

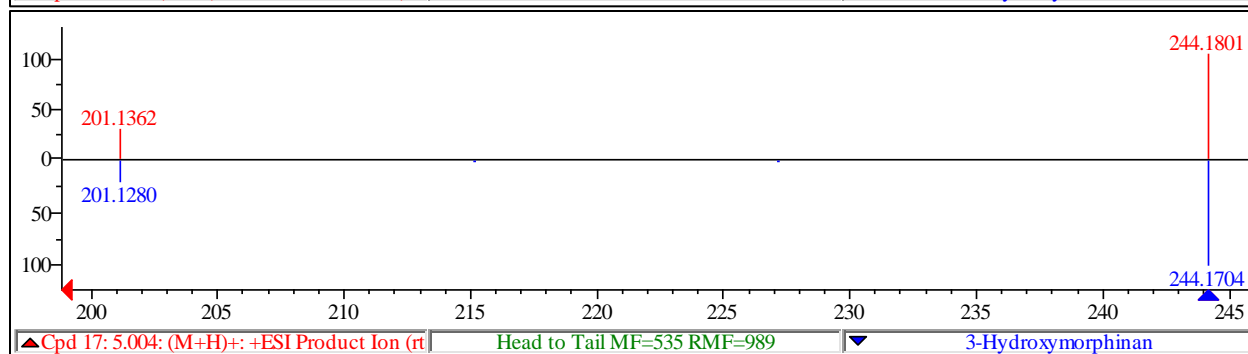
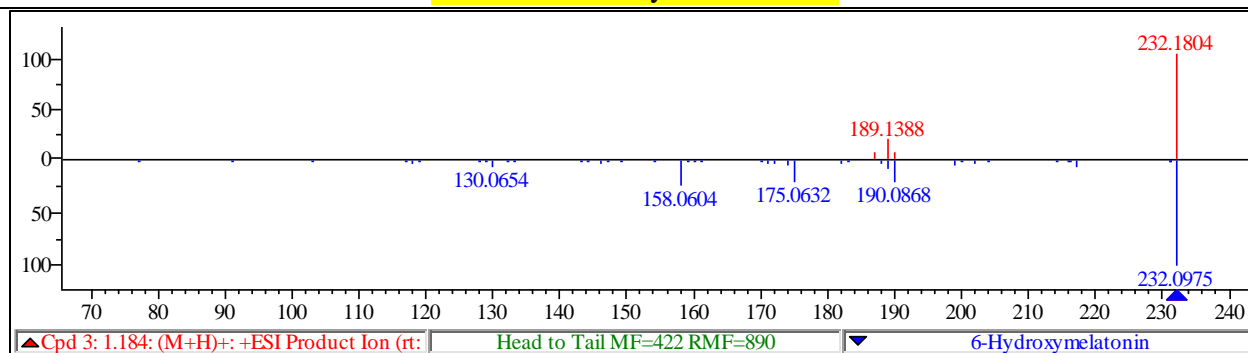
Additional file 7: Metabolite annotations and tandem MS fragmentation patterns of compound detected in EBC. EBC was collected from four groups of volunteers: healthy smokers, healthy non-smokers, non-smokers with nasal congestion, and non-smokers with the common cold. Samples were pooled, lyophilized, reconstituted in 20µL of buffer, and analyzed using LC-MS based metabolomics. Metabolite peaks were extracted with Mass Hunter Profinder software (Agilent) using exact mass and isotope ratios. Tandem MS was performed, spectra was exported to NIST MS Search v2.2, and matched to the NIST14 Mass Spectral library. Fragments in red indicate EBC sample, fragments in blue indicate NIST standard reference spectra.

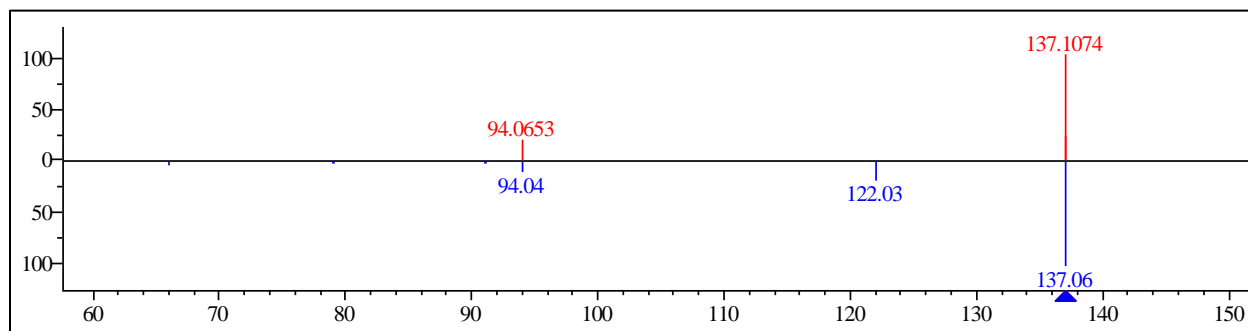
Compound	Smkr	Nasal	Cold	Hlthy	RT (mins)	Mass	Formula	Mode	NIST MF	NIST RMF	KEGG	PubChem
(R)-4'-Deoxyindenesol	X	X	X	X	6.620	250.1358	C18 H18 O	+			C14541	11954028
(R)-5-Deoxyindenesol	X	X	X	X	7.839	250.1358	C18 H18 O	+			C14543	11954030
N-Acetyl-D-fucosamine	X	X	X	X	8.079	205.0950	C8 H15 N O5	+			C15480	11954186
Heptadecatrienoic acid	X	X	X	X	8.080	264.2089	C17 H28 O2	+			C16344	16061034
(+)-Prosopinine	X	X	X	X	10.422	313.2609	C18 H35 N O3	+			C10167	442654
1,3-Dicyclohexylurea	X	X	X	X	8.876	224.1889	C13 H24 N2 O	+	713	880		4277
10-Hydroxydecanoic acid	X	X	X	X	7.523	216.1357	C10 H20 O3	-			C02774	74300
11-Aminoundecanoic acid	X	X	X	X	7.418	229.1680	C11 H23 N O2	-				17083
1-Hydroxy-2-naphthoic acid	X	X	X	X	6.258	188.0472	C11 H8 O3	+			C03203	6844
2-(Methylthiomethyl)-3-phenyl-2-propenal	X	X	X	X	6.388	230.0169	C11 H12 O S	+				6435634
2,4-Diamino-6-nitrotoluene	X	X	X	X	7.112	167.0703	C7 H9 N3 O2	+			C16396	96177
13,14-dihydro Prostaglandin F1a	X	X	X	X	6.814	358.2736	C20 H38 O5	+				
2-Anthramine	X	X	X	X	6.672	193.0897	C14 H11 N	+			C14417	11937
2-Amino-3,7-dideoxy-D-threo-hept-6-ulosonic acid	X	X	X	X	6.380	213.0620	C7 H13 N O5	+			C16850	25137912
2-Carboxy-4-dodecanolide	X	X	X	X	6.301	282.1449	C13 H22 O4	+				
2-Methylisborneol	X	X	X	X	10.458	185.1778	C11 H20 O	+				16913
4-Heptadecene	X	X	X	X	10.081	255.2924	C17 H34	+				
3-Deoxyestrone	X	X	X	X	7.300	254.1676	C18 H22 O	+			C14972	5882
4-Vinylcyclohexene	X	X	X	X	7.491	233.2141	C8 H12	+				7499
5-Nitro-2-furfuryl methyl ether	X	X	X	X	6.855	139.0270	C6 H7 N O4	-			C14293	11469
9-(Methylthio)nonanenitrile	X	X	X	X	6.799	185.1234	C10 H19 N S	+				93987
Allotetrahydrocorticosterone	X	X	X	X	6.756	351.2768	C21 H34 O3	+			C13713	101771
beta-Santonin	X	X	X	X	7.790	286.1171	C15 H18 O3	+			C09545	237619
Butocamide hydrogen succinate	X	X	X	X	5.933	375.2285	C16 H29 N O5	-			C12946	2486
C14 sphingosine	X	X	X	X	9.628	271.2141	C14 H29 N O2	-				
Arachidonoyl-1-thio-Glycerol	X	X	X	X	6.303	428.3085	C23 H38 O3 S	+				
cis-Hydroxy Perhexiline	X	X	X	X	7.714	331.2304	C19 H35 N O	+				
Citronellyl formate	X	X	X	X	8.918	184.1461	C11 H20 O2	-			C12295	7778
Diethylene glycol	X	X	X	X	1.201	202.0454	C4 H10 O3	-			C14689	8117
Dimethyl suberate	X	X	X	X	6.940	202.1207	C10 H18 O4	-			C17803	15611
Dizocilpine	X	X	X	X	7.245	221.1209	C16 H15 N	+			C13737	1207
Ethyl 3-(N-butylacetamido)propionate	X	X	X	X	6.857	215.1522	C11 H21 N O3	-				
Ethyl 3,4,5-trimethoxybenzoate	X	X	X	X	6.664	219.1691	C12 H16 O5	+				231162
Furmecyclo	X	X	X	X	13.492	251.1517	C14 H21 N O3	-				43359
Enhydrin	X	X	X	X	7.002	464.1678	C23 H28 O10	-			C09405	325606
Ganoderic acid Mg	X	X	X	X	6.451	602.3877	C35 H54 O8	+				
Gnididilatin	X	X	X	X	7.590	669.3502	C37 H48 O10	+			C09101	442032
Gomphrenin-I	X	X	X	X	11.228	646.1258	C24 H26 N2 O13	-			C08544	4480887
Gossypetin 3,5,8,3',4'-pentamethyl ether	X	X	X	X	0.979	388.1127	C20 H20 O8	+				
Heptanal	X	X	X	X	6.502	210.0870	C7 H14 O	-			C14390	8130
Icosenoic acid	X	X	X	X	13.666	327.3138	C20 H38 O2	+			C16526	5282768
Indicumenone	X	X	X	X	12.421	234.1620	C15 H24 O3	-			C17612	
12,14-Pentacosadienoic acid	X	X	X	X	6.122	374.3185	C25 H42 O2	-				9543642
Isodictamnine	X	X	X	X	6.491	199.0637	C12 H9 N O2	+			C10697	442913
N-cis-tetradec-9Z-enoyl-L-Homoserine lactone	X	X	X	X	10.715	309.2301	C18 H31 N O3	+				
Oxprenolol	X	X	X	X	8.085	265.1652	C15 H23 N O3	-				4631
Pantothenol	X	X	X	X	6.088	187.1208	C9 H19 N O4	-			C05944	4678
p-Cymene	X	X	X	X	9.382	152.1205	C10 H14	+			C06575	7463
Pulcherriminic acid	X	X	X	X	6.774	238.1332	C12 H20 N2 O4	-				3083664
Tamarixetin	X	X	X	X	6.420	298.0486	C16 H12 O7	-			C10188	482576
Teniposide	X	X	X	X	11.221	656.1547	C32 H32 O13 S	-			C11153	5396
Tremetone	X	X	X	X	1.200	264.0154	C13 H14 O2	-			C08992	78673
Ureidoglycine	X	X	X	X	0.980	380.0903	C3 H7 N3 O3	-			C02091	503
Zeatin	X	X	X	X	7.333	219.1122	C10 H13 N5 O	+			C00371	15419
3-Cyano-6-methoxycoumarin	X				5.936	201.0426	C11 H7 N O3	+	508	970		

1,2-Dimethylimidazole	X				1.538	96.0687	C5 H8 N2	+	520	987		15617
1-Hexadecylamine	X				9.087	241.277	C16 H35 N	+	398	858		8926
2,6-Di-tert-butyl-4-hydroxymethylphenol	X				6.806	236.1776	C15 H24 O2	+	823	922		6929
2-Aminobenzamide	X				1.58	136.0637	C7 H8 N2 O	+	425	977		6942
2-Amino-m-cresol	X				0.811	123.0684	C7 H9 N O	+	560	999		3014138
3-Methylhistidine	X				0.809	169.0851	C7 H11 N3 O2	+	383	860	C01152	64969
Arginine	X				0.81	174.1117	C6 H14 N4 O2	+	610	908	C02385	232
Carnosine	X				0.809	226.1066	C9 H14 N4 O3	+	262	841	C00386	9369
p,p'-Ditolylamine	X				6.038	197.1204	C14 H15 N	+	597	933		69293
Tryptophan	X				4.079	204.0899	C11 H12 N2 O2	+	679	926		
4-Hydroxy-3-methoxyphenethyl alcohol	X				5.255	166.063	C9 H12 O3	+	560	999		16928
4-Imidazoleacrylic acid	X				5.023	138.0429	C6 H6 N2 O2	+	557	998		1178
5-Aminosalicylic acid	X				1.612	153.0426	C7 H7 N O3	+	553	997		4075
D-erythro-Sphinganine	X				5.186	301.2981	C18 H39 N O2	+	51	299		91486
Triethyl citrate	X				7.519	276.1209	C12 H20 O7	+	360	945		6506
Acetylgarginine	X				4.91	216.1222	C8 H16 N4 O3	+	404	910		
5-Methoxytryptophan	X				6.124	234.1004	C12 H14 N2 O3	+	532	993		119802
1,2-Benzenecarboxylic acid	X		X	X	12.835	148.016	C8 H4 O3	+	679	946		181977
2-Butyl-4-propylthiazole	X		X	X	7.548	205.0902	C10 H17 N S	+				
3-Hydroxymorphinan	X			X	5.004	243.1623	C16 H21 N O	+	535	989		
Gabaculine	X		X	X	6.387	121.0524	C7 H9 N O2	-			C12110	3445
Thyrotropin releasing hormone	X		X		9.248	362.1702	C16 H22 N6 O4	-			C03958	4968
12-Nitrolinoic acid	X	X	X		6.303	325.2245	C18 H31 N O4	+				
12-O-Palmitoyl-16-hydroxyphorbol 13-acetate	X	X			5.803	756.4039	C38 H60 O9	-			C09153	124127
15(S)-HPETE	X	X		X	10.185	264.2089	C20 H32 O4	+			C05966	1440
2-chloro-2-iodoacetamide	X	X	X		8.499	278.9149	C2 H3Cl I N O	-				
2-Oxo-4-hydroxy-5-aminovalerate	X	X			1.604	129.0426	C5 H9 N O4	-			C05941	440852
2-Oxo-6-methylthiohexanoic acid	X	X		X	8.085	193.0780	C7 H12 O3 S	+			C17216	44237195
2S-Amino-tridecanoic acid	X	X		X	8.835	257.1986	C13 H27 N O2	+			C13795	656741
3,4-Dihydrocadalene	X	X	X		10.501	200.1563	C15 H20	+				
3-Hydroxy-2-(4-morpholinylmethyl)estra-1,3,5(10)-trien-17-one	X	X			5.178	431.1463	C23 H31 N O3	-			C14926	235463
6-hydroxy caproic acid	X	X	X		6.131	174.0890	C6 H12 O3	-				14490
6-Hydroxy-3,7-dimethyloctanoate	X	X		X	8.518	188.1410	C10 H20 O3	-			C18067	
Bisdiphosphoinositol tetrakisphosphate	X	X	X		0.771	705.8145	C6 H20 O24 P8	-				25245165
Carteolol	X	X	X		6.385	274.1687	C16 H24 N2 O3	-			C06874	2583
Chalcogran	X	X			6.409	156.1151	C9 H16 O2	-			C08471	441558
Cybutryne	X	X	X		2.275	281.1293	C11 H19 N5 S	-				91590
Deaminohydroxyblasticidin S	X	X			5.769	483.2076	C17 H25 N7 O6	-			C03860	629
Homoserine	X	X	X		6.707	215.0406	C4 H9 N O3	-				779
Dodecanedioic acid	X	X	X		8.186	230.1517	C12 H22 O4	-			C02678	12736
Eleganin	X	X	X		7.474	434.1566	C22 H26 O9	-			C09401	5281440
Ethirimol	X	X			6.063	532.2984	C11 H19 N3 O	-				32152
gamma-Chaconine	X	X	X		6.247	601.3965	C33 H53 N O6	-				160496
Hallactone B	X	X	X		9.784	468.1098	C20 H24 O9 S	-			C09105	442036
Hydnocarpic acid	X	X	X		9.749	252.2089	C16 H28 O2	+			C16795	110680
Levan	X	X	X		1.016	504.1672	C18 H32 O16	-			C06215	440946
Lys Lys Gly	X	X	X		5.934	377.2258	C14 H29 N5 O4	-				
Met Trp Glu	X	X			10.589	492.1678	C21 H28 N4 O6 S	-				
Meteloidine	X	X			5.385	315.1683	C13 H21 N O4	-			C10861	443006
N-Acetylleucine	X	X			5.710	173.1055	C8 H15 N O3	-				1995
N-Methylpelletierine	X	X	X		6.429	201.1364	C9 H17 N O	-			C06184	86786
PA(22:2/0:0)	X	X	X		6.118	490.3105	C25 H47 O7 P	-				
Pachymic acid	X	X			5.487	642.3713	C33 H52 O5	-			C17044	316448
Paromamine	X	X	X		5.176	369.1758	C12 H25 N3 O7	-			C01743	439560
PI(12:0/12:0)	X	X	X		5.703	698.3983	C33 H63 O13 P	-				
Tetrahydrodipicolinate	X	X	X		7.780	153.0427	C7 H9 N O4	-				5460758
Threonine	X	X	X		8.939	233.0513	C4 H9 N O3	-				205
1,8-Diazacyclotetradecane-2,9-dione		X	X		6.118	498.3410	C12 H22 N2 O2	-			C04277	16
13,14-dihydroxy-docosanoic acid		X	X		10.059	394.3109	C22 H44 O4	+				102450
(R,S)-Tetrahydrobenzylisoquinoline		X	X	X	7.463	223.1366	C16 H17 N	+			C05201	98468
2-Methylpropanal oxime		X	X	X	6.879	87.0683	C4 H9 N O	+			C03219	5324281
3-Hydroxy-4-methoxybenzyl alcohol		X		X	5.078	154.063	C8 H10 O3	+	479	804		78089
3-Oxosteroid		X	X	X	8.419	291.2562	C19 H30 O	+			C01876	439594

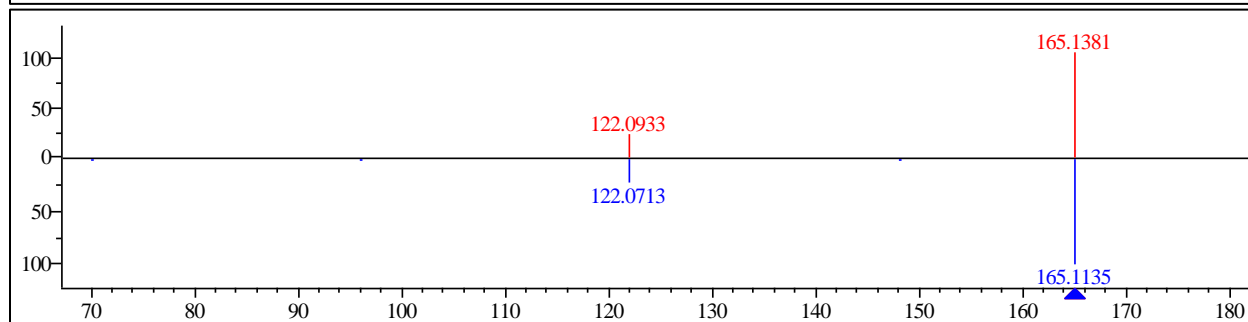
4-Dodecylphenol		X	X	X	11.465	279.2561	C18 H30 O	+			C14245	66030
5-(1-oxopropan-2-yl)isolongifol-5-ene		X	X	X	11.149	260.2132	C18 H28 O	+				
6-(2-Chloroallylthio)purine		X	X		7.239	247.9896	C8 H7 Cl N4 S	+			C15397	3247797
Aniracetam		X	X	X	8.231	201.0790	C12 H13 N O3	-			C13355	2196
Benzylamine		X			8.278	107.0735	C7 H9 N	+	539	983	C15562	7504
1 α ,24,25,28-tetrahydroxyvitamin D2		X	X		6.213	460.3189	C28 H44 O5	-				
MG(18:1)		X	X	X	8.908	373.3185	C21 H40 O4	+				
Miotine		X	X	X	6.023	222.1369	C12 H18 N2 O2	+			C11763	46092
O-decanoyl-R-carnitine		X	X		6.305	361.2453	C17 H33 N O4	-				
Palmitoylglycine		X		X	9.931	335.2469	C18 H35 N O3	+				151008
PC(18:1/22:6)		X	X	X	6.813	831.5785	C48 H82 N O8 P	+				
PG(18:4/20:4)		X	X	X	12.183	790.4734	C44 H71 O10 P	+				
Purine		X			8.811	120.0436	C5 H4 N4	+	791	993	C15587	1044
S-(4,5-Dihydro-2-methyl-3-furanyl) ethanethioate		X	X	X	5.915	186.0353	C7 H10 O2 S	-				5463955
Tris(2-butoxyethyl)phosphate		X	X	X	12.185	398.2433	C18 H39 O7 P	+	829	922	C14446	6540
3-Acetyl-8-methoxycoumarin			X		5.846	218.0579	C12 H10 O4	+	661	881		
1-(2-Pyrimidyl)piperazine				X	5.37	164.1062	C8 H12 N4	+	559	998		88747
1-Butylimidazole			X		4.977	124.1	C7 H12 N2	+	449	852		61347
2-Hydroxy-6'-methoxyacetophenone				X	10.183	166.063	C9 H10 O3	+	153	601		69709
4-(4-Aminophenoxy)aniline				X	5.892	200.095	C12 H12 N2 O	+	454	893		
6-Hydroxymelatonin				X	1.184	248.1161	C13 H16 N2 O3	+	422	890	C05643	1864
Atractyloside C			X	X	13.415	442.2598	C21 H36 O7	-				
Benzofuran			X	X	7.921	118.0419	C8 H6 O	+			C14512	9223
α -Lipoic acid			X		5.666	206.0435	C8 H14 O2 S2	+	476	775	C00725	864
Ephedrine			X		31.317	165.1154	C10 H15 N O	+	560	999	C01575	5032
Hexaethylene glycol			X		5.443	282.1679	C12 H26 O7	+	765	949		17472
Arogenate			X	X	6.828	227.0775	C10 H13 N O5	-				193887
Tetradecylamine			X		7.876	213.2456	C14 H31 N	+	522	957		

EBC from healthy non-smokers

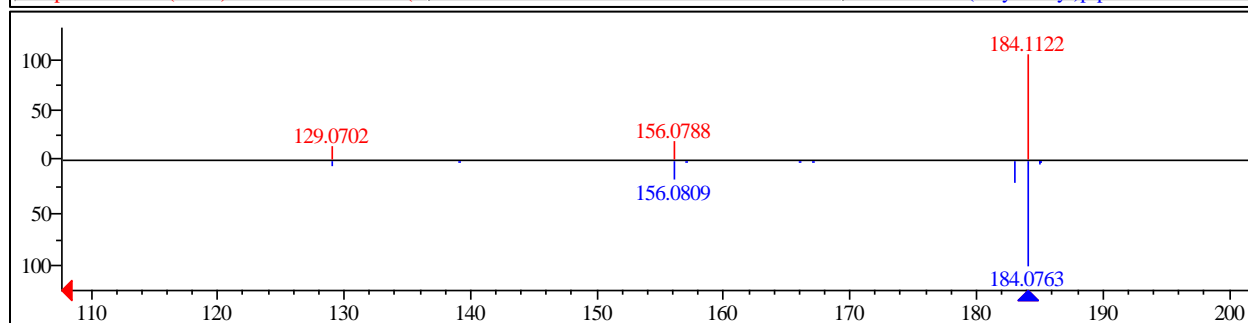




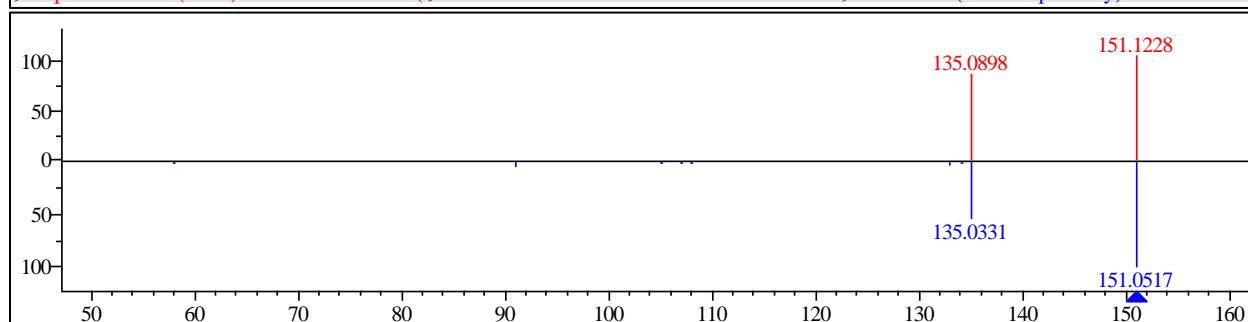
▲ Cpd 21: 5.072: (M+H)+: +ESI Product Ion (t) | Head to Tail MF=413 RMF=928 | ▼ 3-Hydroxy-4-methoxybenzyl alcohol



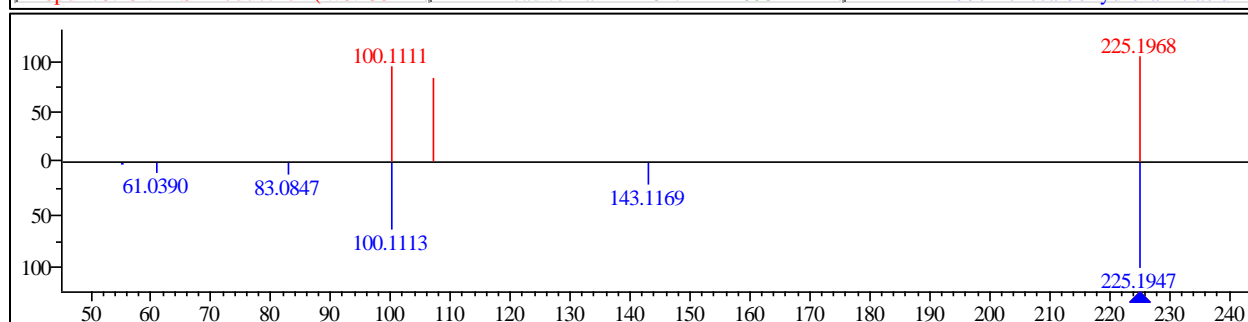
▲ Cpd 71: 5.370: (M+H)+: +ESI Product Ion (rt) | Head to Tail MF=559 RMF=998 | ▼ 1-(2-Pyrimidinyl)piperazine



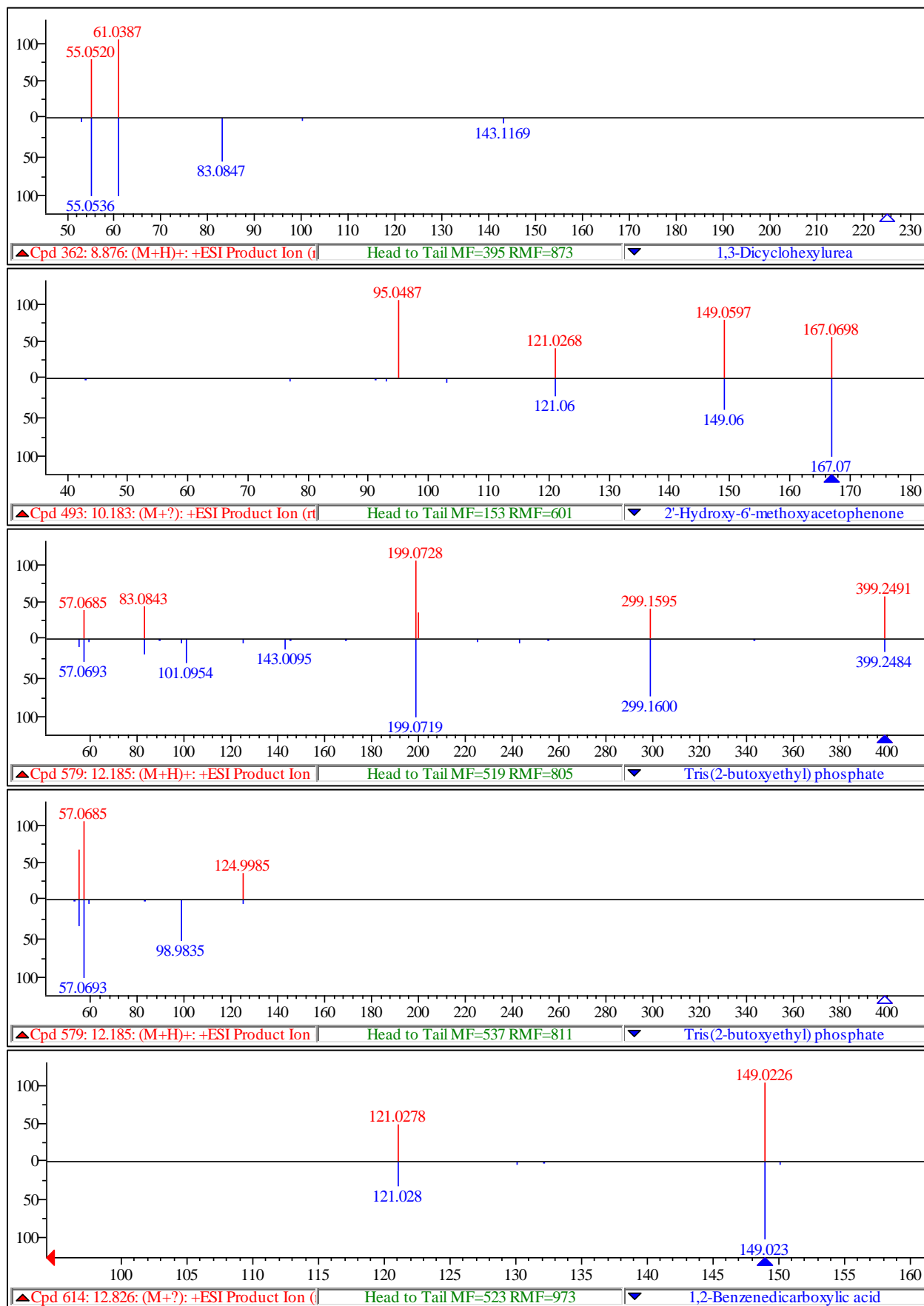
▲ Cpd 125: 5.892: (M+H)+: +ESI Product Ion (t) | Head to Tail MF=454 RMF=893 | ▼ 4-(4-Aminophenoxy)aniline



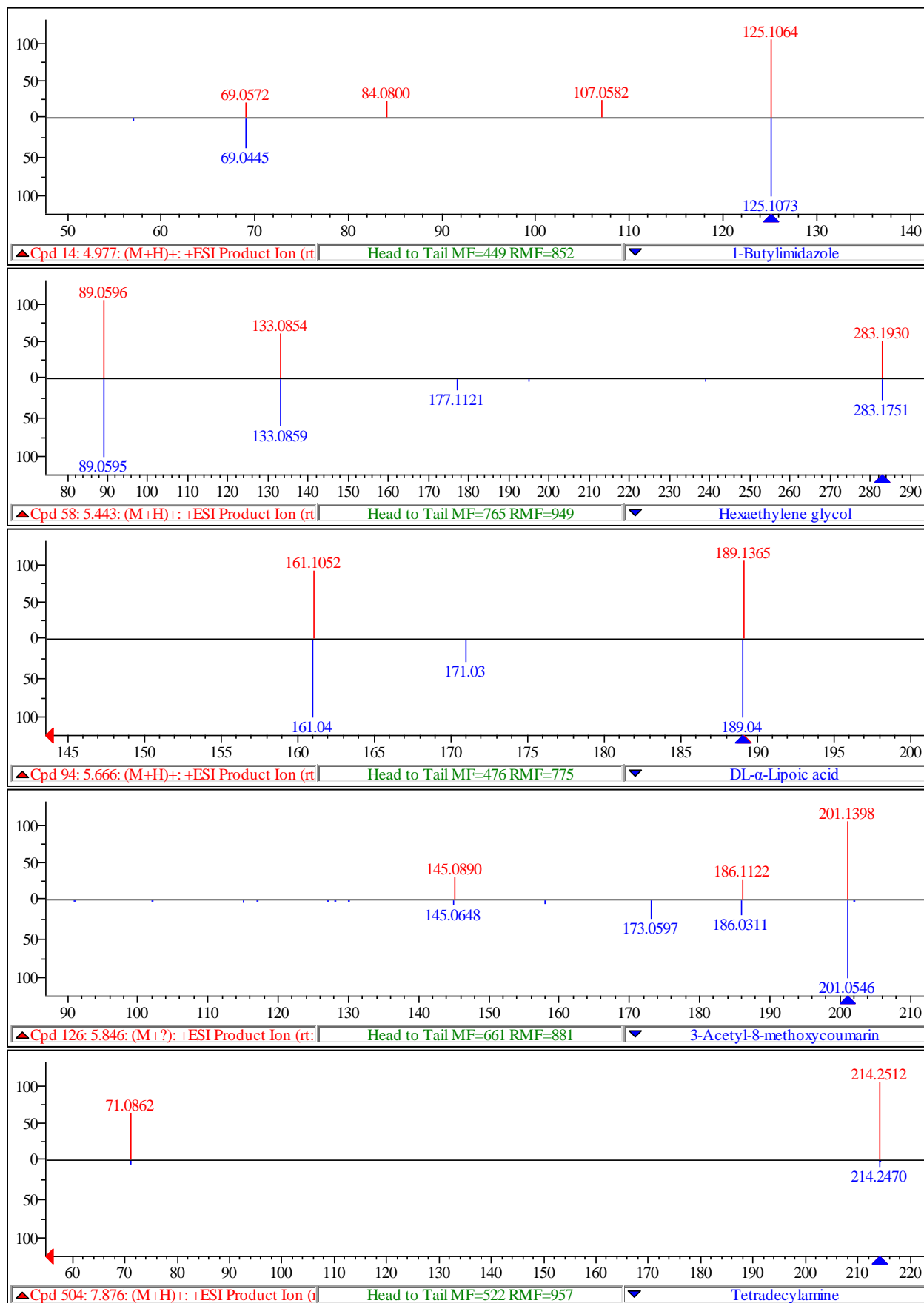
▲ Cpd 2: 5.182: +ESI Product Ion (rt: 5.138 min) | Head to Tail MF=527 RMF=993 | ▼ 2-Aminobenzenecarbohydroxamic acid

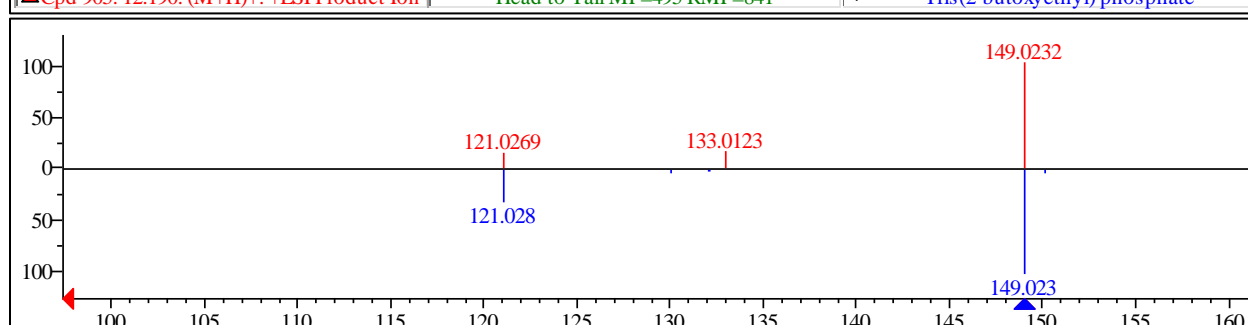
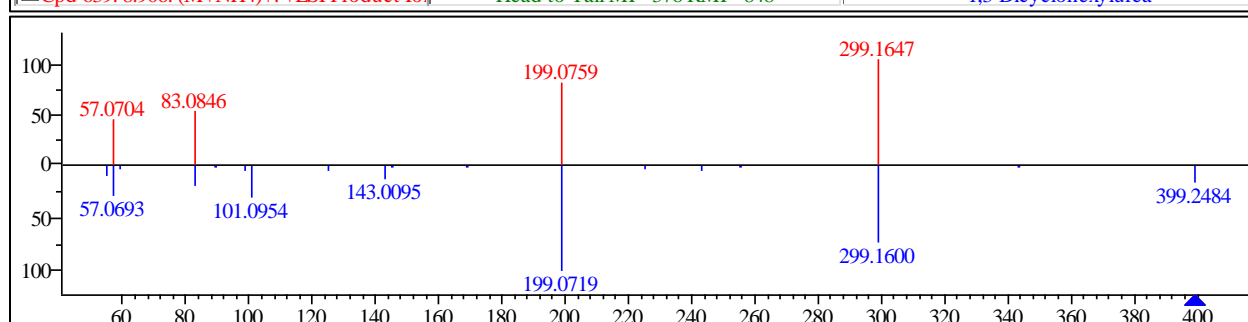
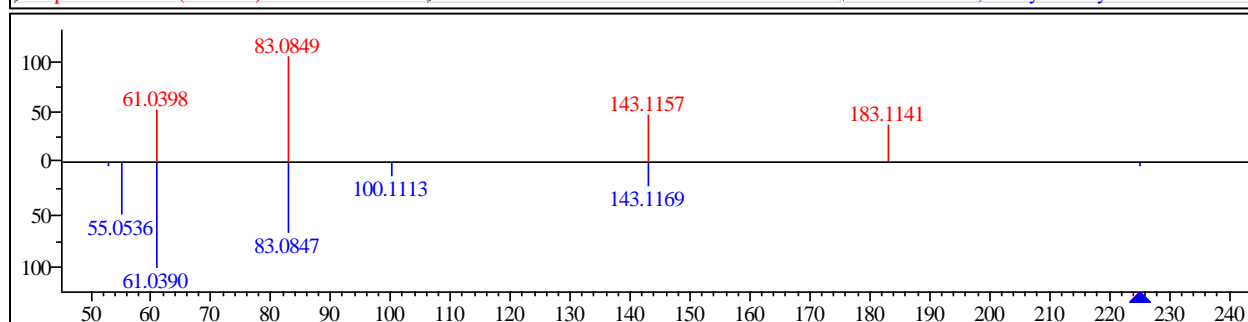
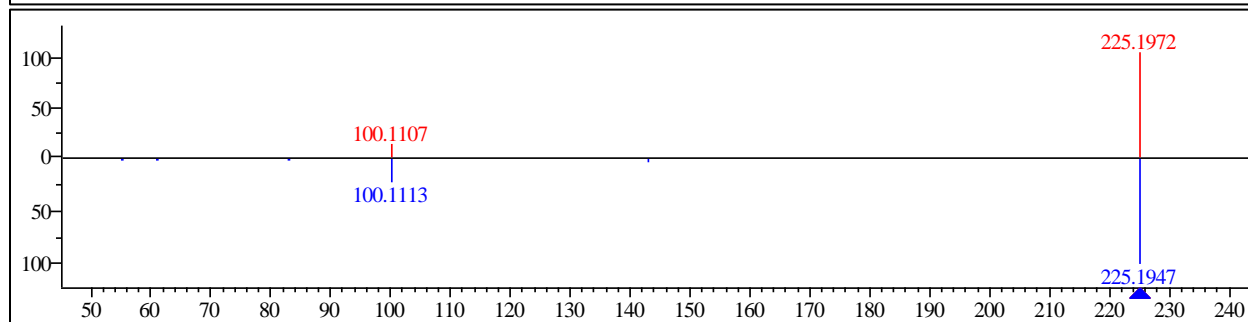
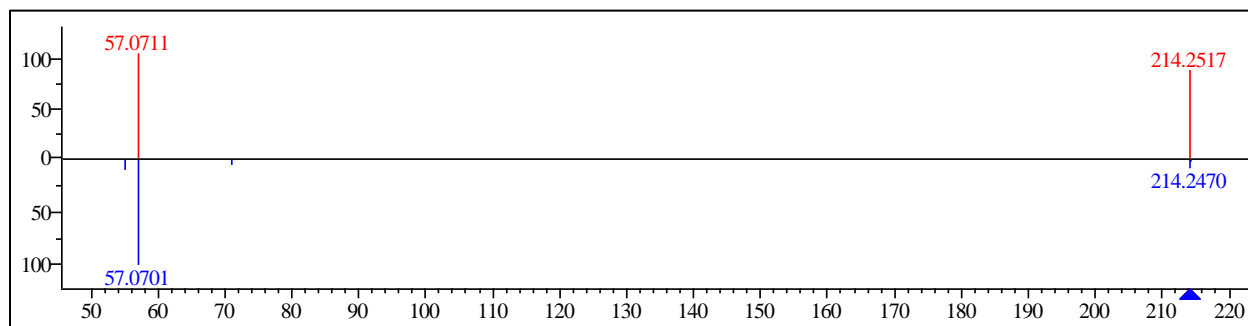


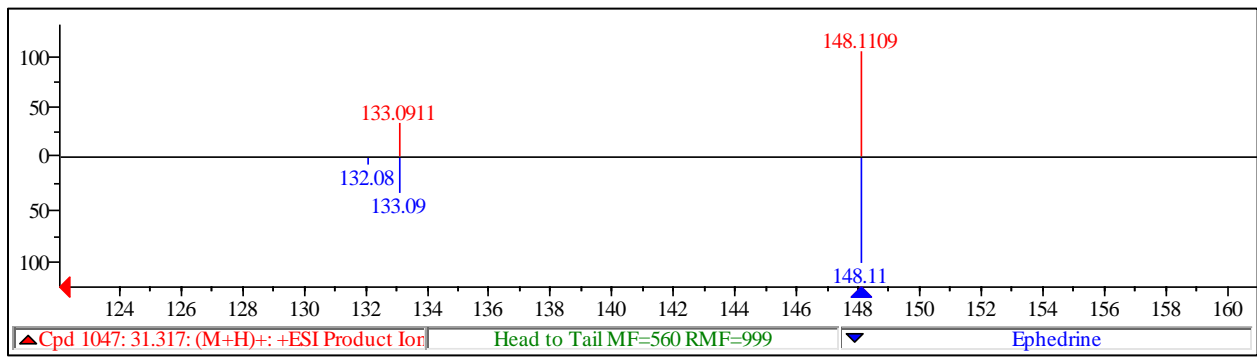
▲ Cpd 362: 8.876: (M+H)+: +ESI Product Ion (t) | Head to Tail MF=473 RMF=789 | ▼ 1,3-Dicyclohexylurea



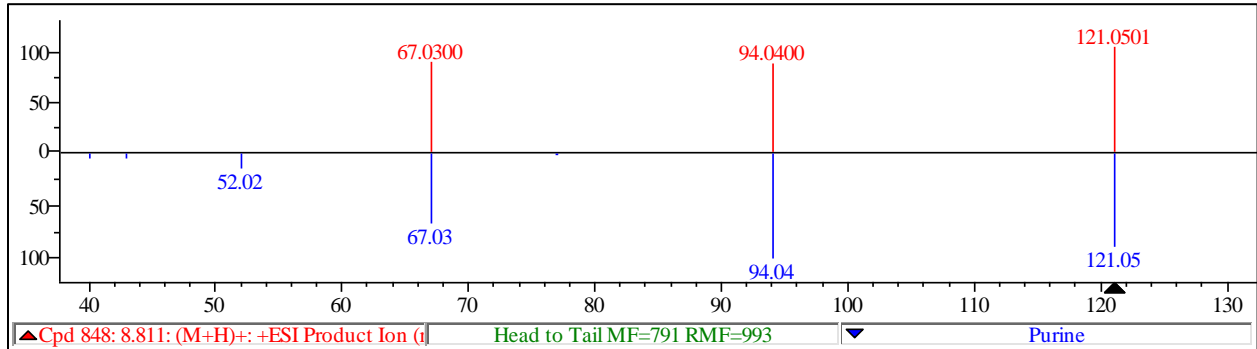
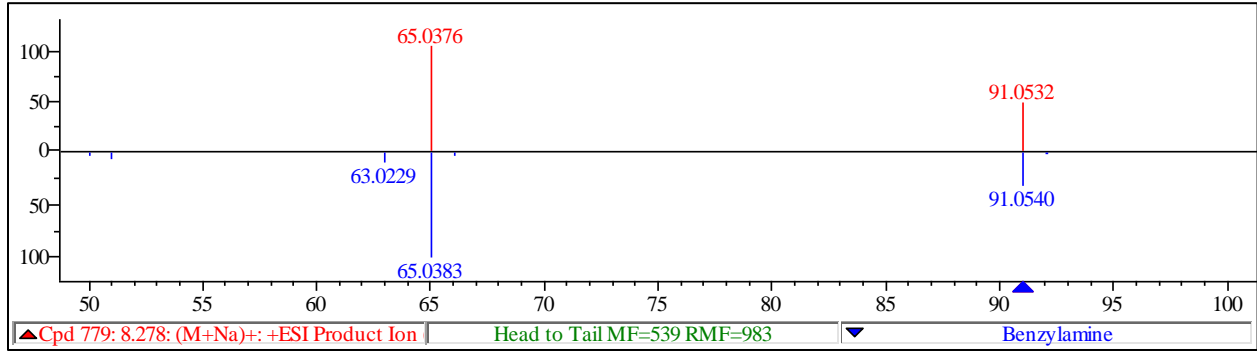
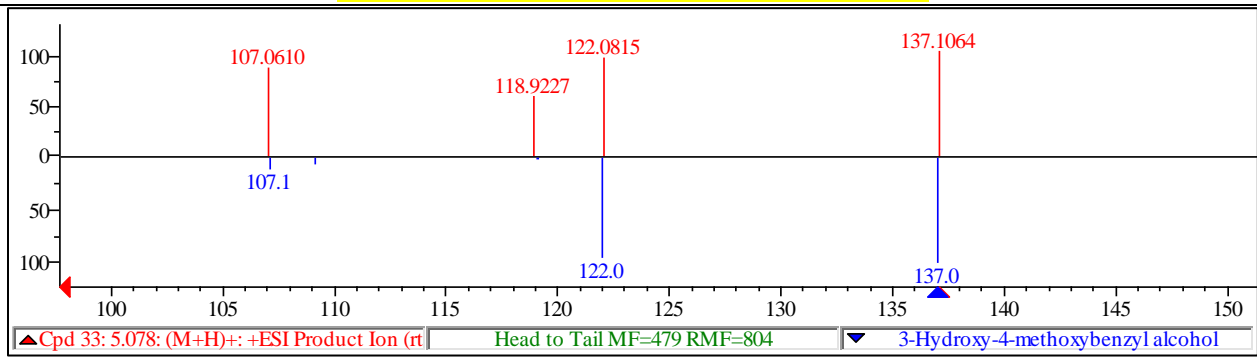
EBC from non-smokers with the common cold

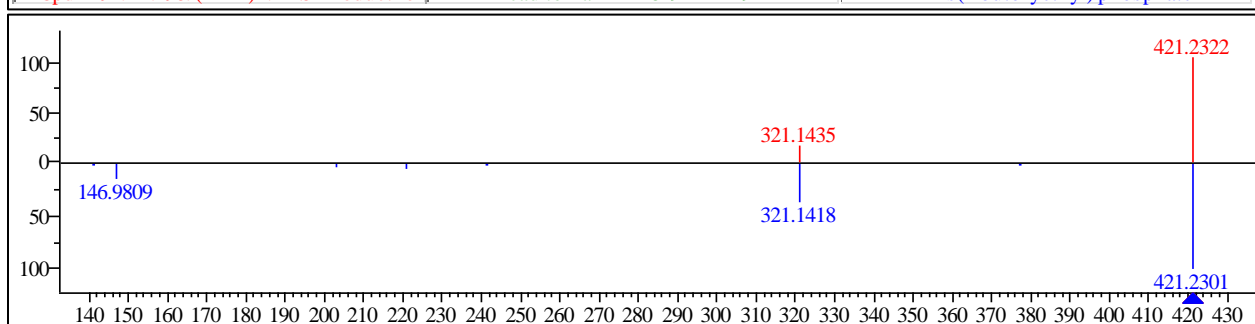
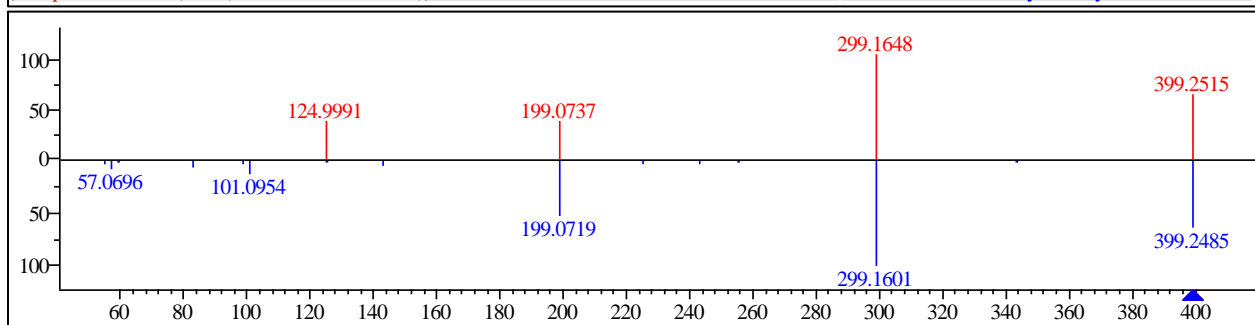
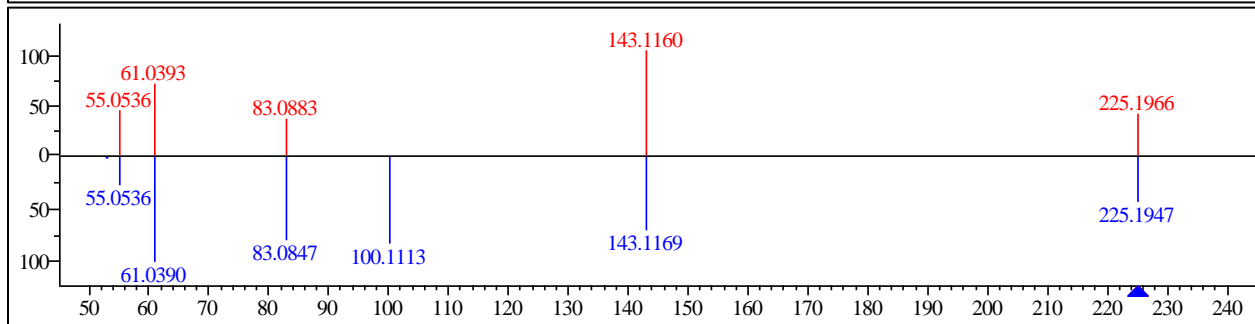
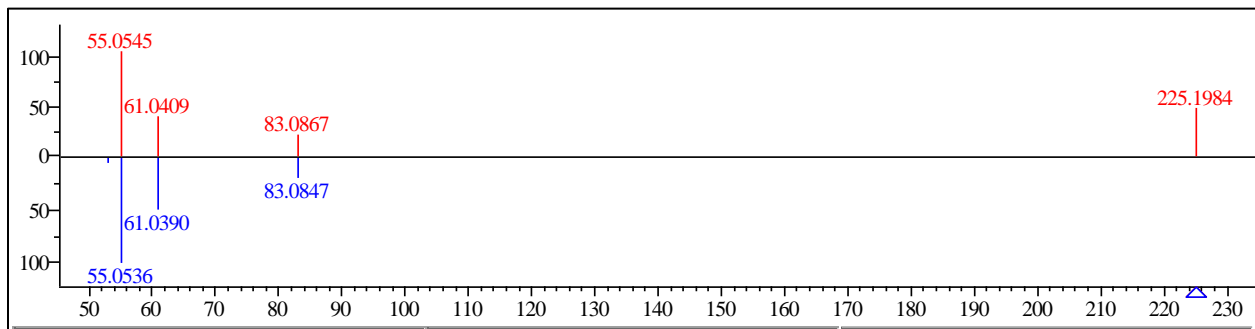






EBC from non-smokers with nasal congestion





EBC from healthy non-smokers

