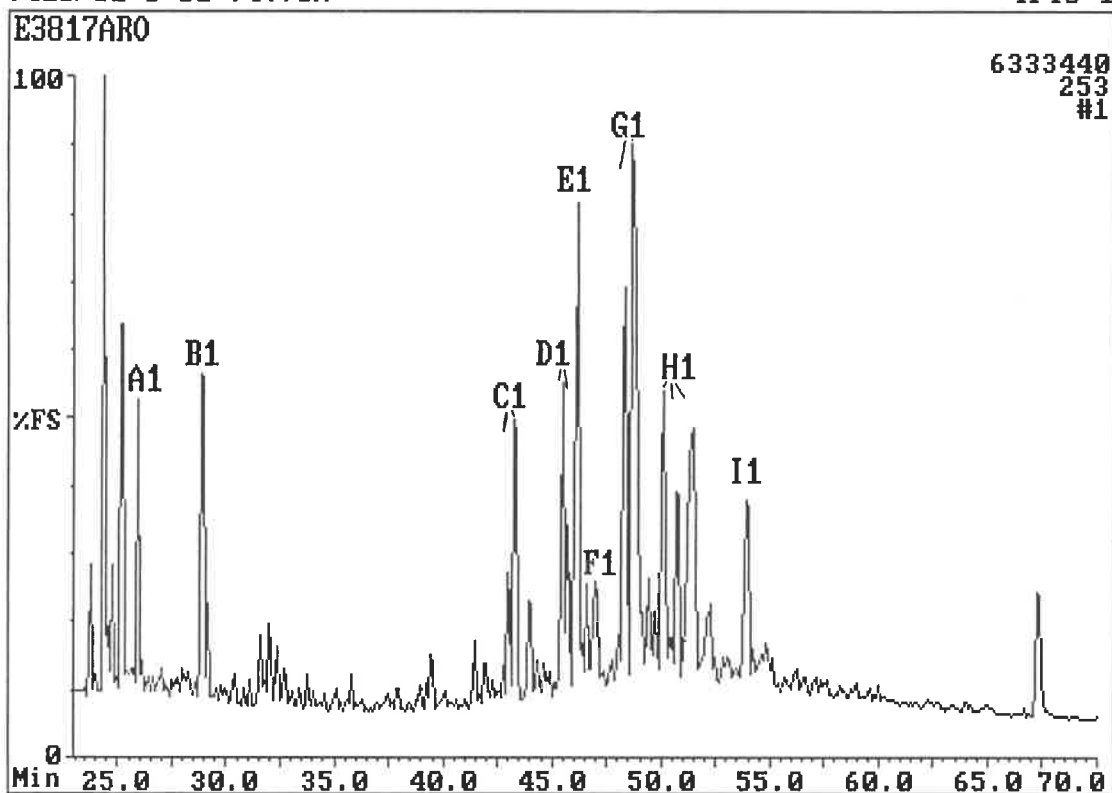
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.67m

Trio-1



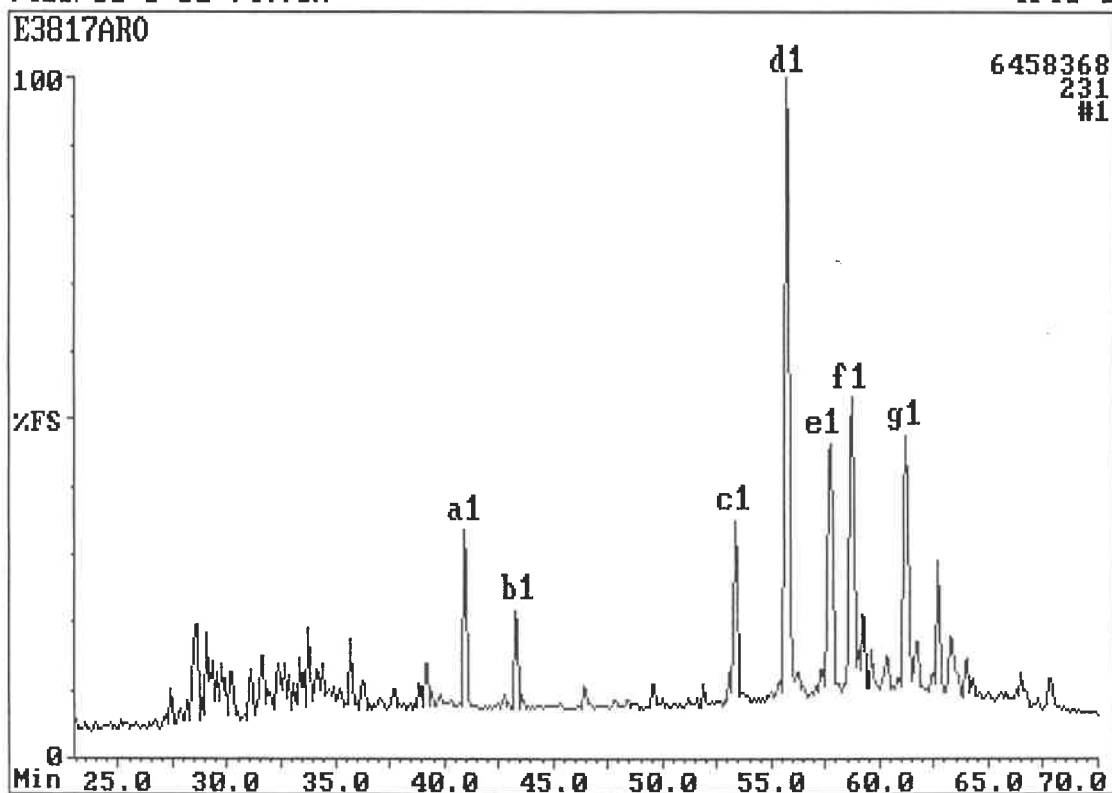
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



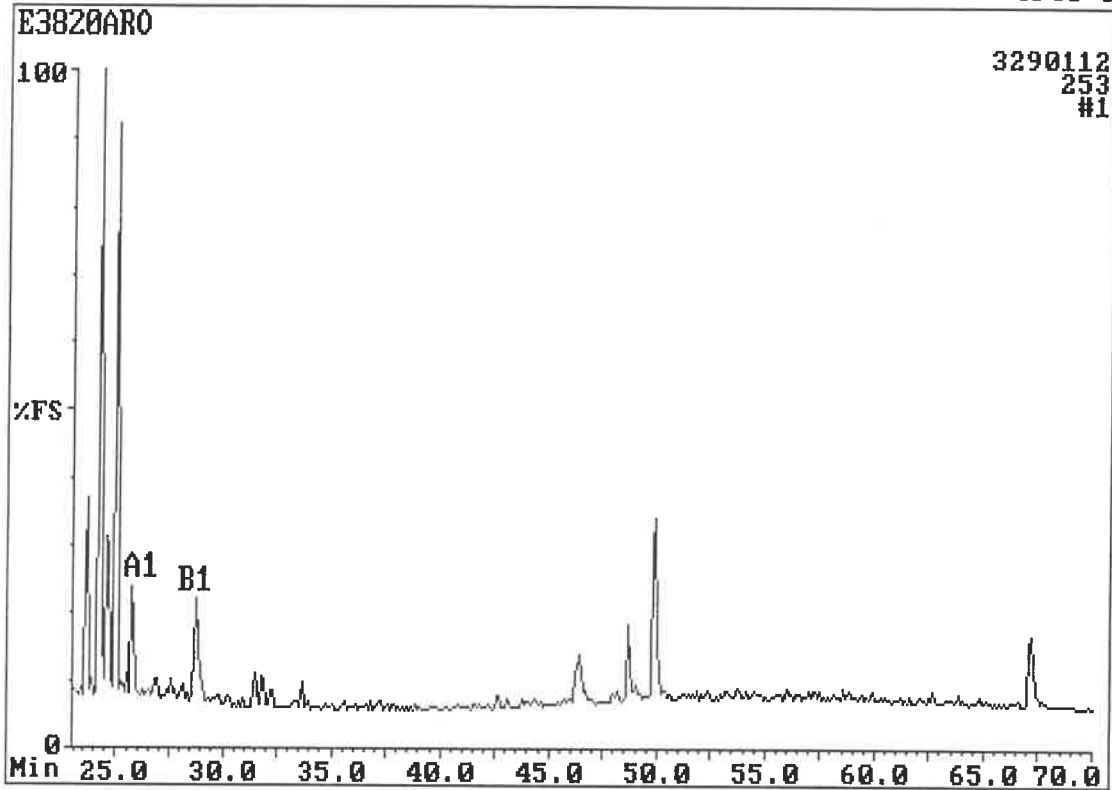
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



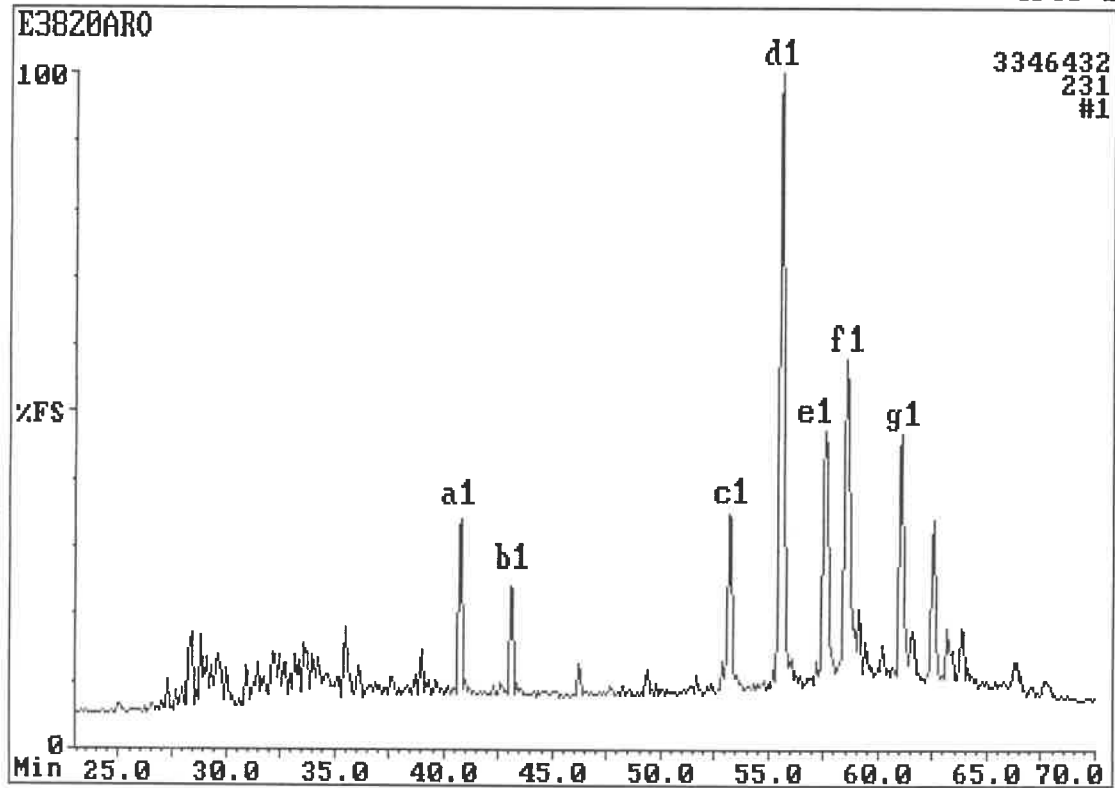
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



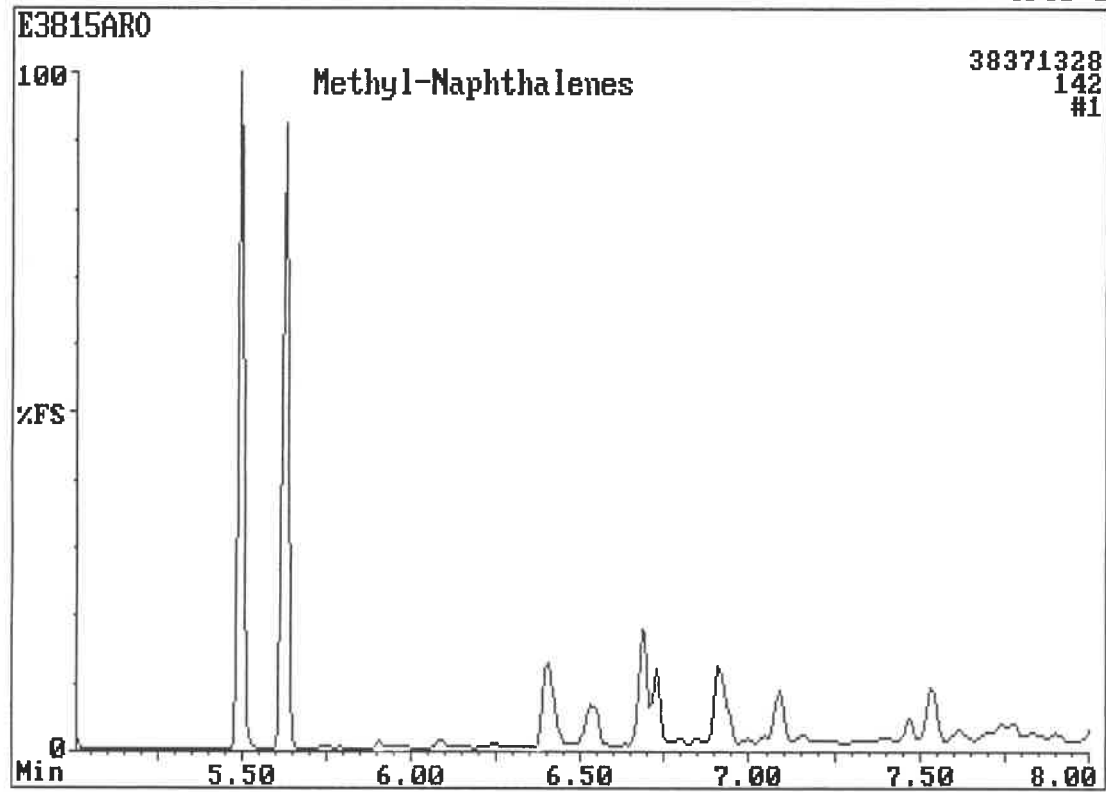
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



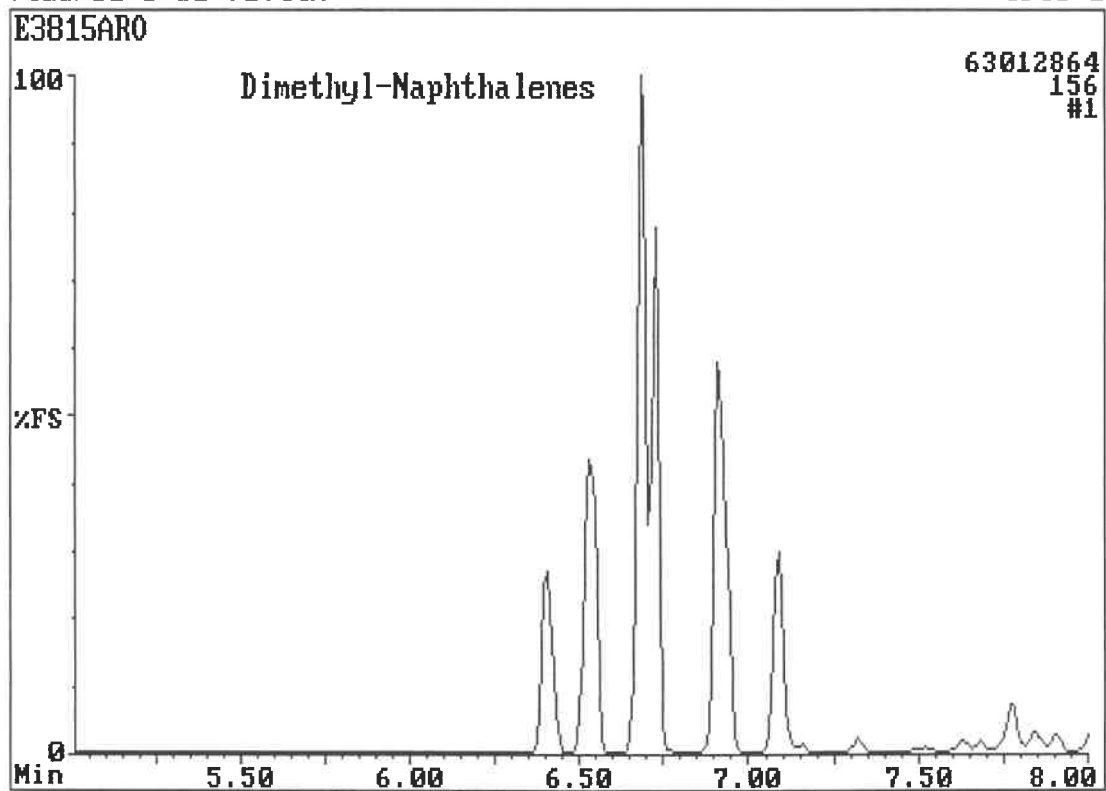
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 71.44m

Trio-1



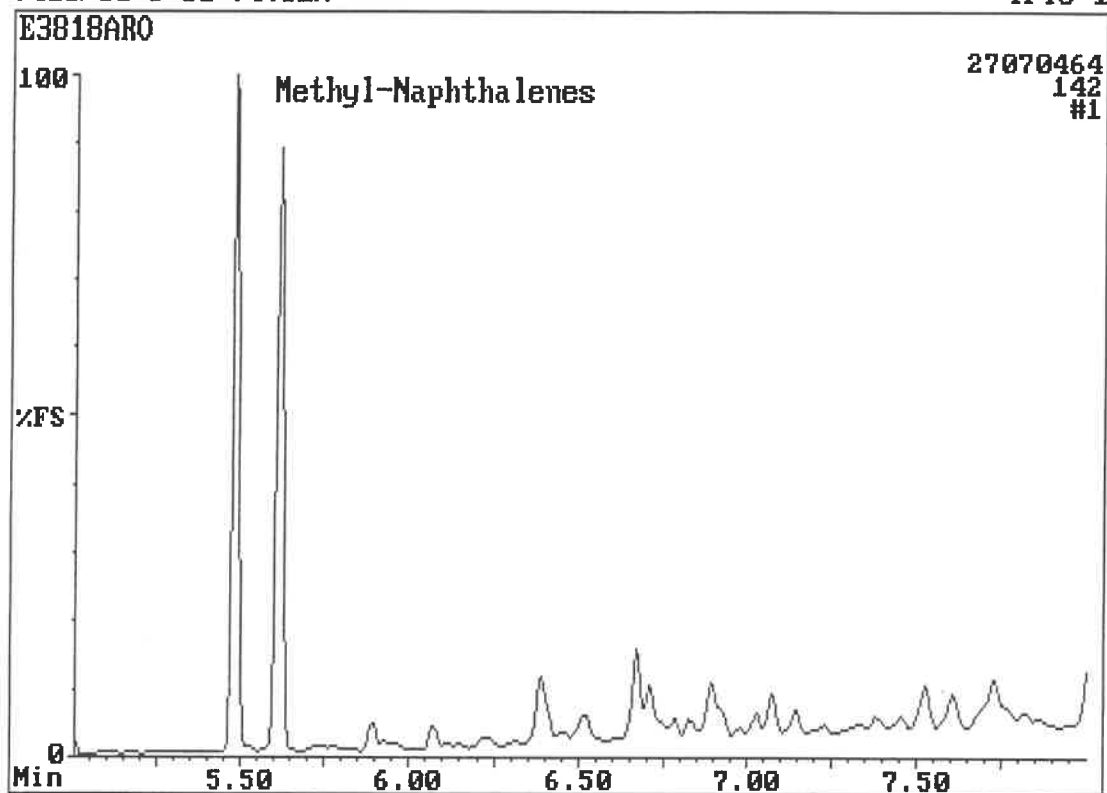
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 71.44m

Trio-1



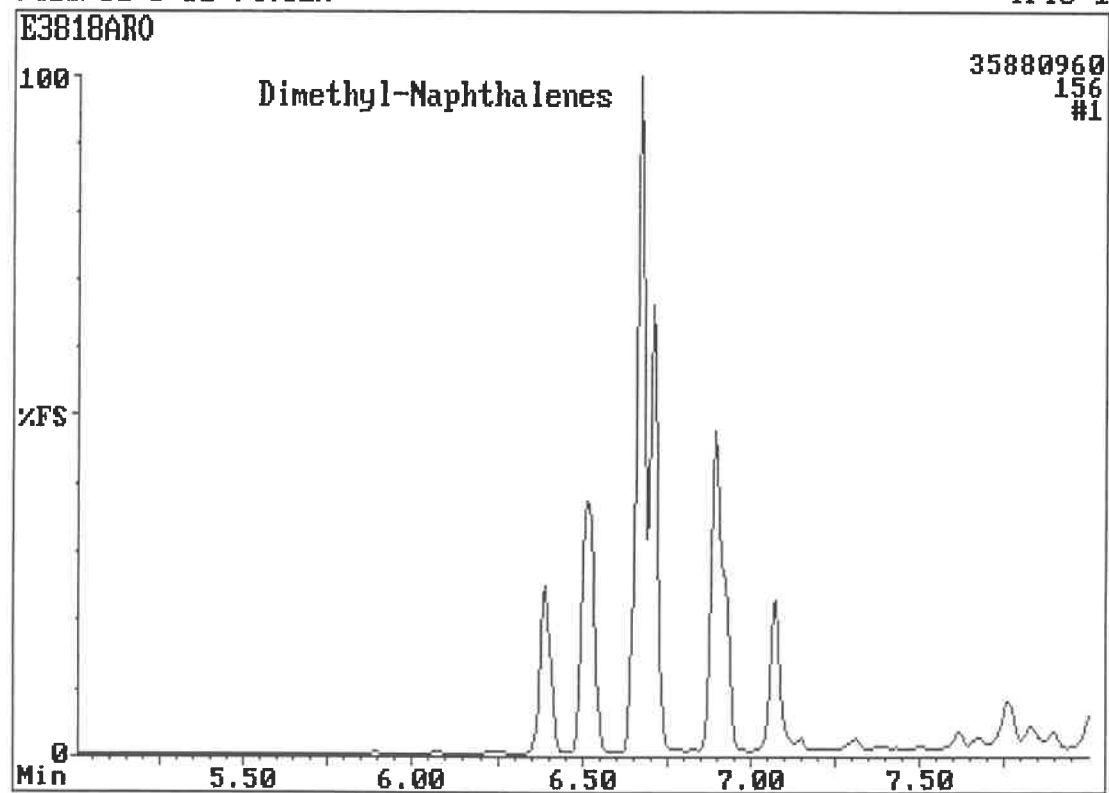
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



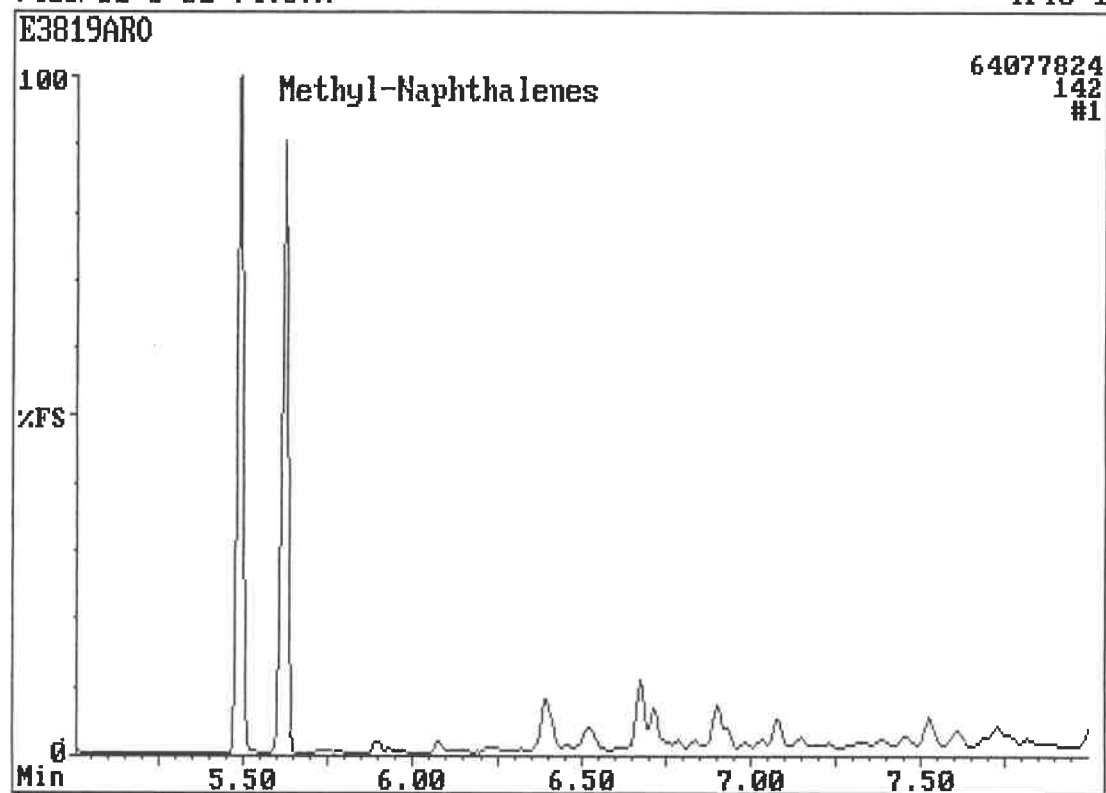
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



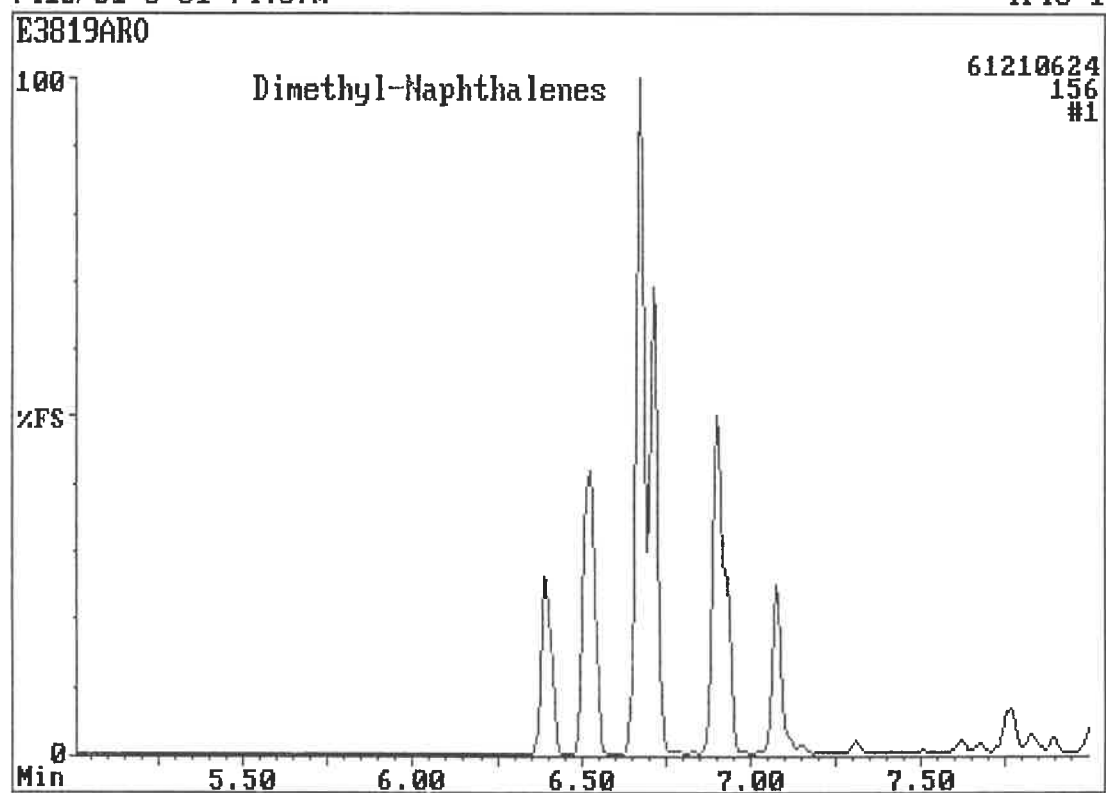
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.67m

Trio-1



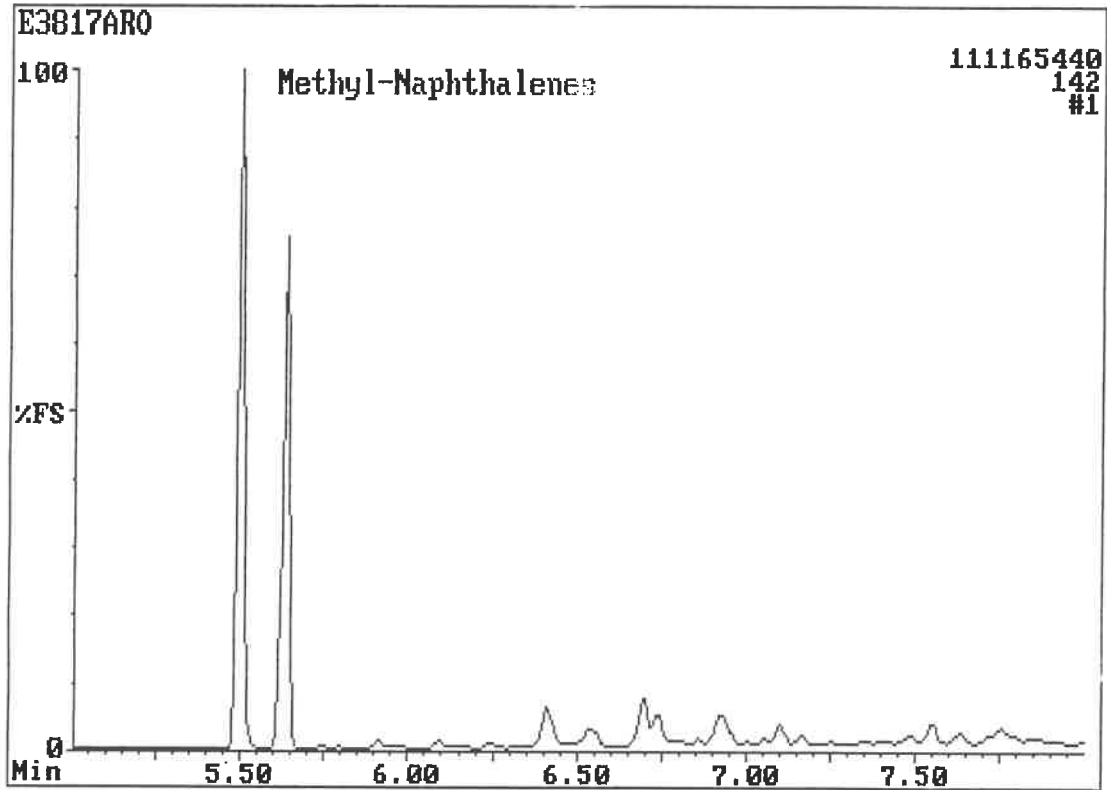
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.67m

Trio-1



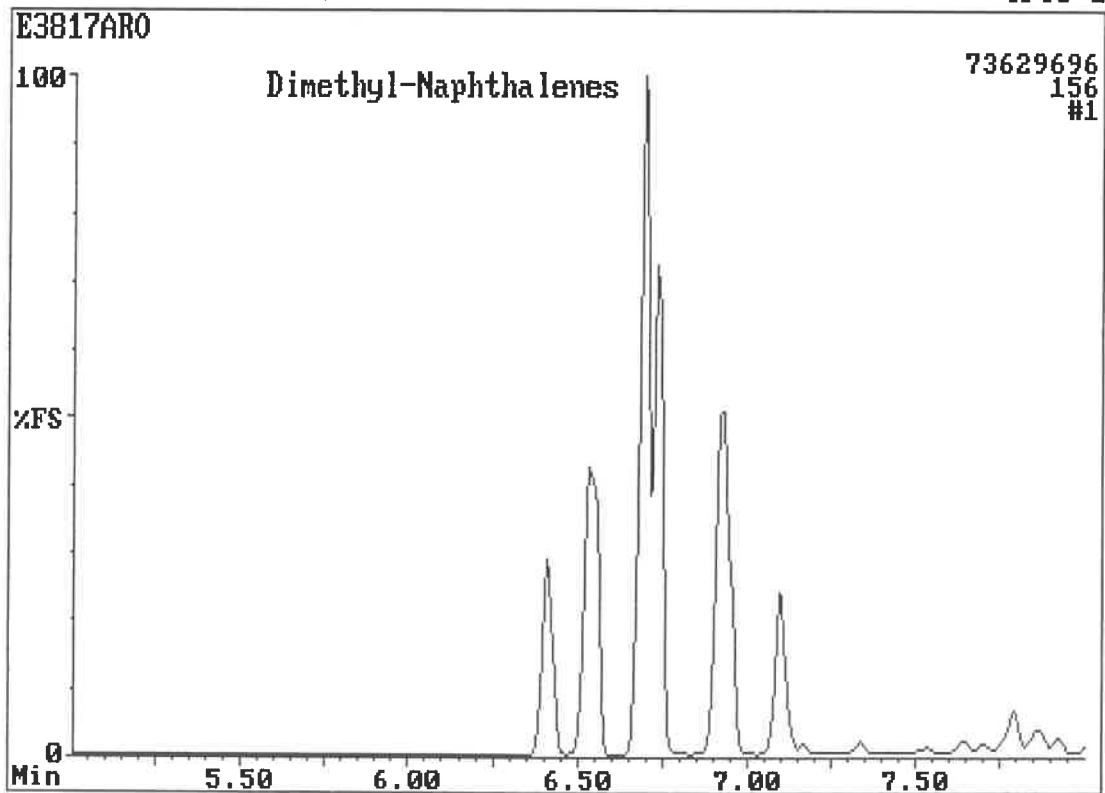
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



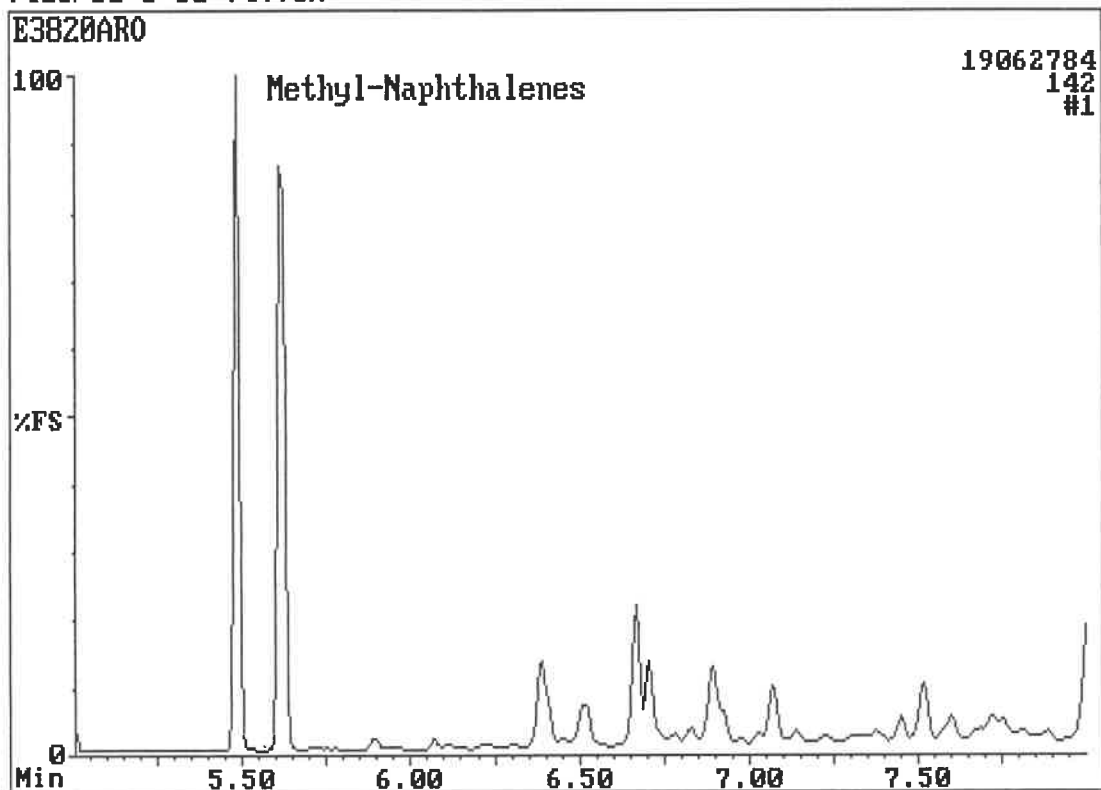
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



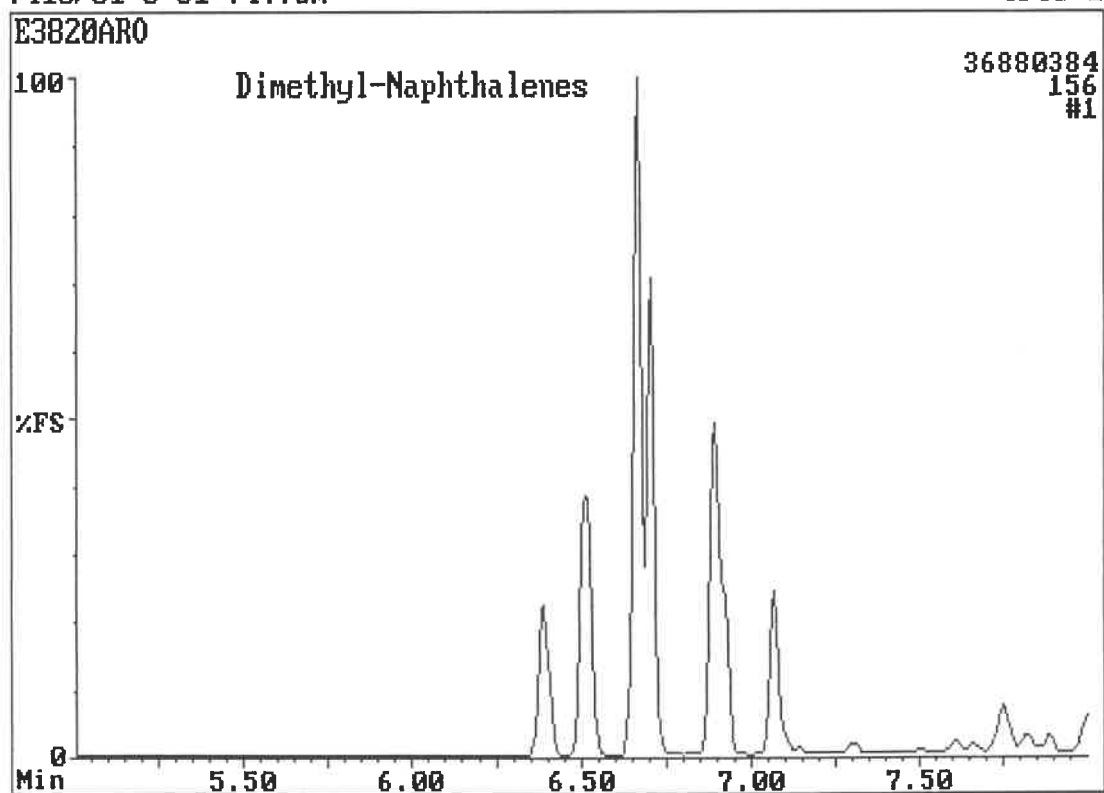
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



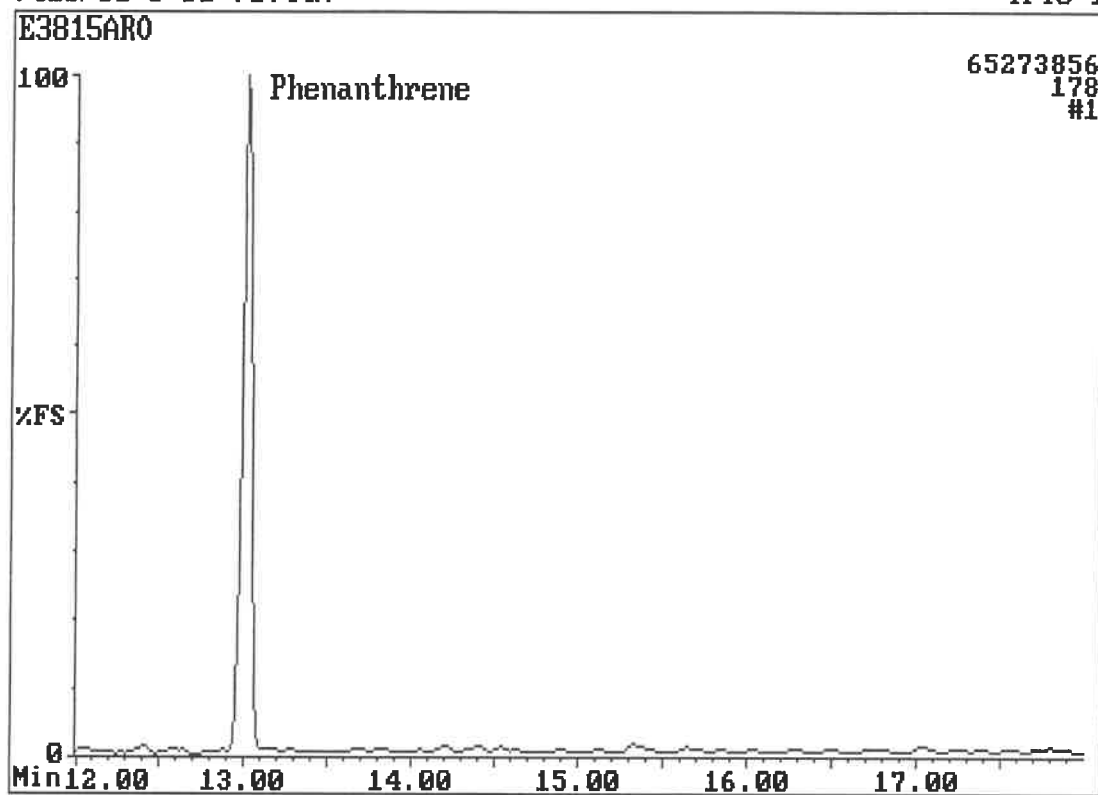
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



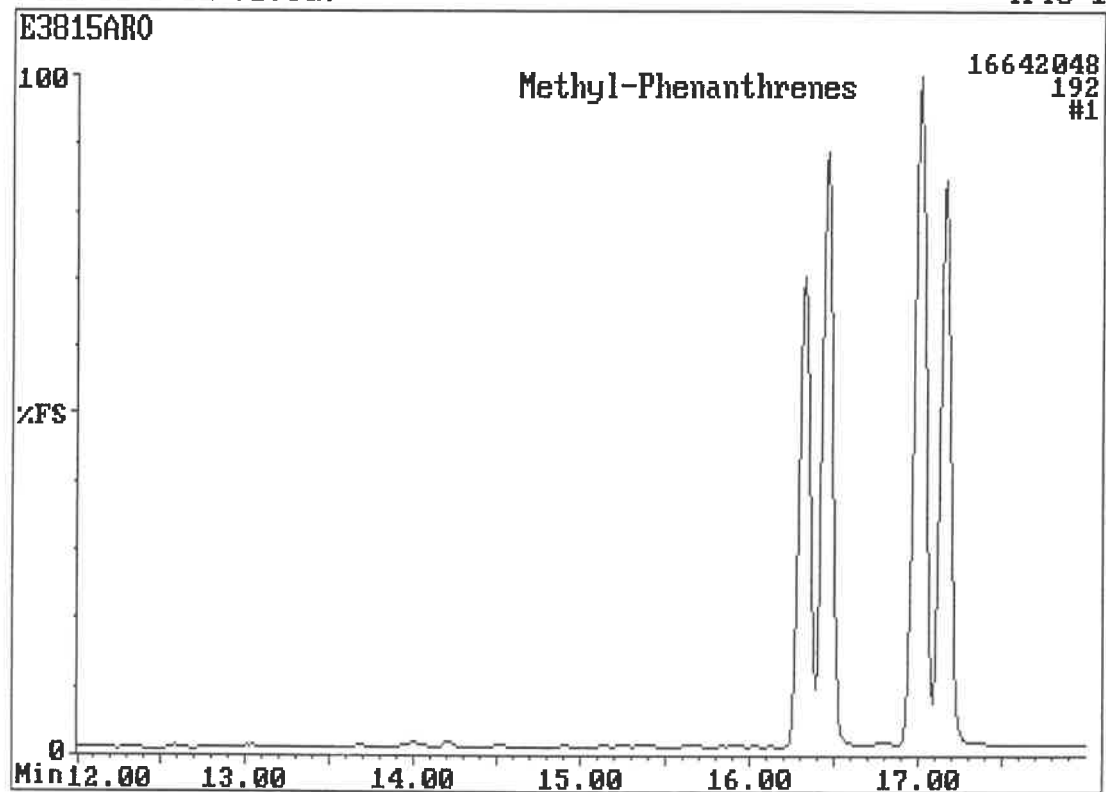
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 71.44m

Trio-1



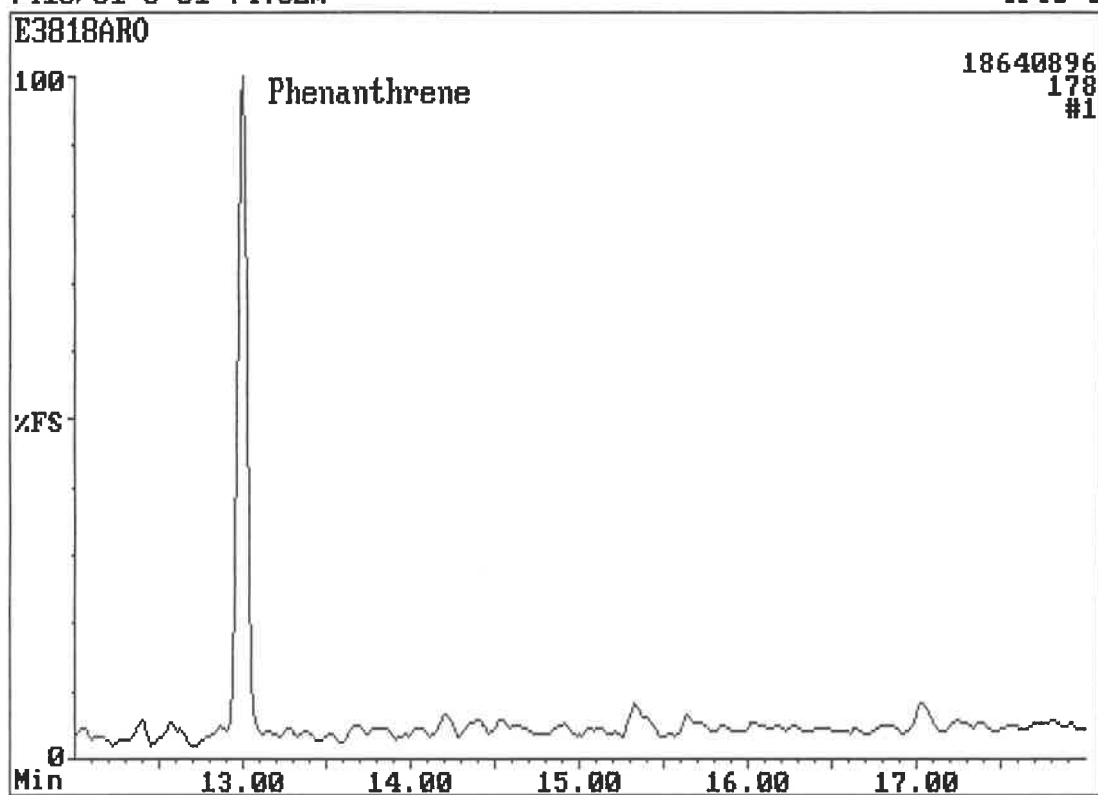
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7418/01-U-01 71.44m

Trio-1



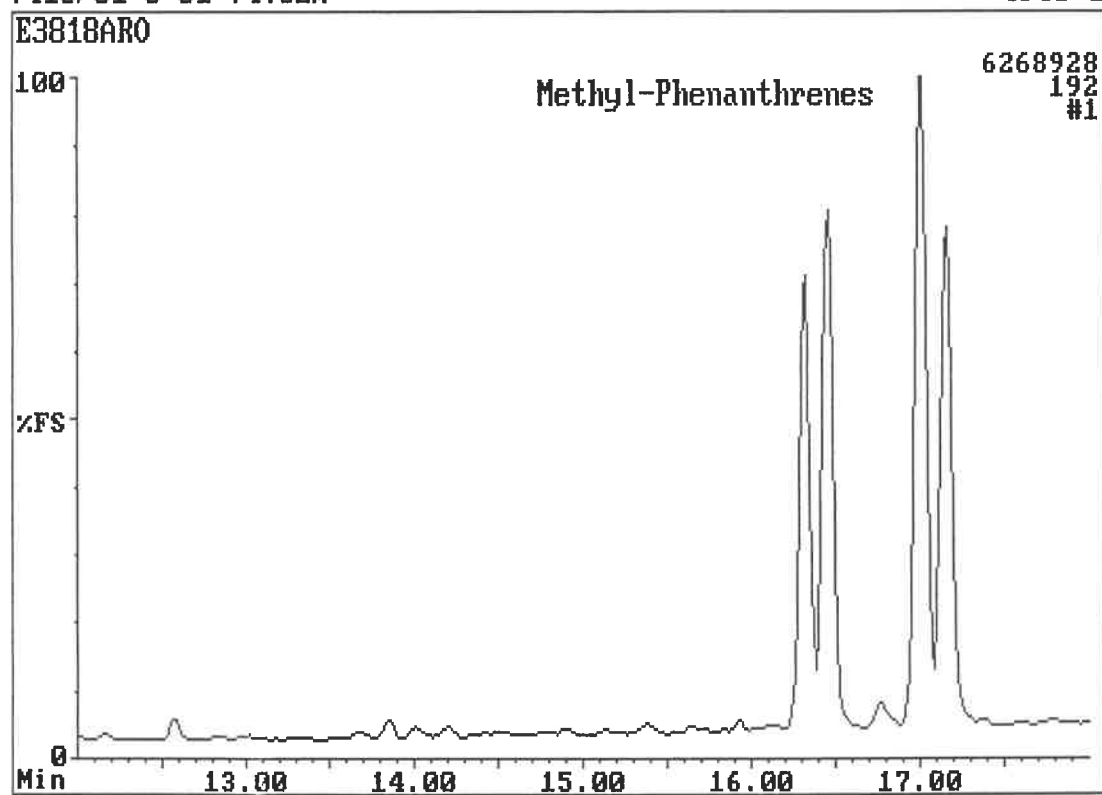
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



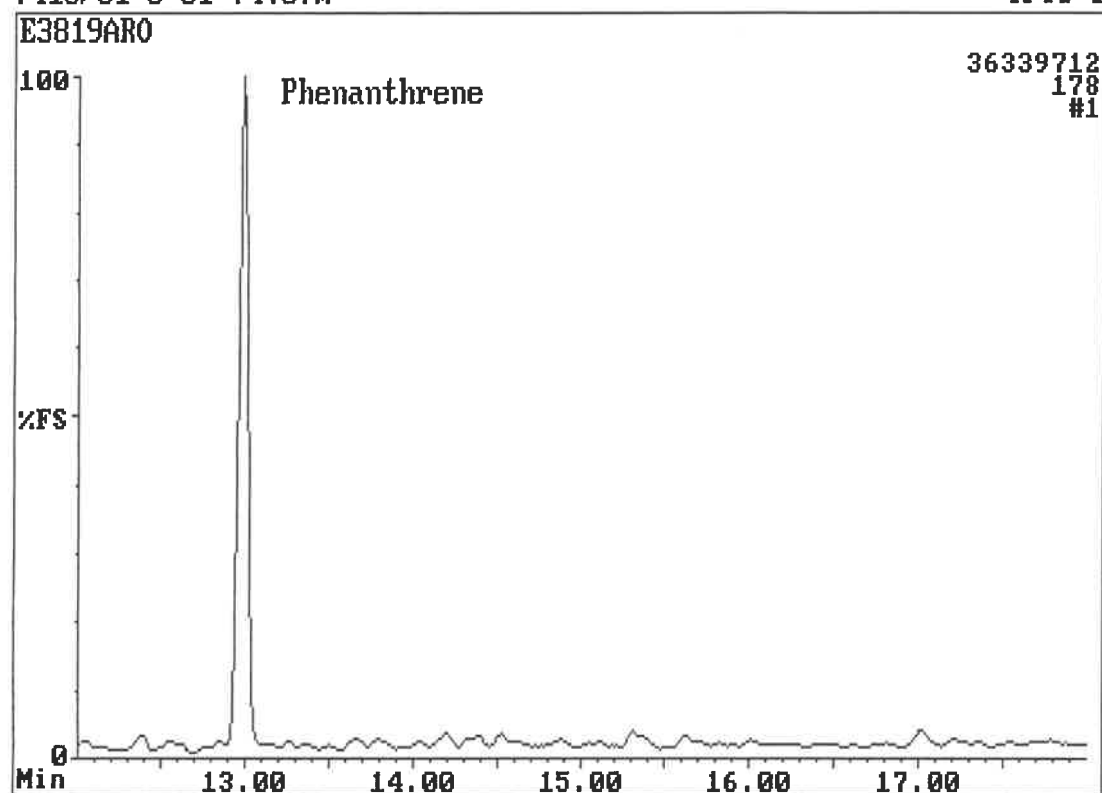
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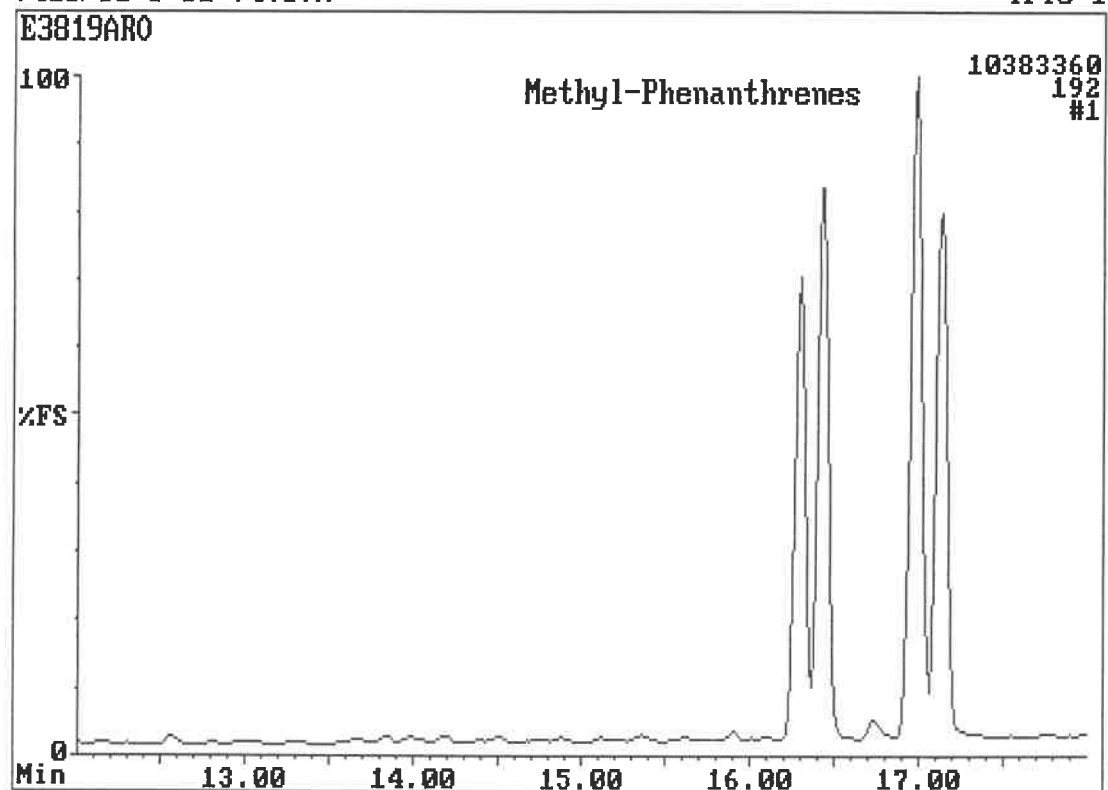
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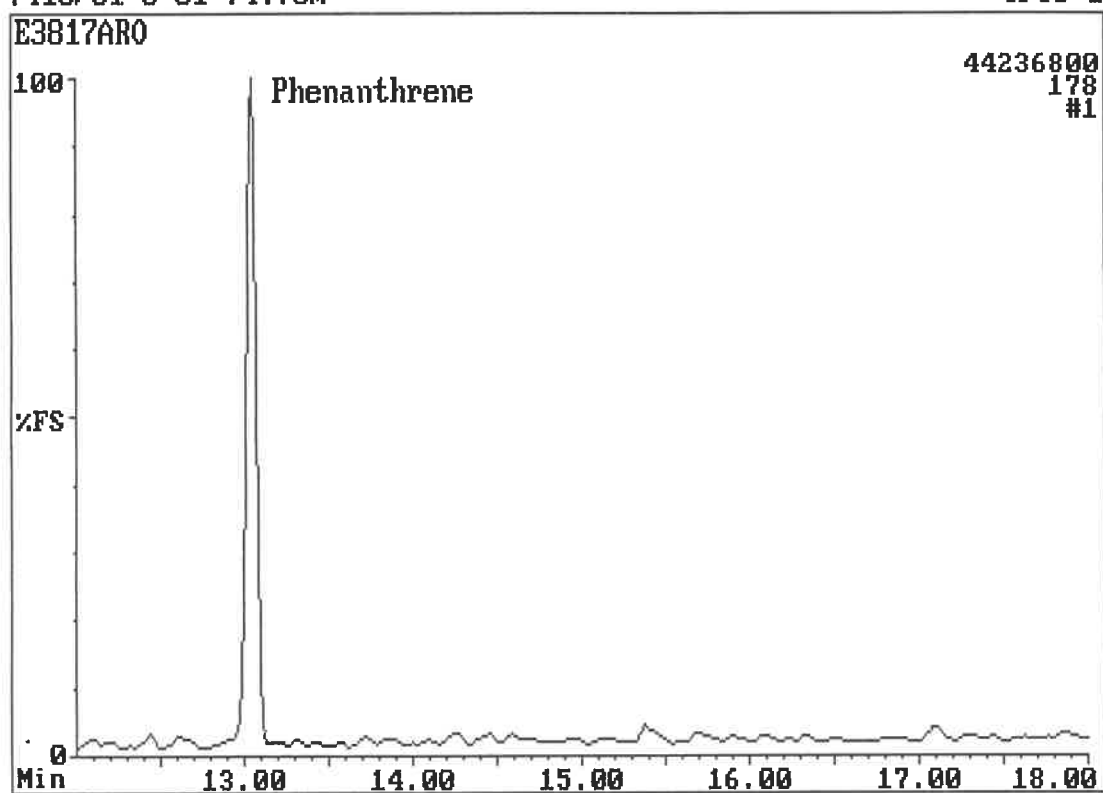
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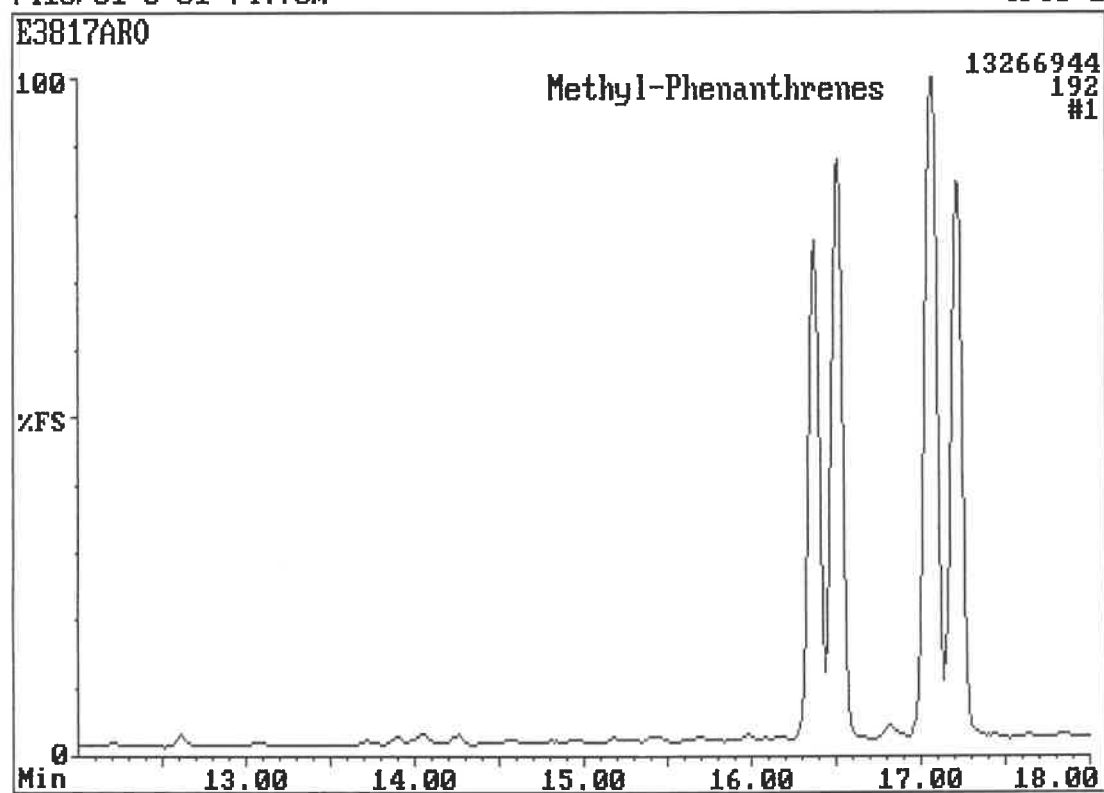
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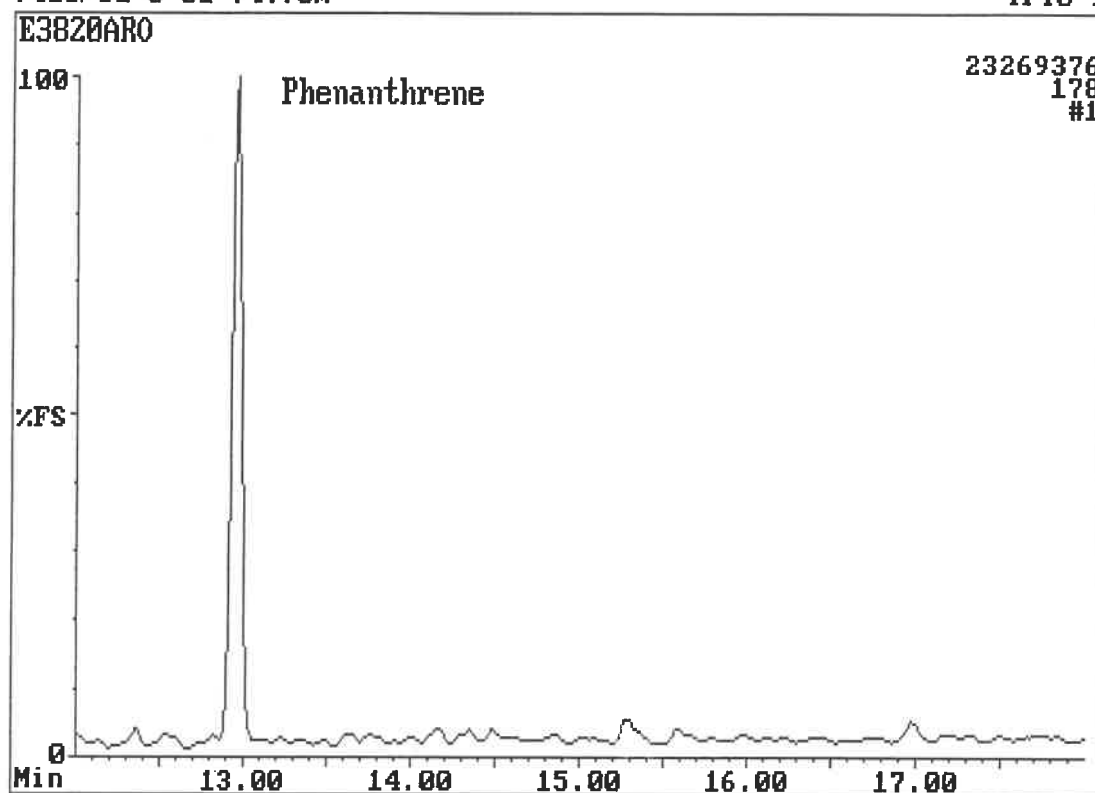
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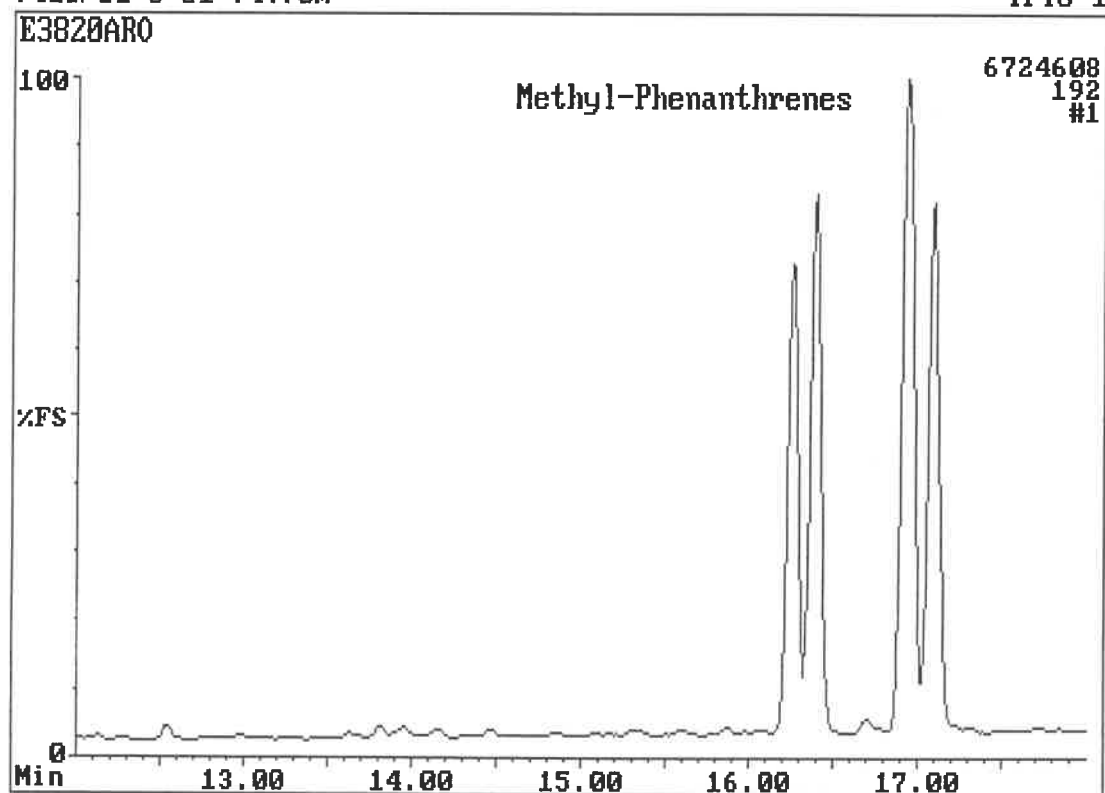
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7418/01-U-01 74.73m

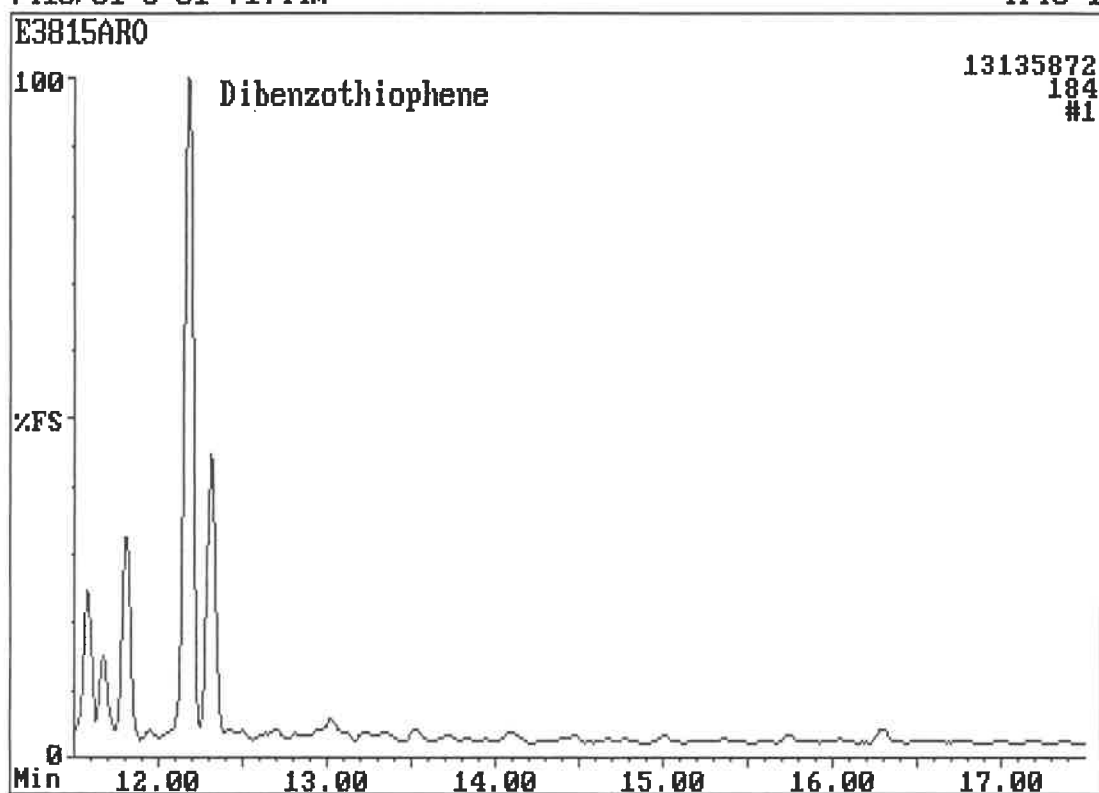
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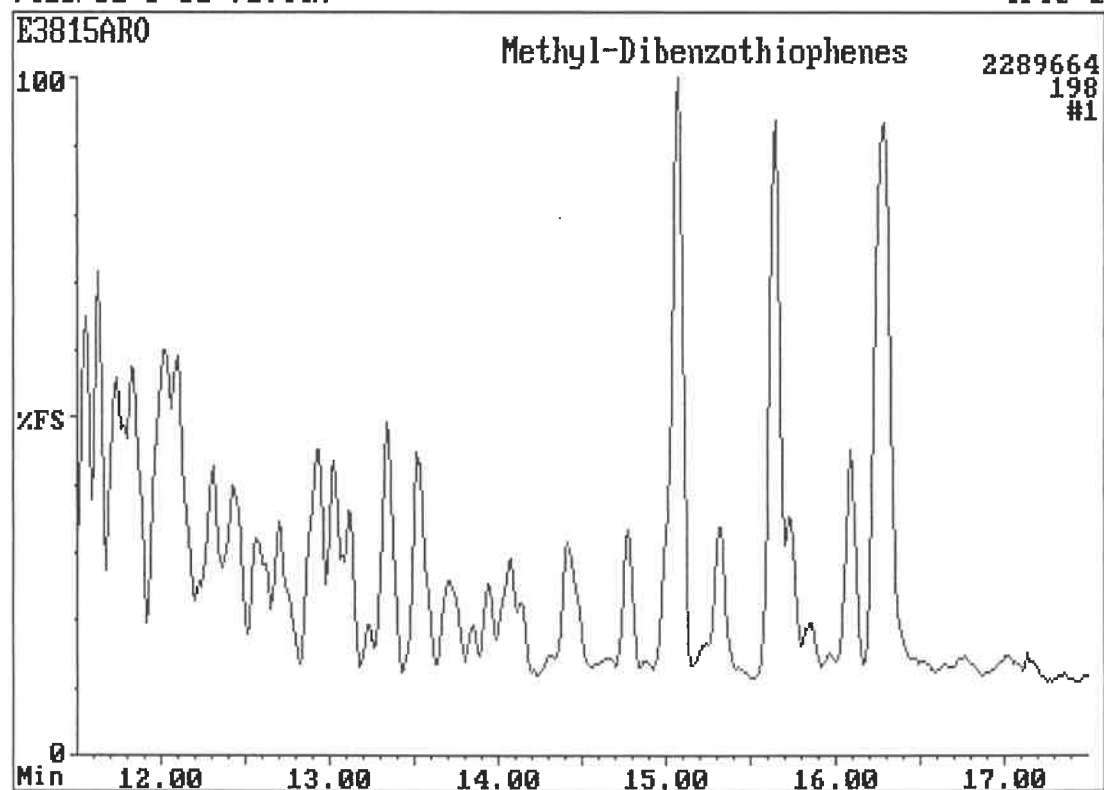
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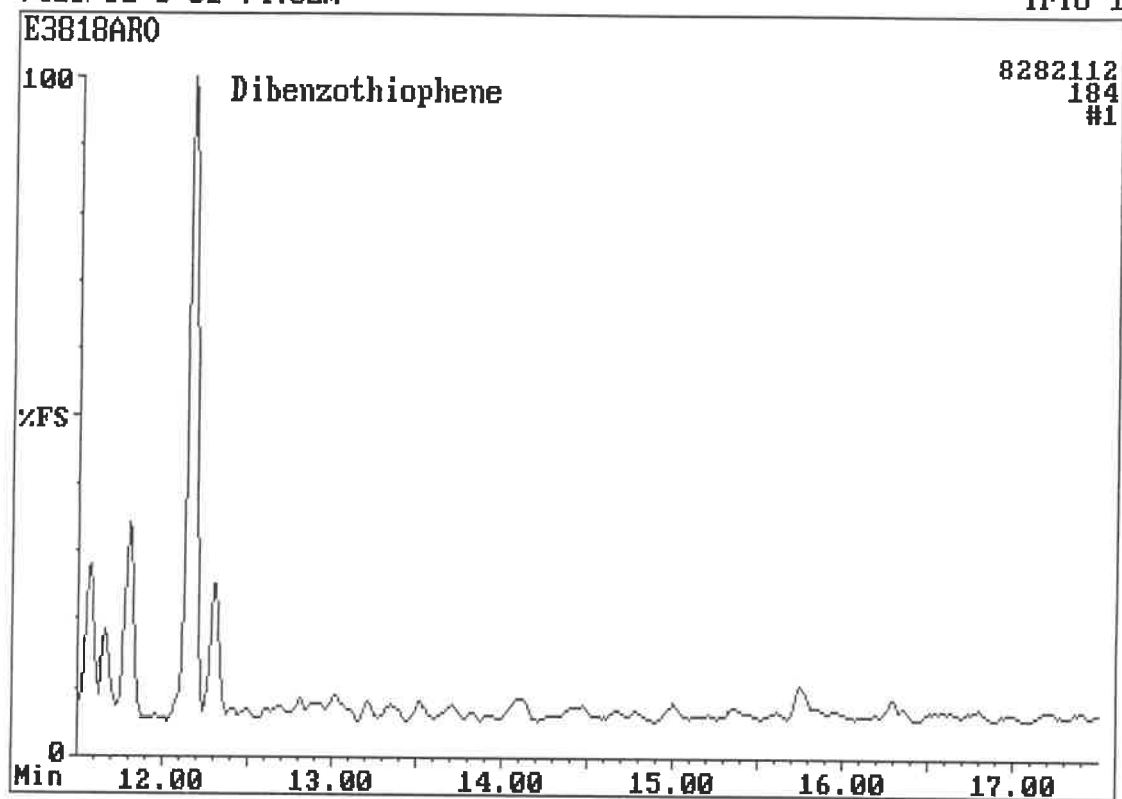
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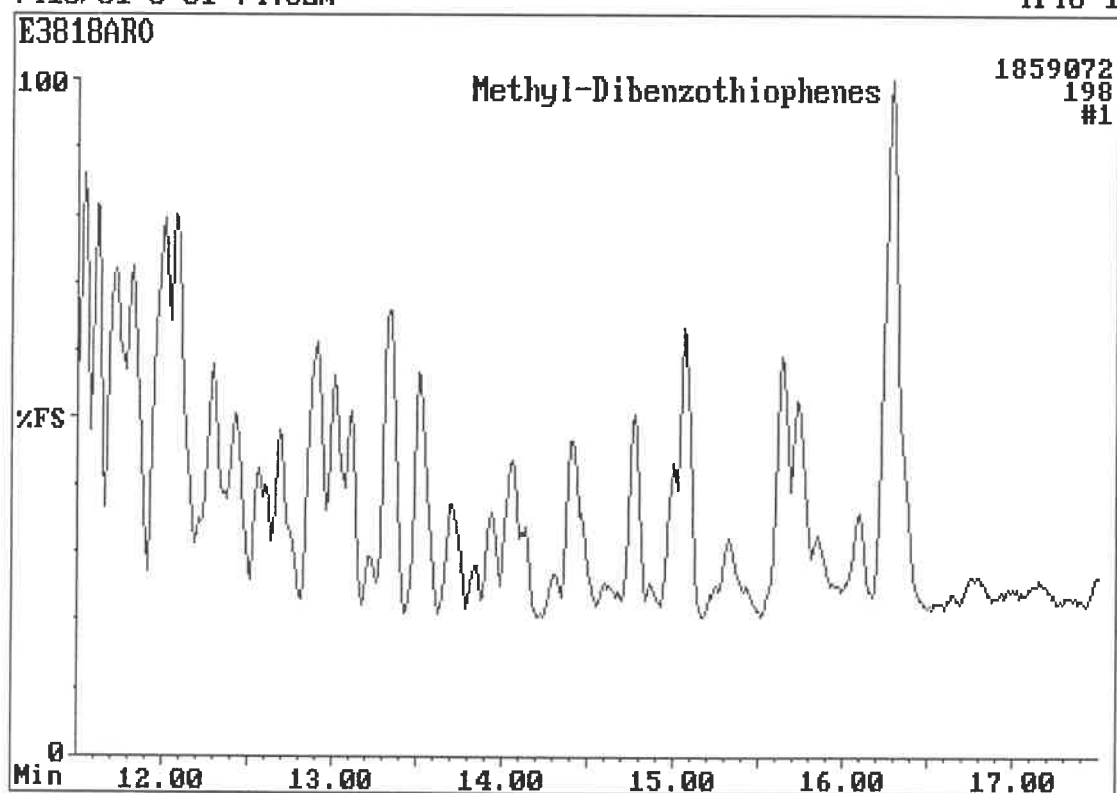
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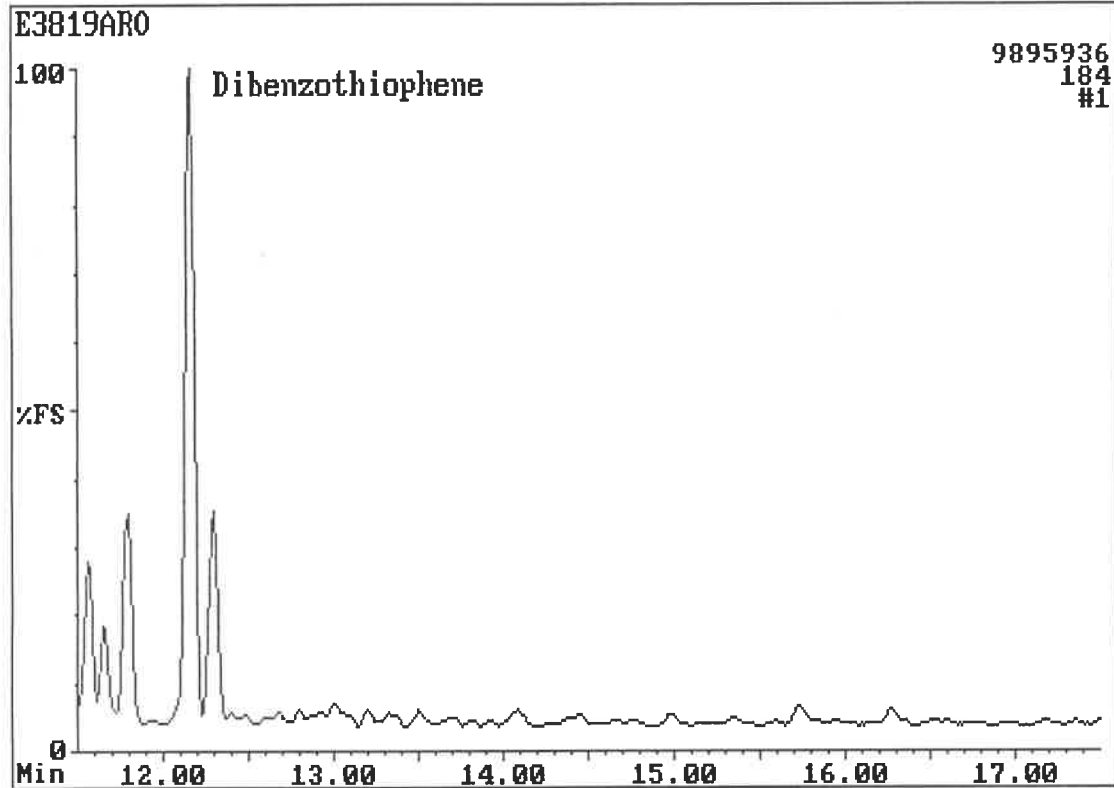
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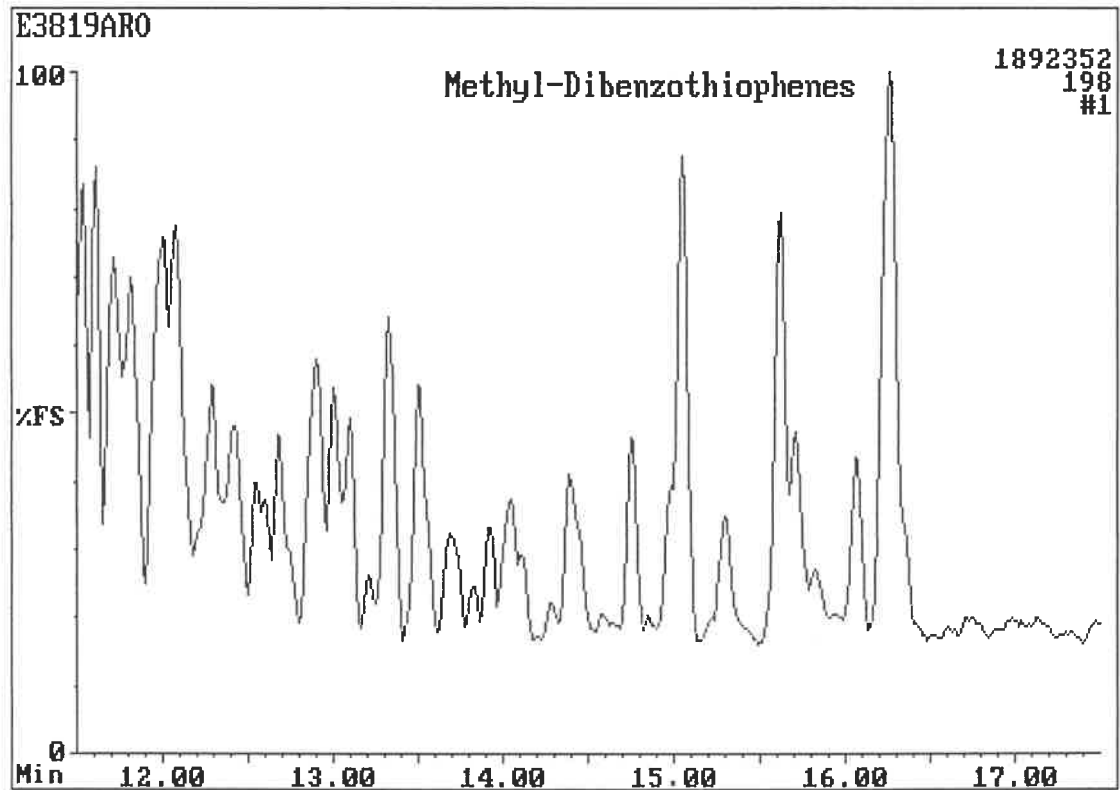
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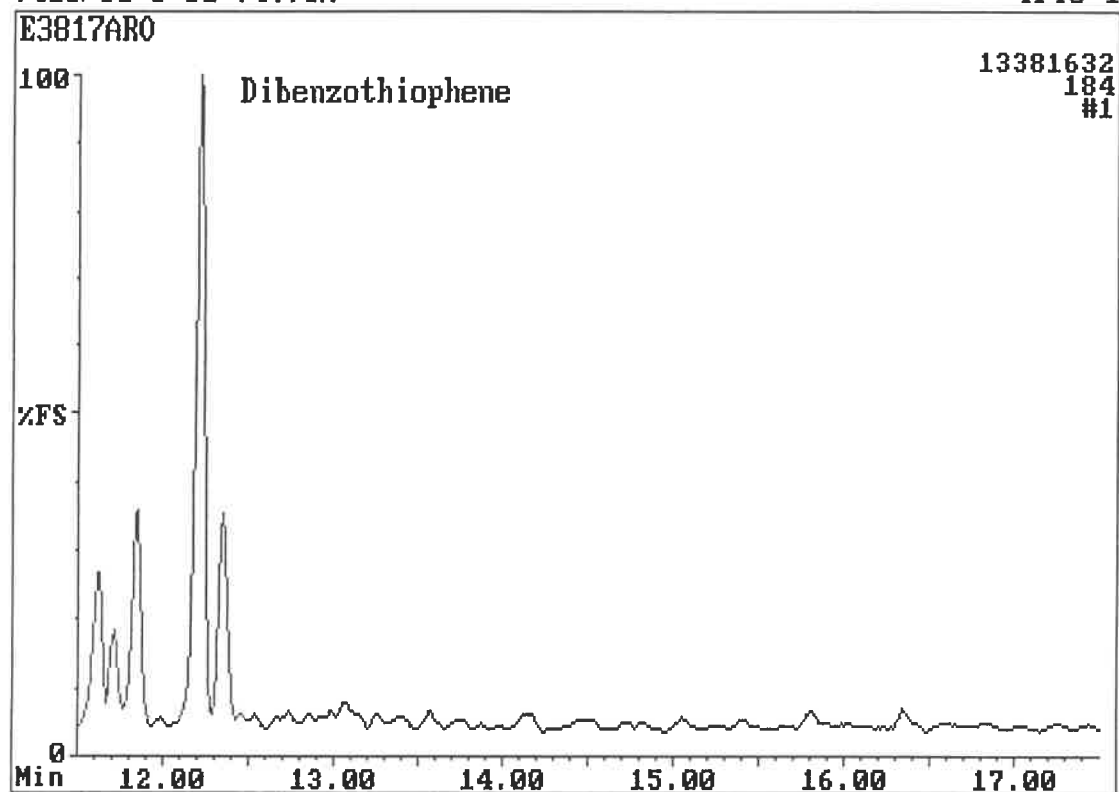
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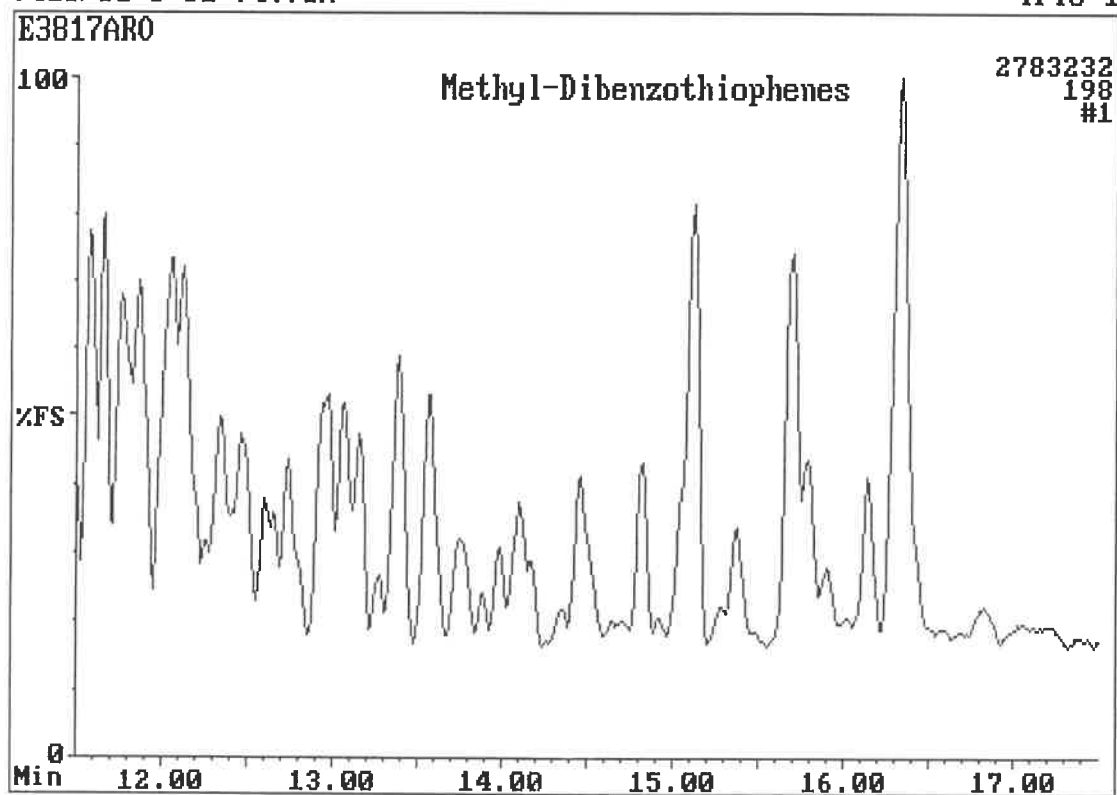
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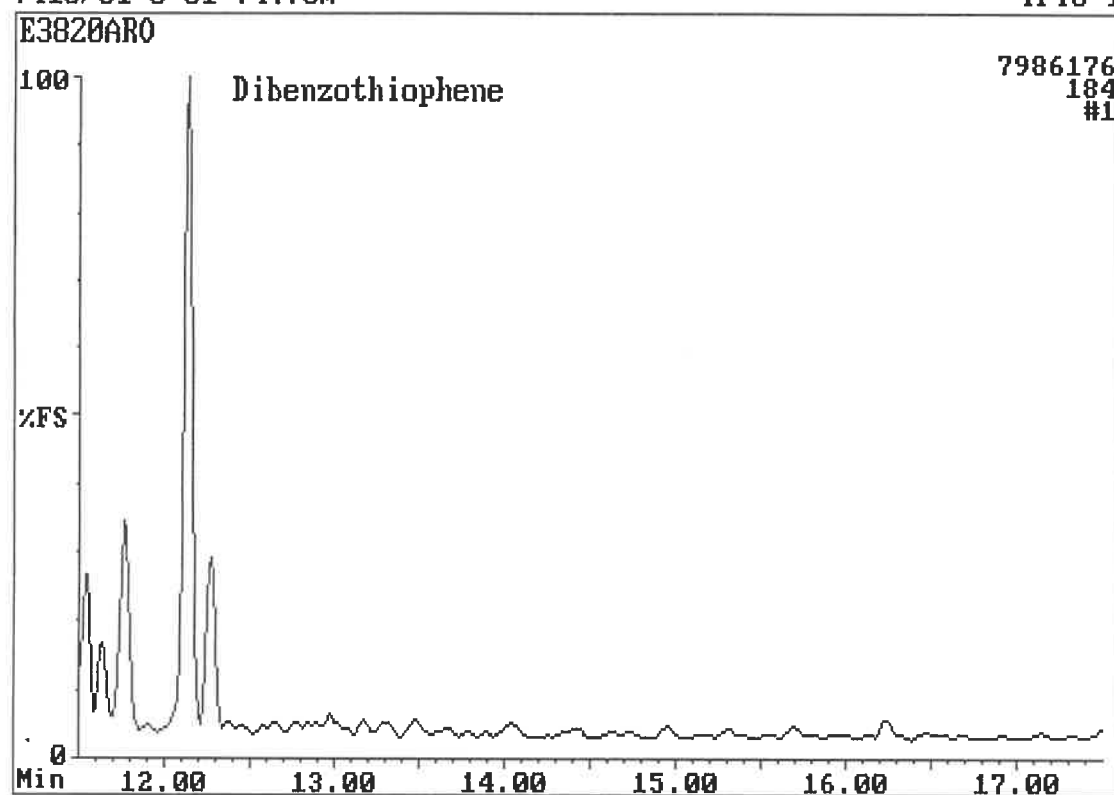
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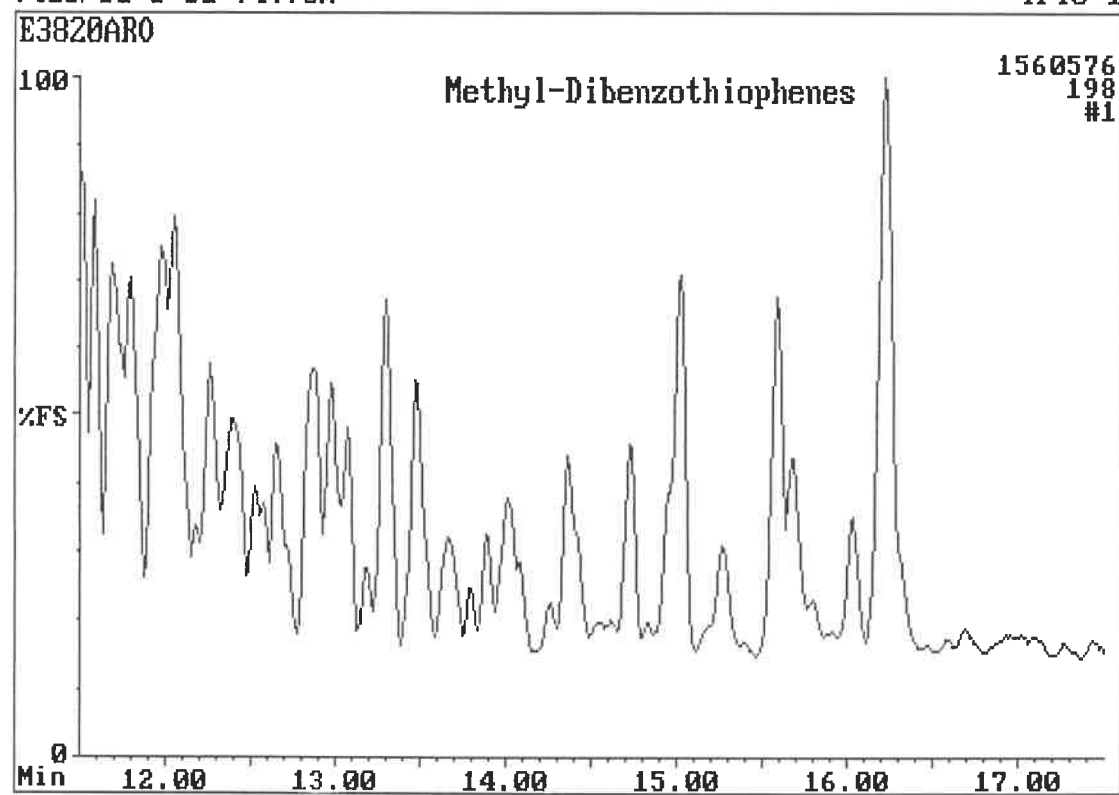
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7418/01-U-01 74.73m

Trio-1



Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



Appendix 3: Analytical Procedures

Evaluation of kerogen type and thermal maturity in transmitted light

The rock samples were crushed and treated with hydrochloric acid and hydrofluoric acid in order to remove the mineral matter and isolate the kerogen. The isolated kerogen was mounted in glycerine jelly on microscope slides as a strew-mount.

Treatment of the isolated kerogen varies according to the requirements and preservation of the samples. Slides from the total acid-insoluble residue and of the sieved ($>15\mu\text{m}$) residue are routinely prepared. In difficult cases, flotation in ZnBr_2 will be required to remove heavy minerals.

The samples were examined using a Leitz Diaplan microscope with a white halogen light source. Objective lenses of 10x and 63x magnification were used. The higher magnification allowed a more detailed description of the kerogen, with resolution down to $2\mu\text{m}$ diameter. The samples were also examined in ultra-violet light using a Leitz Orthoplan microscope and a 25x objective lens.

Thermal Alteration Indices (TAI) on a 1 - 10 scale were determined from the colour of spores and pollen, using a technique adapted from Staplin (1969) and Burgess (1974). This scale is similar to, but not identical with, that of the Spore Coloration Index (SCI), which is determined by visual comparison of the specimen with a set of standard slides. SCI (instead of TAI) determination is required according to the Norwegian Standard Guide on Organic Geochemistry, but cannot be performed as long as Simon Petroleum Technology (SPT), the only producer of these slides, does not make them available to competitors like IKU.

Vitrinite Reflectance Analyses

Vitrinite reflectance analyses were carried out on whole-rock samples according to the procedure described in the Norwegian Industry Guide to Organic Geochemical Analyses.

Kerogen terminology

The following kerogen terminology is used:

1. Fluoramorphanite - degraded, unstructured material of unidentified origin which fluoresces under ultra-violet light.
2. Hebamorphanite - degraded, unstructured material of unidentified origin.
3. Algal material - particles of recognisably algal origin.
4. Liptinitic material - recognisable spores, pollen, cuticle and cysts.
5. Woody material - structured and unstructured woody tissue.
6. Coaly material - black, reworked or oxidised material.

Comparison of microscopic thermal maturation systems at IKU

Spore colour		Vitrinite reflectance	Sporinite fluorescence
TAI	NEW TAI	%	
1 - 2-	1.0 - 3.5	0.25 - 0.40	1 - 4
2- - 2	3.5 - 4.0	0.40 - 0.60	4 - 6
2 - 2+	4.0 - 4.5	0.60 - 0.80	6 - 7
2+ - 3-	4.5 - 5.5	0.80 - 1.00	7 - 8
3- - 3	5.5 - 6.0	1.00 - 1.20	8 - 9
3 - 5	6.0 - 10.0	<1.20	Absent

At IKU, TAI determination is generally undertaken on bisaccates.

Relation between fluorescence colour and sporinite fluorescence zones:

Excitation filter 400 nm

Barrier filter 530 nm

colour	G	G/Y	Y	Y/O	L.O	M.O	D.O	O/R	R
zone	1	2	3	4	5	6	7	8	9

Gas analyses

- Headspace gas:

A septum was attached to the can and a sample of the headspace gas was taken for analysis of C₁, C₂, C₃, i-C₄, nC₄ and C₅₊ hydrocarbons.

This analysis was performed on Carlo Erba Fractovap 2150 gas chromatographs equipped with 2 m c 1/8" stainless steel columns filled with Porapak Q on Chromosorb using nitrogen as carrier gas. An oven temperature of 150°C was used. After elution of n-butane, the column was back-flushed and C₅₊ compounds were recorded as two peaks. A standard gas sample containing methane, ethane, propane, n-butane, n-pentane and n-hexane (1000 ppm each) was used for quantification.

The can was then opened and headspace volume, water volume, and sample weight were measured. The canned samples were washed with luke-warm water (30-35°C) and were then dried at 40°C.

- Occluded gas:

Prior to drying, an aliquot of the sample was crushed in water for 10 minutes using a gas-tight ball mill. The evolved gas was analysed as described for headspace gas. The standard gas sample contained 100 ppm C₁-C₅ n-alkanes.

Total Organic Carbon

Bulk samples were crushed in a disk mill. Aliquots of the samples were then weighed into Leco crucibles, treated three times with 10% (vol) HCl, and heated to 60°C in order to remove carbonate. Finally they were washed four times with distilled water in order to remove any traces of HCl. The crucibles were then dried for 24 hours on a hot plate. The total organic carbon (TOC) content of the dried samples was determined using a CS 244 carbon/sulphur analyser.

The instrument was calibrated using a synthetic carbon standard with 5.02% carbon. Standard and parallel runs were carried out at least every 10th measurement.

Rock-Eval pyrolysis

Powdered sample (5-100 mg, dependent on TOC and S₂) was weighed into a platinum crucible (the base and cover of which are made of sintered steel), and analysed on a Rock-Eval II pyrolyser (Girdel/IFP) under standard conditions (Carrier gas: helium; flow rate: 100 ml/min.; temperature programme: 300°C (3 min.) - 25°C/min. - 550°C). The instrument was calibrated using a Black Ven Marl standard with S₁ = 0.47 mg/g rock, S₂: 19.00 mg/g rock, T_{max} = 420°C. Standard and parallel runs were carried out at least every 10th measurement.

Pyrolysis Gas Chromatography (S₂-peak)

Preextracted rock samples were analysed at Geolab Nor according to The Norwegian Industry Guide to Organic Geochemical Analyses.

Extractable Organic Matter

Powdered rock was extracted by Soxhlet technique with boiling dichloromethane (DCM) containing 7%(v/v) methanol as solvent in a Soxhlet apparatus for 24 hours. DCM of organic geochemical grade was used and blank analyses indicated that the occurrence of contaminating hydrocarbons was negligible. Activated copper fillings were used in order to remove any free sulfur from the samples.

After extraction, the solvent was evaporated off using a Büchi Rotavapor and the amount of extracted organic matter (EOM) was determined.

Asphaltene precipitation

The EOM or stabilised oil was diluted in DCM containing 7% (v/v) methanol (1:3 mg/ μ l) and the asphaltenes were precipitated using excess n-pentane (40:1 pentane: (DCM+EOM)). The asphaltene fraction was filtered and dissolved in DCM and weighed after drying at room temperature until a constant weight was achieved.

TLC-FID (Iatroscan)

The malthene fraction was diluted with DCM:MeOH(93:7 v/v) and ca. 20 μ g of the solution were applied to a precleaned and activated Chromarod (type SIII). Three replicates of each sample were analysed. The rods were fully developed with n-hexane (10-11 cm), then dried and redeveloped to half-rod height (5.5 cm) in toluene, and finally developed in DCM:MeOH (93:7 v/v, 2.5 cm).

The rods were passed through the flame-ionisation detector (FID) of a Iatroscan TH-10 (H_2 = 160 ml/min; air = 2 l/min; scan speed = 0.38 cm/sec (gear no. 30)). The FID response was recorded and integrated using a VG Multichrom lab data system. The relative response factors of the saturated and aromatic hydrocarbons and resins were determined by using an external standard ("Oil I" from Statoil's Round Robin 1991), which contains 65.9% saturated hydrocarbons, 33.0% aromatic hydrocarbons and 1.1% polar compounds. The following relative response factors (area / weight %) were used: 0.90 for SAT, 0.86 for ARO and 12.4 for the polar compounds (POL1 and POL2).

Liquid chromatographic separation

The remaining maltenes were separated into saturated, aromatic and non-hydrocarbon fractions using an MPLC system with n-hexane as eluant (Radke et al. 1980). The various fractions were concentrated using a Büchi Rotavapor. Then they were transferred to glass vials. The remaining solvent was removed.

Gas chromatographic analysis

The whole oil was analysed on a Hewlett Packard 5890 gas chromatograph equipped with a 30 m DB-1 fused silica column (0.25 mm i.d.). Hydrogen was used as a carrier gas with 12 psi inlet pressure. Injections were performed in split mode (split ratio 1:10). The temperature program used was -20°C (2 min.) - 4°C/min. - 300°C.

The saturated hydrocarbon fractions were diluted with n-hexane and analysed on a Varian 3400 gas chromatograph equipped with a 30 m DB-1 fused silica column (0.25 mm i.d.).

The total aromatic fractions were diluted with n-hexane and analysed on a HP 5890 gas chromatograph, fitted with a DB-5 fused silica column (30 m x 0.25 mm i.d.).

Hydrogen was used as a carrier gas with a flow rate of about 1.5 ml/min. Injections were performed in split mode (split ratio 1:10). The temperature program used was 80°C (2 min.) - 4 °C/min. - 300°C.

All data from the GC analyses were processed on a VG Multichrom lab data system.

Gas chromatography - mass spectrometry (GC-MS)

GC-MS analyses were performed on a VG TRIO 1 quadrupol instrument. A Hewlett Packard 5890 Series II GC with a HP7671 Automatic sampler was fitted with a fused silica DB-1 capillary column (30 m x 0.25 mm i.d.). Helium was used as a carrier gas with 20 psi as inlet pressure. The injections were performed in splitless mode (1.00 min.).

The temperature program used was 50°C (1 min.) - 35°C/min. - 150°C - 2°C/min. - 310°C (10 min.).

The samples were analysed in multiple ion mode (MID) at a scan cycle time of approximately 2 secs. The mass spectrometer operated at 70eV electron energy with an ion source temperature of 200°C and a source pressure of 10^{-5} torr. Data acquisition was performed using a VG data system.

Peaks were identified by comparison with elution patterns in certain mass chromatograms. Peak ratios were calculated from peak heights in the appropriate mass chromatograms.

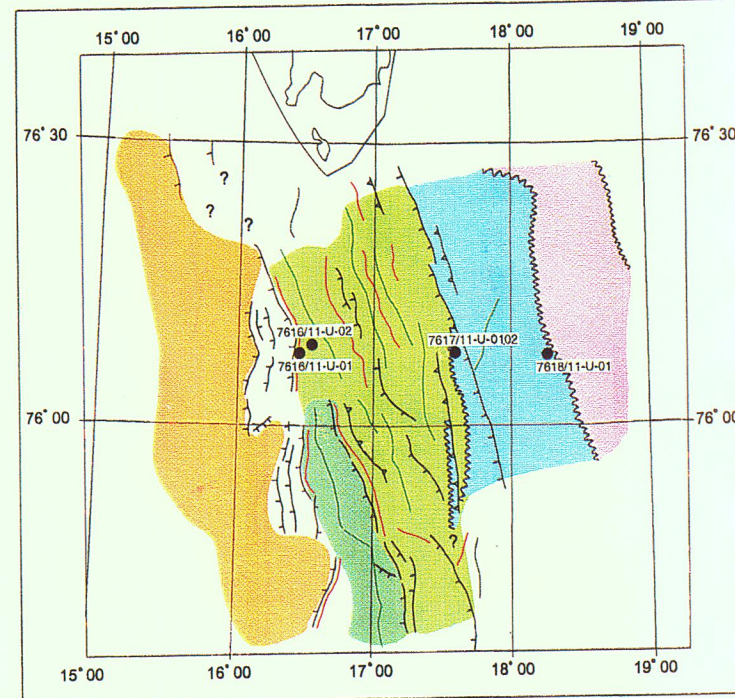
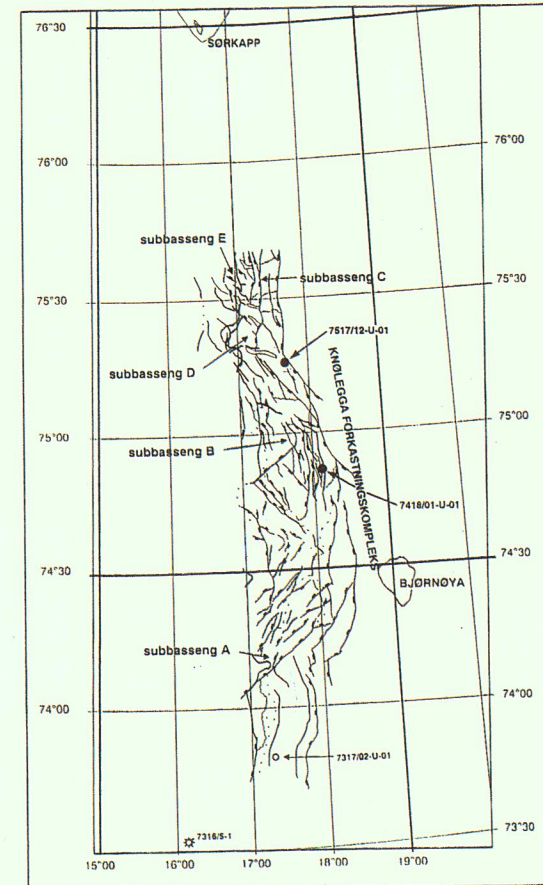
Stable carbon isotope analysis

The $\delta^{13}\text{C}$ isotope analysis was performed by mass spectrometry at the Institute for Energy Technology (IFE) in Kjeller, Norway, according to their method. Their oil standard was analysed together with the samples and the analysis results was within $\pm 0.1\%$. IFE's reference value for the NBS 22 standard is $-29.77 \pm 0.06\%$ PDB.

APPENDIX 4

Organic richness, kerogen character and thermal maturity of cored sections in the Nordflaket area.

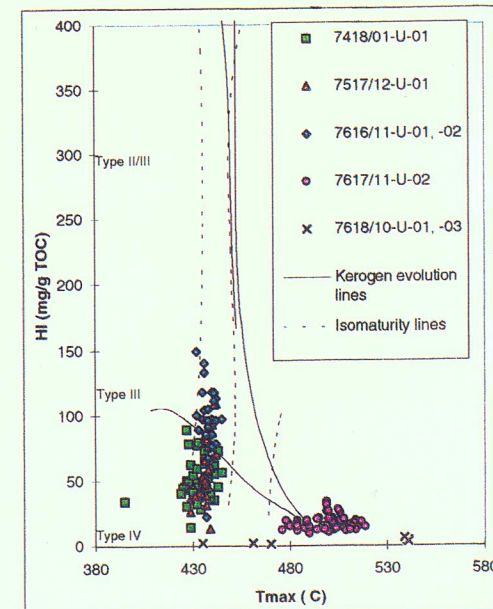
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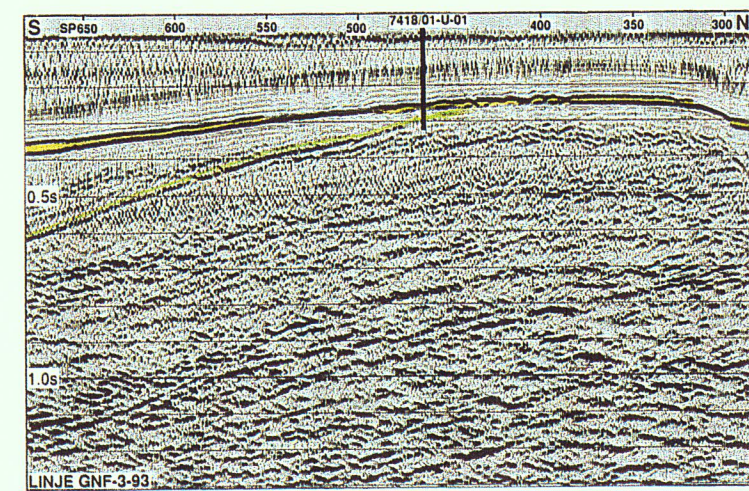
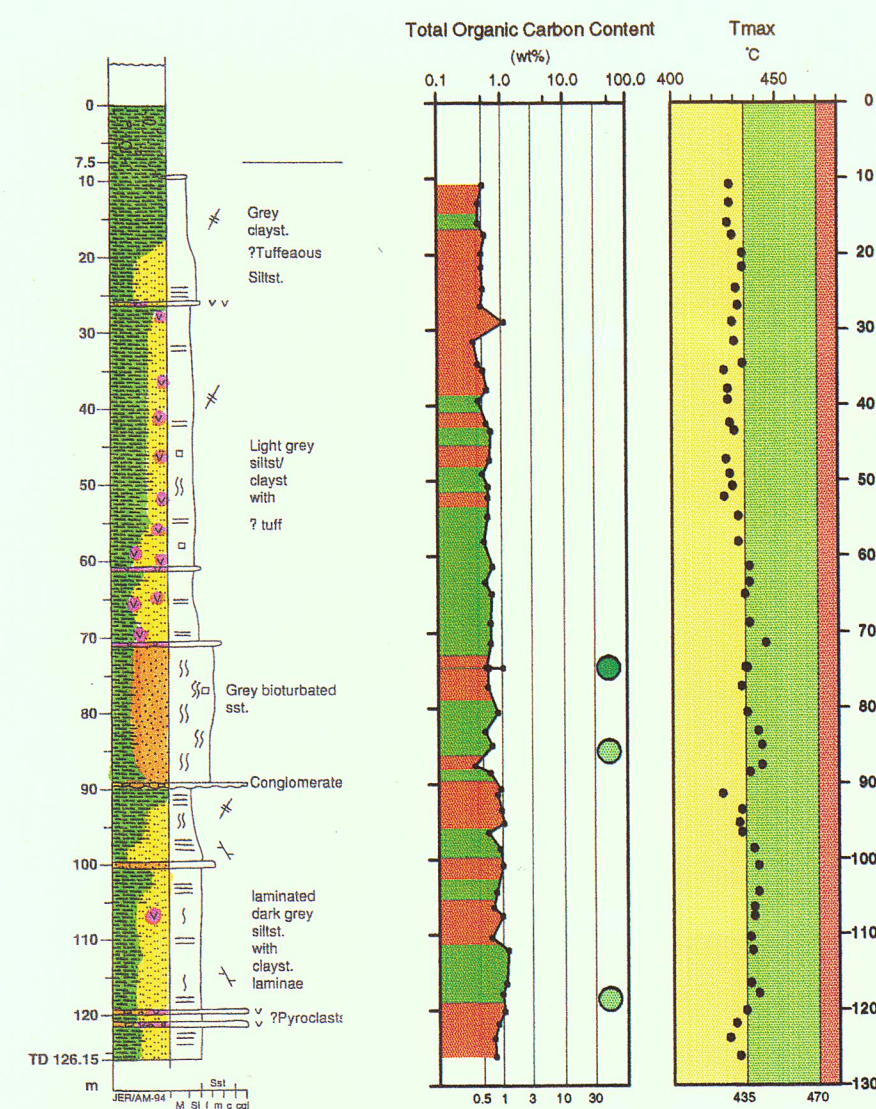
ROCK-EVAL HYDROGEN INDEX CLASSES (corresponding to kerogen types at low maturity)

- HI > 600 mg/g TOC (Type I)
- HI = 400 - 600 mg/g TOC (Type II)
- HI = 200 - 400 mg/g TOC (Type II/III)
- HI = 50 - 200 mg/g TOC (Type III)
- HI < 50 mg/g TOC (Type IV)
- not determined

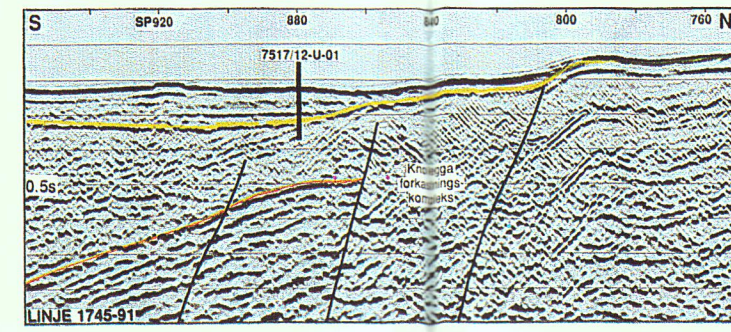
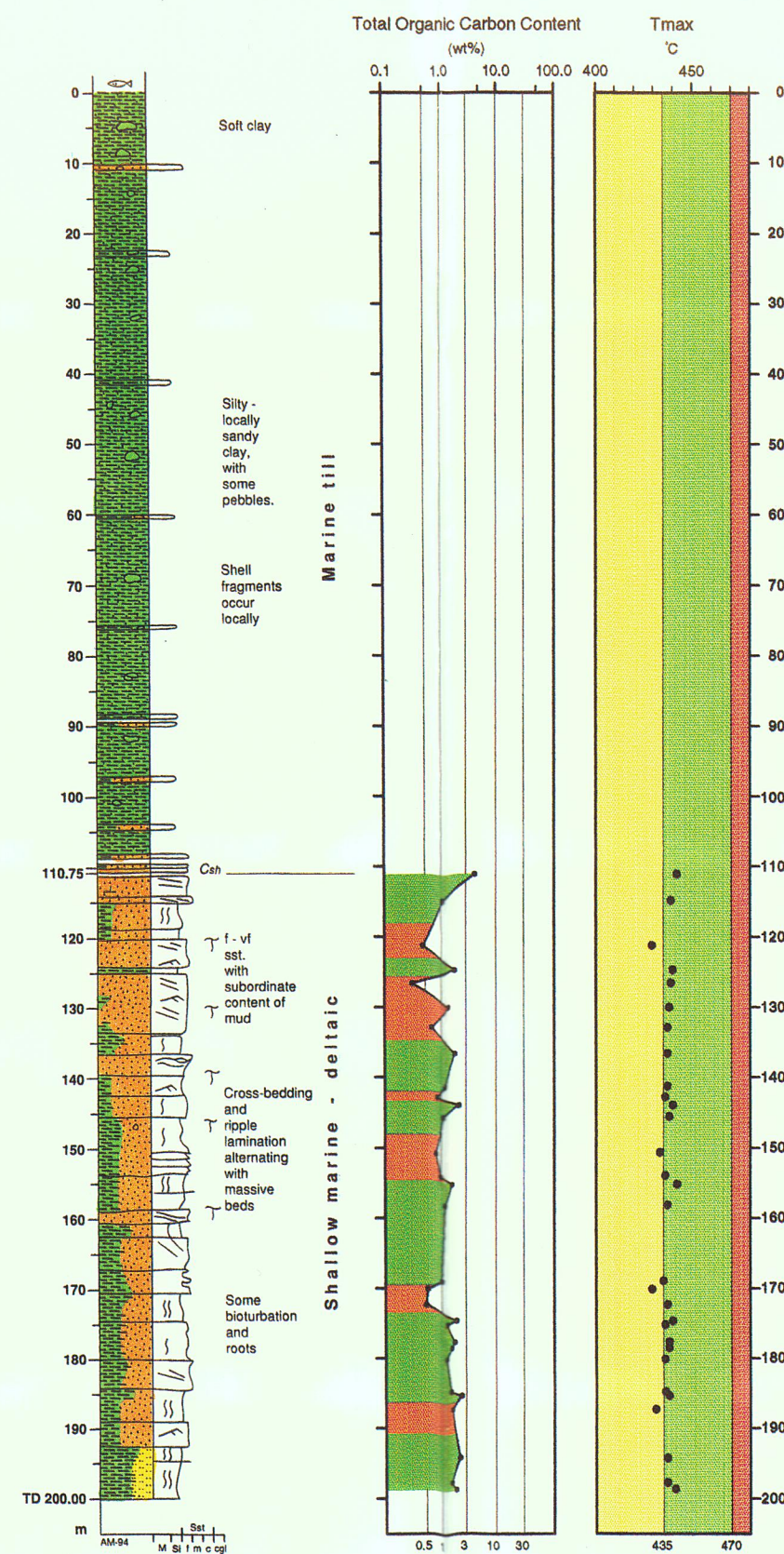
- Visible oil staining
- Bitumen staining suggested by geochemical data



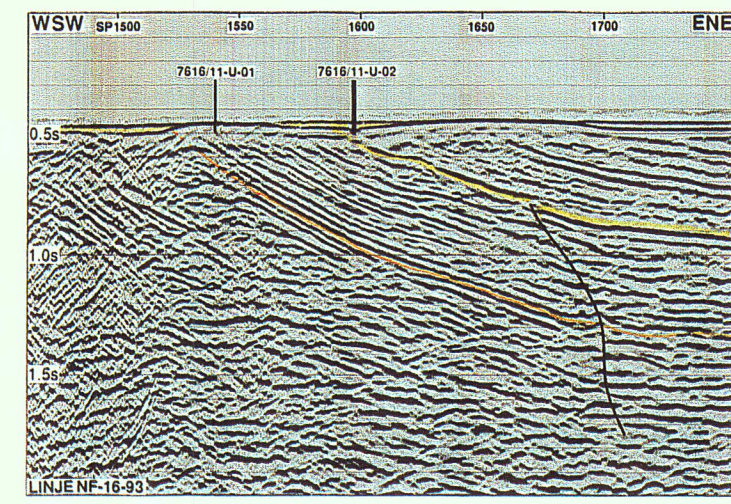
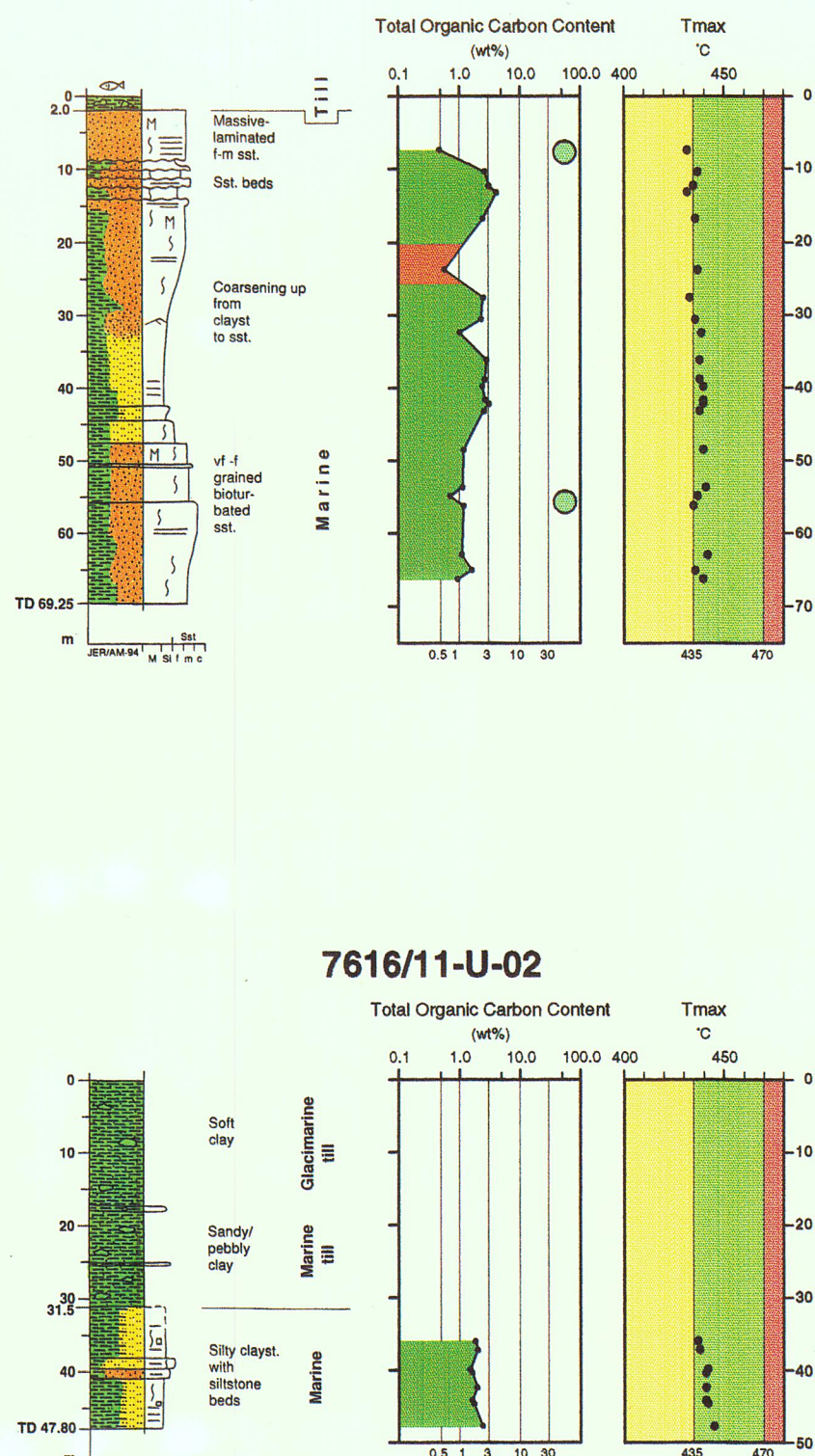
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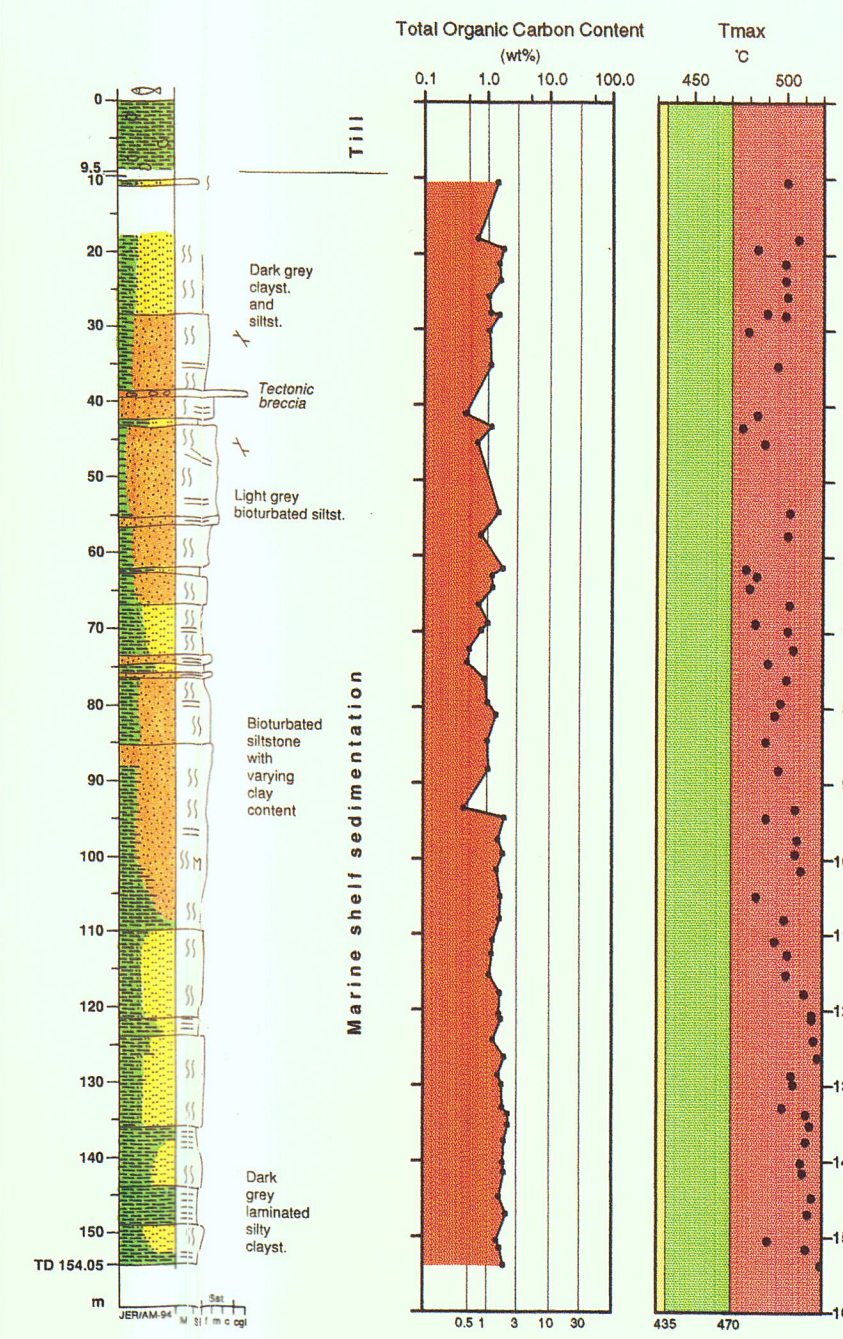
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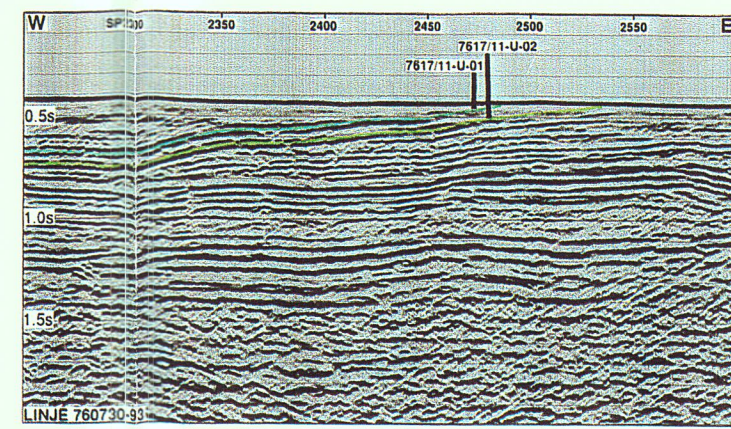
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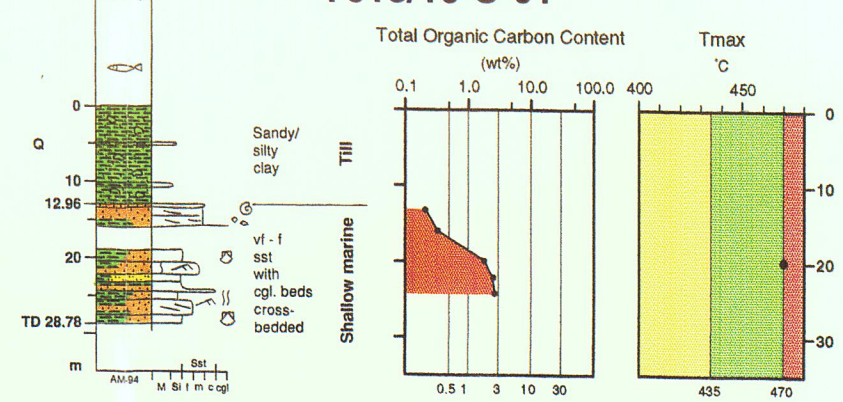
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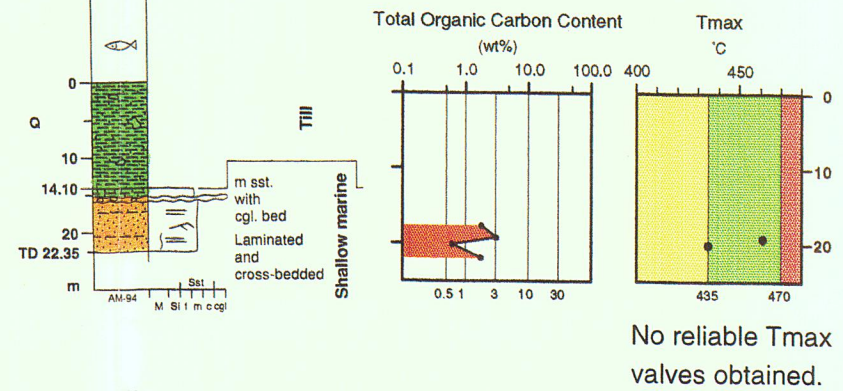
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7618/10-U-01



7618/10-U-03



No reliable Tmax values obtained.

