APPENDICES

APPENDIX A

Data of pharmacognostic specifications of five root species in Ben-Cha-Moon-Yai remedy

Table 51 Pharmacognostic characters (% by weight) of *A. marmelos* root

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
1	Tak (Meung)	1	7.08	3.47	0.56	10.43	5.01	4.46
		2	7.23	3.46	0.54	10.34	4.96	4.41
		3	7.71	3.46	0.50	10.42	5.18	4.13
2	Lop Buri	1	6.95	3.34	0.50	8.43	4.61	4.26
		2	6.90	3.39	0.45	9.90	4.29	4.23
		3	6.96	3.24	0.62	9.40	4.11	4.40
3	Buri Ram	1	7.08	4.56	0.80	10.42	6.58	6.05
		2	6.96	4.73	0.91	10.32	6.17	6.78
		3	6.89	4.55	0.90	10.34	7.01	5.96
4	Phetchaboon	1	5.41	5.59	0.87	8.44	7.19	6.19
		2	5.51	5.46	0.78	8.44	7.50	6.22
		3	5.40	5.43	0.82	6.95	7.31	6.31

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
5	Tak (Maesot)	1	6.17	3.40	0.65	7.94	4.37	4.33
		2	6.21	3.33	0.48	9.04	4.34	4.62
		3	6.25	3.35	0.54	8.74	4.43	4.80
6	Ubon Ratchathani	1	7.14	4.09	1.26	9.42	6.88	6.59
		2	7.29	4.12	1.16	8.94	6.30	6.75
		3	7.39	4.08	1.13	5.95	6.81	6.93
7	Uthai Thani	1	6.78	2.50	0.29	9.71	4.80	6.64
		2	6.41	2.58	0.29	9.93	4.62	6.69
		3	6.47	2.59	0.38	9.54	4.71	6.58
8	Kalasin	1	6.52	4.33	1.00	8.92	7.75	8.10
		2	6.45	4.29	0.98	8.82	7.76	6.77
		3	6.50	4.24	0.92	8.72	6.99	7.20

Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
9 Uttaradit	1	7.79	5.51	0.57	10.68	1.58	13.59
	2	7.76	5.45	0.56	10.79	1.60	13.61
	3	7.80	5.43	0.51	9.69	1.74	13.49
10 Nong Khai	1	7.73	3.83	0.85	12.80	4.51	7.01
	2	7.65	5.45	0.56	11.02	4.50	7.03
	3	7.80	5.43	0.51	10.91	4.39	7.09
11 Mukdahan(Meung)	1	7.94	3.73	0.76	10.40	5.14	4.78
	2	7.87	3.89	0.76	10.71	5.23	4.70
	3	7.86	3.84	0.88	10.54	5.37	5.02
12 Mukdahan(Nongsung)	1	7.11	2.90	0.35	9.80	4.57	5.56
	2	7.34	2.91	0.36	9.83	4.40	5.79
	3	7.34	2.87	0.43	10.00	4.39	6.13

Table 52 Pharmacognostic characters (% by weight) of *D. longan* root

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
1	Uthai Thani	1	6.71	2.49	0.28	9.09	5.51	4.26
		2	6.72	2.51	0.27	8.91	5.65	3.79
		3	6.48	2.72	0.26	8.47	5.70	4.63
2	Lop Buri	1	6.92	2.70	0.39	10.94	8.67	5.55
		2	6.96	2.79	0.37	10.32	8.47	6.04
		3	6.90	2.83	0.35	10.34	8.69	5.73
3	Buri Ram	1	7.75	2.66	0.52	11.18	10.61	6.49
		2	7.71	2.91	0.56	11.63	10.62	5.61
		3	7.67	2.87	0.56	12.28	11.76	7.32
4	Phetchabun	1	8.96	4.03	0.64	10.26	6.95	4.49
		2	8.96	4.22	0.58	9.92	7.37	4.89
		3	8.96	4.26	0.65	10.15	6.90	Broke

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
5	Tak (Meung)	1	7.23	5.54	1.33	12.46	6.10	3.60
		2	7.25	5.43	1.27	12.71	6.57	3.80
		3	7.38	5.24	1.23	11.46	7.61	3.92
6	Tak (Maesot)	1	8.76	3.38		9.81	5.36	5.77
		2	8.85	3.68	0.48	8.91	5.38	5.28
		3	8.77	3.70	0.79	9.13	4.90	5.48
7	Ubon Ratchathani	1	8.11	3.20	1.10	10.11	9.20	5.08
		2	7.88	5.85	3.79	10.88	9.40	5.53
		3	7.28	3.37		10.59	8.91	4.67
8	Chiang Rai	1	7.43	3.64	0.64	10.44	4.00	3.67
		2	7.76	3.27	0.54	10.38	5.46	3.05
		3	7.75	4.10	0.99	9.63	4.12	3.69

Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
9 Kalasin	1	8.37	3.84	0.60	9.91	7.69	4.86
	2	8.39	3.43	0.59	10.82	7.99	4.82
	3	8.52	3.44	0.44	10.65	8.25	4.72
10 Uttaradit	1	10.24	2.49	0.35	11.91	10.42	5.96
	2	10.22			13.18	9.26	5.61
	3	10.22	2.25	0.31	11.93	9.90	5.42
11 Nong Khai	1	7.65	2.03	0.37	9.42	10.29	6.63
	2	8.00	2.03	0.38	9.63	9.73	7.27
	3	7.74	2.01	0.35	10.05	10.21	5.89
12 Mukdahan	1	7.40	7.58	5.69	10.04	6.96	6.08
	2	7.41	7.11	5.75	9.95	6.16	5.80
	3	7.37	6.76	5.21	10.31	6.19	5.84
13 Nan	1	8.18	2.59	0.42	11.54	7.09	4.16
	2	8.19	2.62	0.41	11.46	7.20	4.07
	3	8.14	2.61	0.39	11.44	7.41	3.82

Table 53 Pharmacognostic characters (% by weight) of *D. serrulata* root

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
1	Buri Ram (Prakonchai)	1	7.89	3.97	1.09	14.37	4.06	7.56
		2	7.95	3.96	0.95	13.69	4.13	7.37
		3	7.95	3.98	0.81	13.38	4.07	7.04
2	Tak (Maesot)	1	7.35	4.11	0.80	10.98	4.39	5.59
		2	7.29	4.35	0.82	9.79	4.40	5.15
		3	7.31	4.19	0.79	9.79	4.41	4.66
3	Uttaradit	1	9.10	2.58	0.74	14.17	3.03	11.36
		2	9.08	2.62	0.44	13.59	3.00	12.16
		3	9.05	2.64	0.79	12.59	2.84	11.90
4	Nakhon Ratchasima	1	8.63	2.83	0.38	14.19	1.58	3.72
		2	8.69	2.85	0.48	15.18	0.16	3.65
		3	8.73	2.84	0.37	15.59	1.61	3.56
5	Nan	1	7.75	4.36	0.58	12.59	4.14	16.41
		2	7.70	4.30	0.61	12.19	4.29	15.13
		3	7.69	4.13	0.63	13.79	4.49	15.38

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
6	Nong Khai	1	7.45	1.14	0.38	10.88	4.28	10.38
		2	7.63	1.11	0.43	12.08	4.52	10.67
		3	7.51	1.11	0.31	11.27	4.14	9.77
7	Tak	1	6.67	4.20	0.62	10.67	2.48	8.62
		2	6.72	4.13	0.58	10.97	2.25	8.79
		3	6.66	4.15	0.53	10.98	2.22	7.82
8	Lop Buri	1	7.21	4.12	0.60	13.57	6.11	12.92
		2	7.19	4.14	0.60	11.60	6.25	12.77
		3	7.22	4.08	0.59	11.59	6.26	12.12
9	Chaiyaphum	1	8.40	4.10	3.10	12.79	5.55	5.81
		2	8.51	4.05	4.13	12.00	5.80	5.60
		3	8.47	4.05		12.60	5.62	5.42
10	Ubon Ratchathani	1	7.11	2.63	0.50	10.56	7.26	13.17
		2	7.17	2.61	0.35	10.98	7.63	13.11
		3	7.14	2.60	0.45	11.65	7.59	14.24

Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
11 Uthai Thani	1	7.39	5.34	0.65	10.19	7.08	20.44
	2	7.50	5.37	0.80	11.19	7.10	19.80
	3	7.37	5.17		10.79	7.01	18.77
12 Buri Ram (Meung)	1	9.32	3.45	0.75	15.77	4.20	7.41
	2	9.25	3.43	0.67	13.99	4.29	7.95
	3	9.34	3.43	0.72	14.09	4.11	7.43
13 Phetchabun	1	7.78	4.96	0.78	13.19	4.59	11.60
	2	7.48	5.01	0.73	13.99	4.62	11.76
	3	7.70	4.78	0.57	9.19	4.53	11.31
14 Mukdahan	1	7.83	3.25	0.67	14.78	4.54	10.10
	2	7.65	3.20	0.51	13.19	4.15	9.80
	3	7.57	3.19	0.63	12.98	3.77	8.79

Table 54 Pharmacognostic characters (% by weight) of *O. indicum* root

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
1	Lop Buri	1	8.12	5.93	0.90	10.38	12.62	24.49
		2	8.03	6.15	1.05	10.48	13.23	26.13
		3	8.14	6.12	1.03	12.46	13.28	26.67
2	Kalasin	1	6.61	8.49	2.62	8.98	7.14	13.24
		2	6.62	8.22	2.18	9.18	7.64	14.09
		3	6.60	8.40	2.50	8.99	7.84	15.09
3	Chiang Rai	1	9.89	6.69	1.07	9.47	5.02	10.14
		2	7.27	6.95	1.25	9.17	4.66	9.96
		3	7.25	6.91	1.20	8.47	4.06	9.72
4	Ubon Ratchathani	1	6.07	7.27	2.68	8.98	9.93	23.01
		2	6.10	7.13	2.59	8.18	9.95	25.03
		3	6.10	7.08	2.52	8.48	9.41	25.48
5	Mukdahan	1	8.08	3.93	0.67	10.57	9.90	22.50
		2	6.82	3.92	0.69	10.58	10.02	22.77
		3	7.50			11.56	10.51	22.68

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
6	Uthai Thani	1	6.74	4.15	0.60	9.48	10.95	26.96
		2	9.06	4.12	0.52	9.78	10.37	30.64
		3	6.77	4.32	0.63	9.18	8.86	29.93
7	Phetchabun	1	7.38	5.16	0.95	11.67	7.79	15.90
		2	7.40	5.15	0.82	11.38	8.04	52.47
		3	7.32	5.20	0.93	12.36	7.85	16.25
8	Chaiyaphum	1	6.87	3.97	0.76	10.79	13.46	24.84
		2	6.94	3.96	0.74	13.19	13.56	26.12
		3	6.93	3.96	0.74	11.99	14.63	26.52
9	Tak (Meung)	1	6.99	8.46	2.44	10.49	3.54	8.08
		2	7.01	8.51	2.61	10.89	3.39	7.89
		3	6.97	8.38	2.31	10.09	3.49	7.92
10	Nan	1	7.30	3.60	0.72	11.89	6.59	25.48
		2	7.19	3.59	0.63	10.19	5.95	25.30
		3	7.25	3.60	0.68	11.78	4.46	16.88

Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
11 Tak (Maesot)	1	6.06	6.65	1.21	11.98	7.10	17.86
	2	5.83	6.59	1.36	11.57	7.41	16.88
	3	5.86	6.61	1.19	11.68	6.85	17.94
12 Nong Khai	1	6.55	5.59	1.58	12.77	6.22	10.62
	2	6.55	5.67	1.76	11.17	6.11	10.40
	3	6.53	5.69	1.56	10.59	5.97	28.56
13 Buri Ram	1	5.51	2.05	0.35	11.19	4.14	6.87
	2	5.49	2.11	0.42	10.78	3.70	7.36
	3	5.49	2.11	0.38	10.98	3.53	6.80

Table 55 Pharmacognostic characters (% by weight) of *W. trichostemon* root

	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
1	Lop Buri	1	5.87	1.85	0.31	11.57	5.04	3.84
		2	5.81	1.85	0.30	12.17	4.78	3.58
		3	5.70	1.90	0.35	11.48	4.73	3.72
2	Nan (Nanoi)	1	7.15	2.44	0.55	13.97	10.70	7.41
		2	7.15	2.41	0.53	13.17	9.98	7.25
		3	7.13	2.35	0.50	11.57	10.50	6.76
3	Mukdahan (Meung)	1	6.46	2.02	0.83	11.57	3.09	3.21
		2	6.62	2.14		12.57	3.16	3.79
		3	6.54	2.11	0.87	12.47	2.91	3.71
4	Phetchabun	1	7.98	3.92	1.00	15.38	7.14	6.19
		2	7.98	3.93	0.89	15.77	6.92	6.02
		3	8.23	3.81	0.91	15.18	7.00	6.43
5	Mukdahan (Nongsung)	1	7.01	2.58	0.45	11.19	6.20	3.94
		2	7.01	2.51	0.37	11.98	6.21	4.09
		3	6.91	2.58	0.40	12.47	5.89	4.14

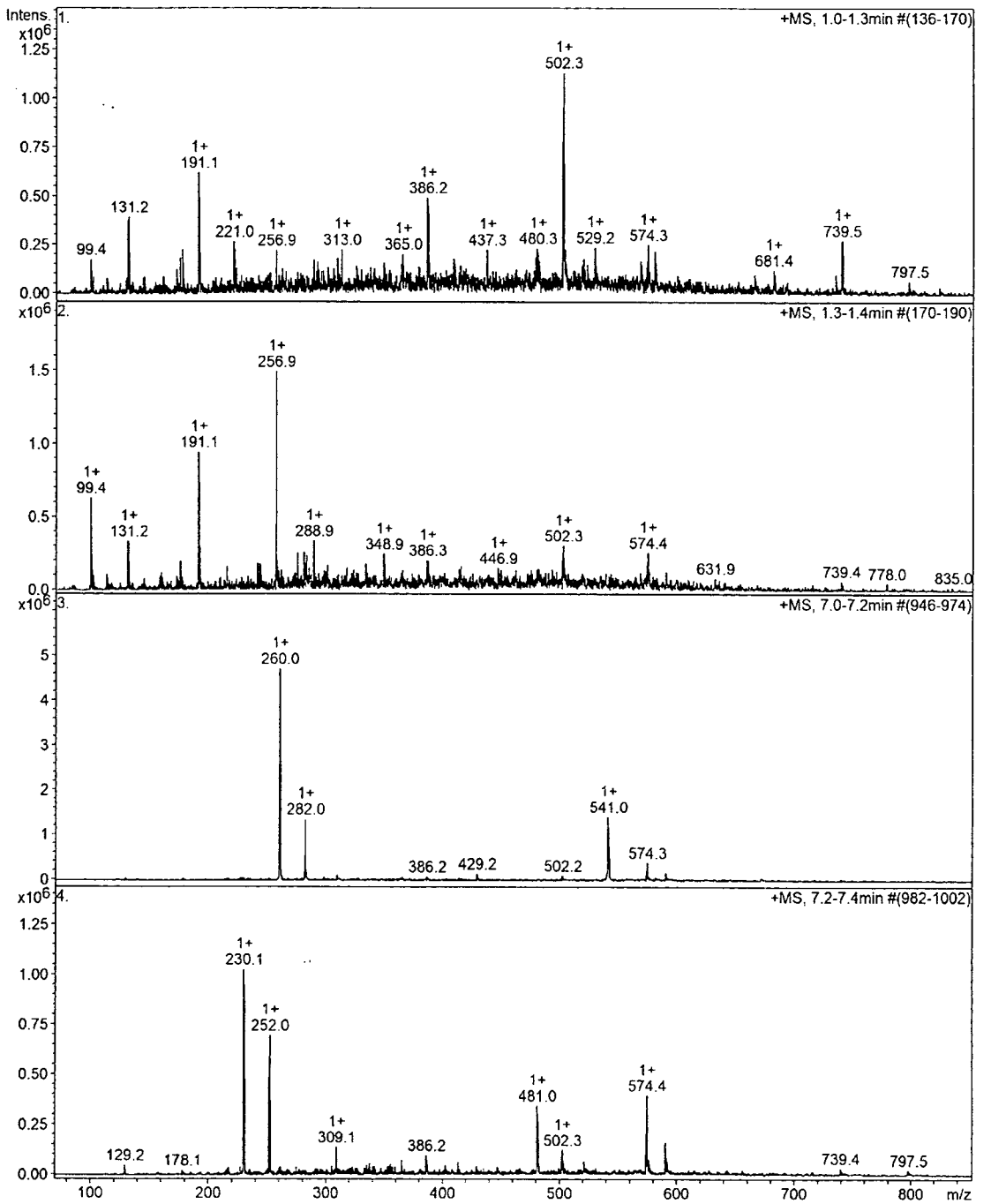
	Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
6	Chaiyaphum	1	8.28	1.60	0.32	15.49	3.19	3.81
		2	8.15	1.61	0.33	16.17	3.46	3.75
		3	8.24	1.59	0.29	16.36	3.39	3.47
7	Buri Ram (Meung)	1	6.80	2.27	0.38	13.56	6.22	10.42
		2	6.71	2.33	0.39	13.96	6.43	9.37
		3	6.72	2.28	0.38	14.35	6.53	8.61
8	Uthai Thani	1	6.38	4.26	0.88	10.98	5.59	6.16
		2	6.44	4.34	0.76	12.17	5.74	6.48
		3	6.32	4.24	0.89	12.76	5.62	6.12
9	Nong Khai	1	6.43	2.13		13.40	4.17	4.45
		2	6.55	2.18	0.48	13.58	4.16	4.12
		3	6.54	2.17	0.46	12.77	4.26	4.59
10	Buri Ram (Prakonchai)	1	6.39	2.47	0.48	11.77	6.62	10.12
		2	6.46	2.47	0.47	11.25	6.94	10.09
		3	6.33	2.46	0.45	12.98	6.70	9.44

Sources	No	Loss on drying	Total ash content	Acid-insoluble ash content	Water content	Ethanol extractive value	Water extractive value
11 Tak	1	7.86	2.84	0.48	16.19	8.82	4.93
	2	7.75	2.88	0.46	15.77	8.51	4.94
	3	7.87	2.58	0.38	13.18	8.94	4.94
12 Surin	1	7.47	2.51	0.38	12.99	5.75	5.63
	2	9.53	2.52	0.37	12.79	5.78	5.53
	3	7.50	2.56	0.36	12.19	5.81	5.88
13 Nan (Weing Sa)	1	7.34	5.95	1.00	12.69	10.01	9.41
	2	7.36	5.71	0.94	12.57	10.58	8.48
	3	7.49	5.73	0.94	12.98	10.89	8.50

APPENDIX B

Liquid Chromatography and Mass Spectrometry

Figure 92 A representative LC/MS spectrums from *Aegle marmelos* root of compound 1-8



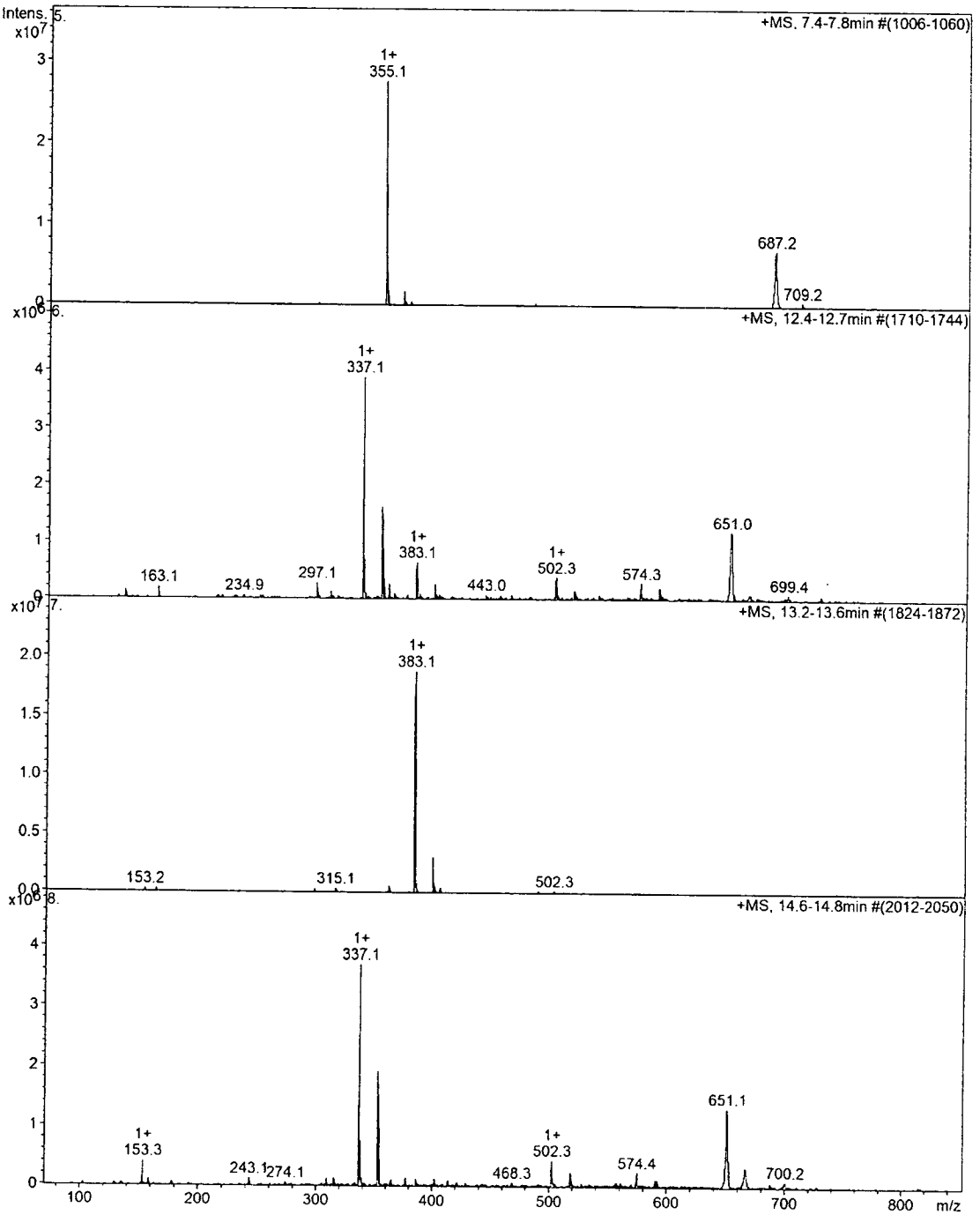
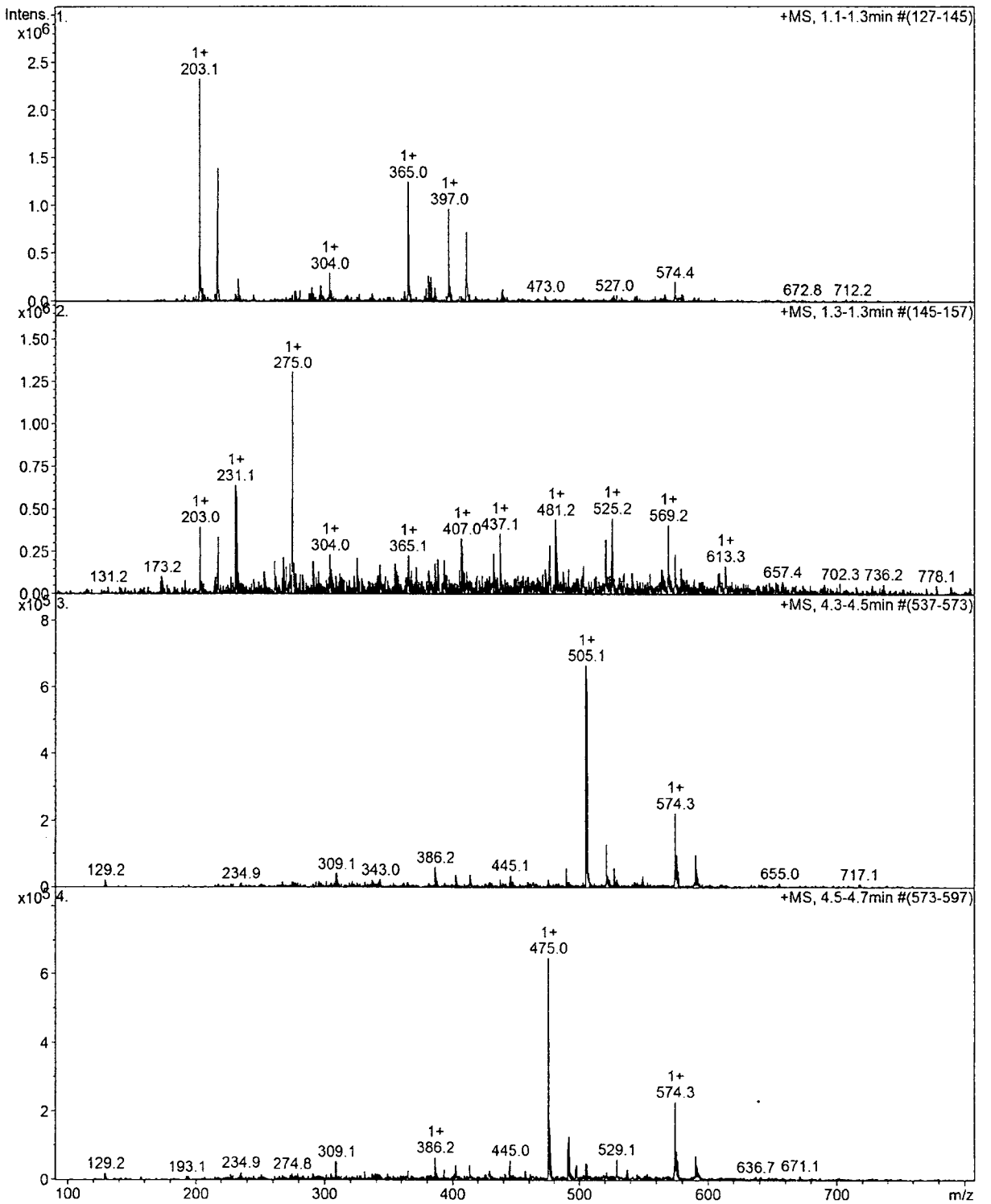
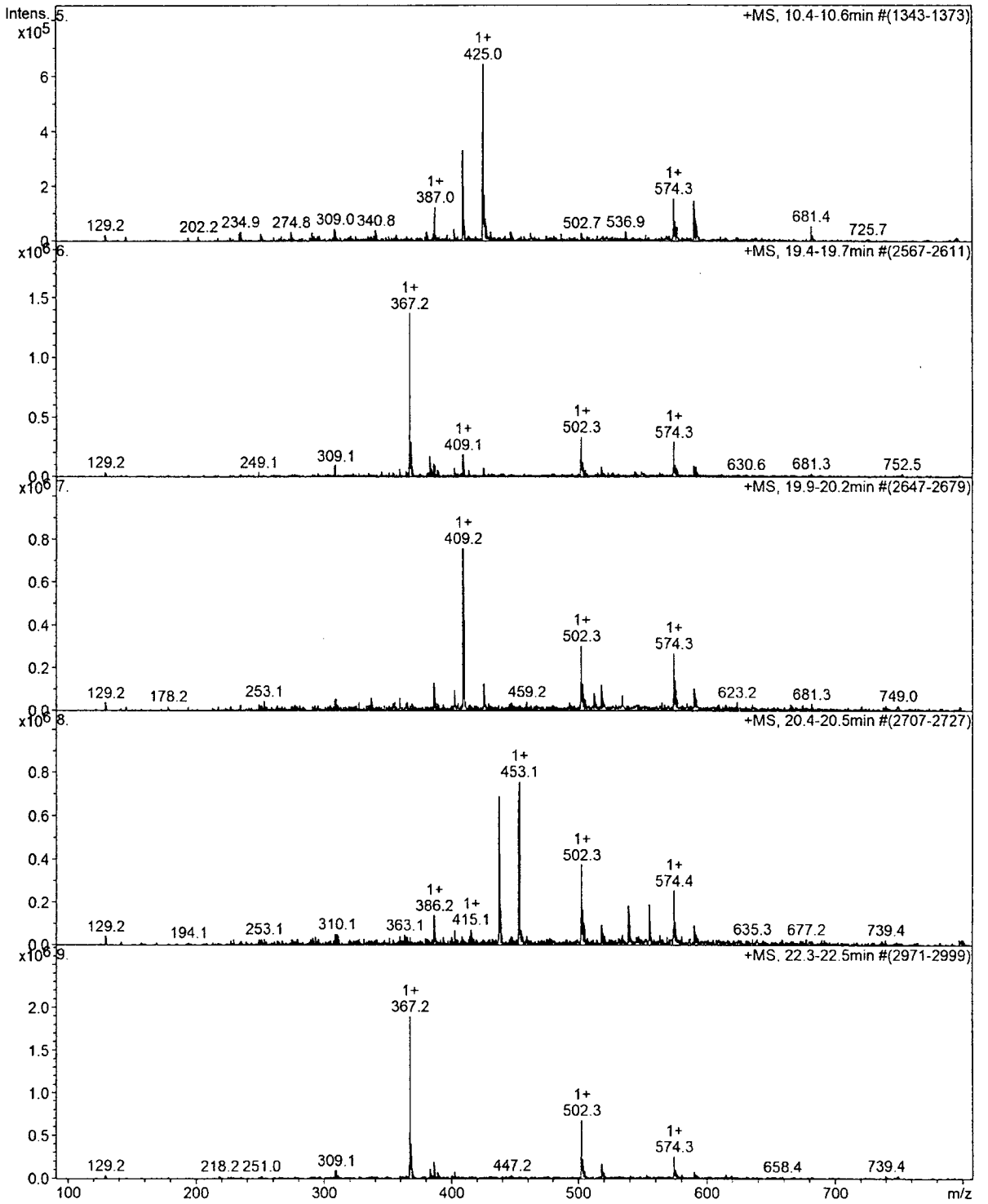

Intens.
x10^7
5.
+MS, 7.4-7.8min #(1006-1060)
1+
355.1
687.2
709.2
x10^6
6.
+MS, 12.4-12.7min #(1710-1744)
1+
337.1
1+
383.1
1+
502.3
651.0
163.1
234.9
297.1
443.0
574.3
699.4
x10^7
7.
+MS, 13.2-13.6min #(1824-1872)
1+
383.1
153.2
315.1
502.3
x10^6
8.
+MS, 14.6-14.8min #(2012-2050)
1+
337.1
651.1
1+
153.3
1+
502.3
243.1
274.1
468.3
574.4
700.2
m/z

Figure 93 A representative LC/MS spectrums from *Dimocarpus longan* root of compound 1-9




Intens.
5.
x10^5
+MS, 10.4-10.6min #(1343-1373)
1+ 425.0
1+ 387.0
1+ 574.3
129.2
202.2
234.9
274.8
309.0
340.8
502.7
536.9
681.4
725.7
6.
x10^6
+MS, 19.4-19.7min #(2567-2611)
1+ 367.2
1+ 409.1
1+ 502.3
1+ 574.3
129.2
249.1
309.1
630.6
681.3
752.5
7.
x10^6
+MS, 19.9-20.2min #(2647-2679)
1+ 409.2
1+ 502.3
1+ 574.3
129.2
178.2
253.1
459.2
623.2
681.3
749.0
8.
x10^6
+MS, 20.4-20.5min #(2707-2727)
1+ 453.1
1+ 502.3
1+ 574.4
1+ 386.2
1+ 415.1
129.2
194.1
253.1
310.1
363.1
635.3
677.2
739.4
9.
x10^6
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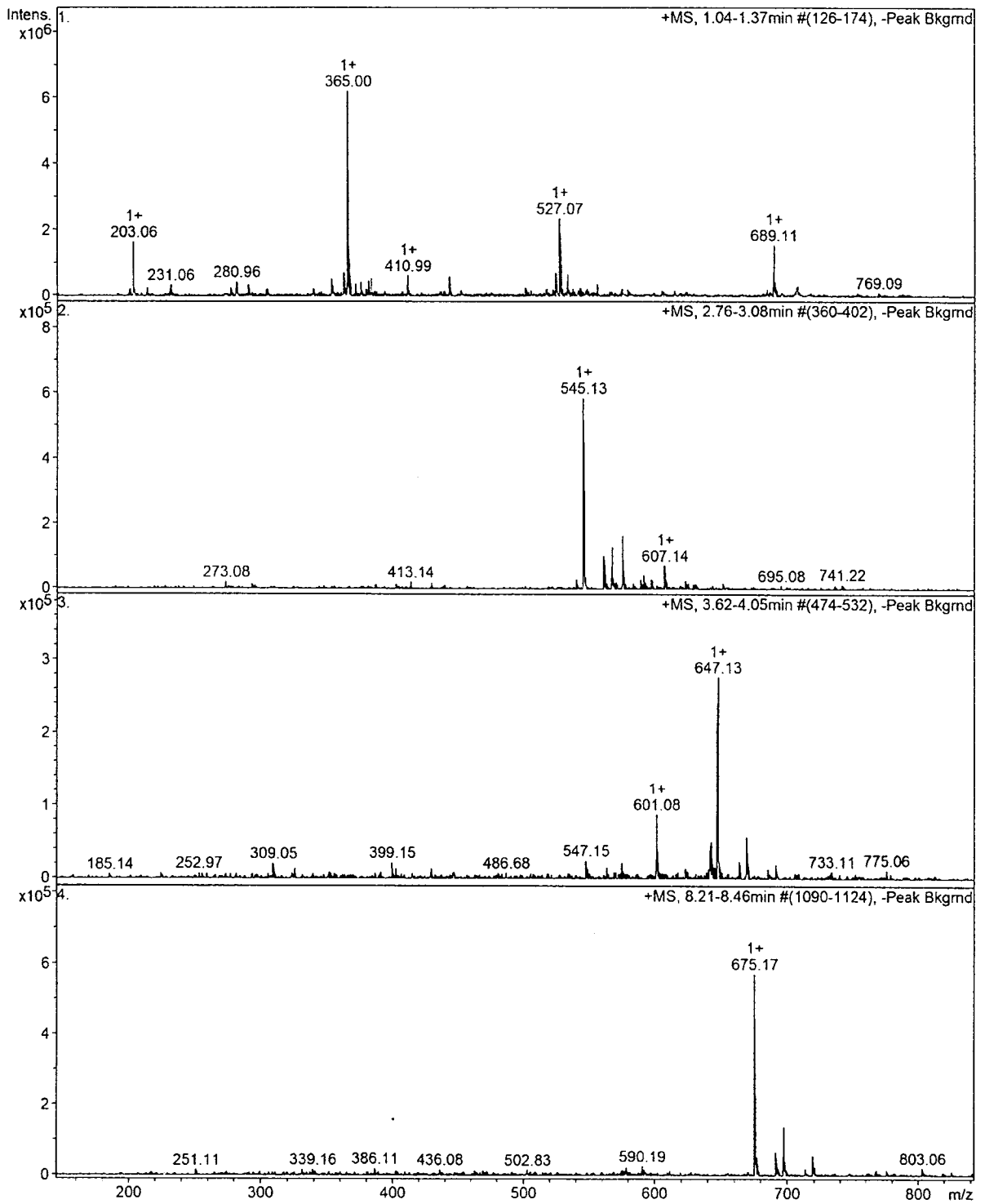
1+ 367.2
1+ 502.3
1+ 574.3
129.2
218.2
251.0
309.1
447.2
658.4
739.4
m/z

Figure 94 A representative LC/MS spectrums from *Dolichandrone serrulata* root of compound 1-11



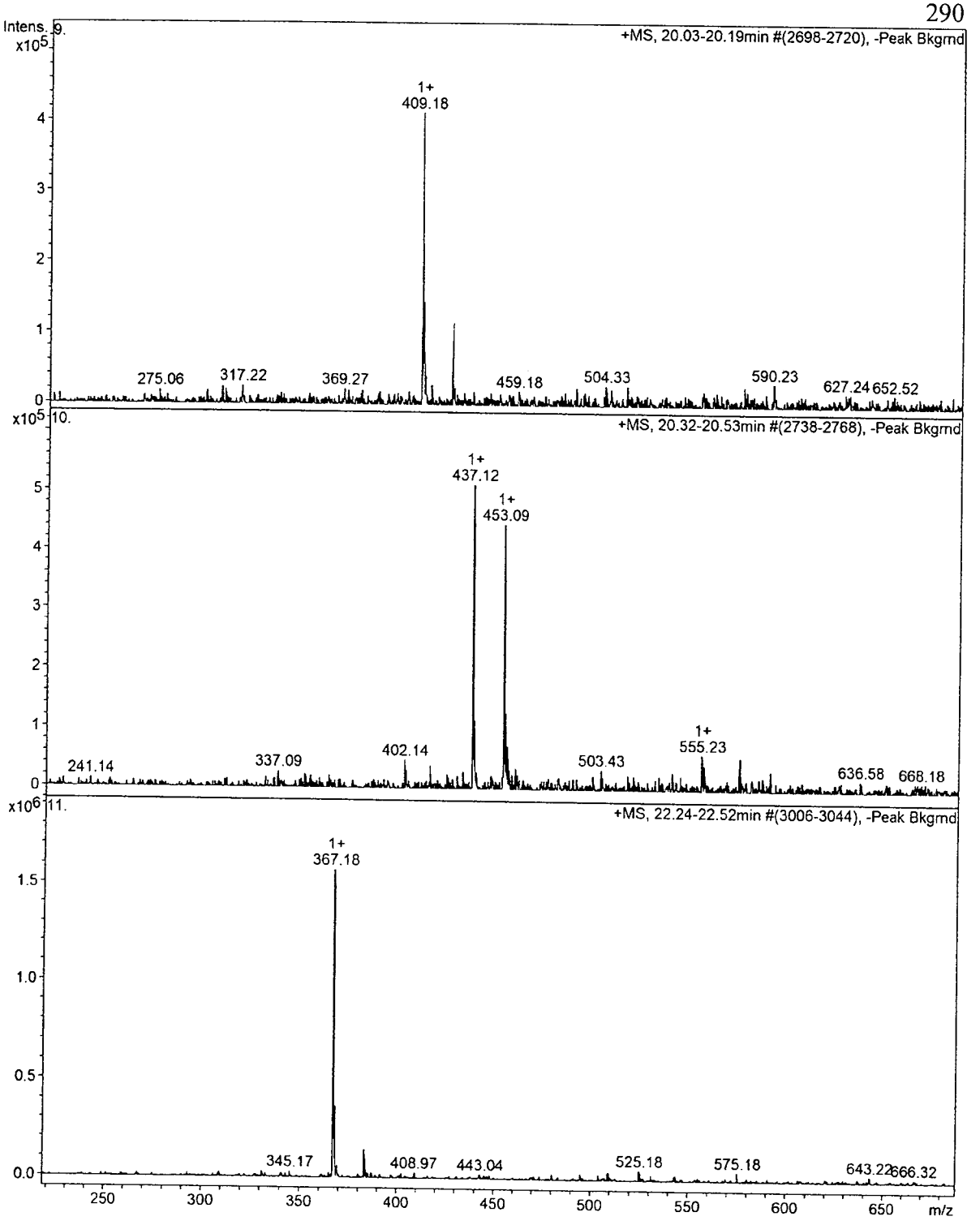
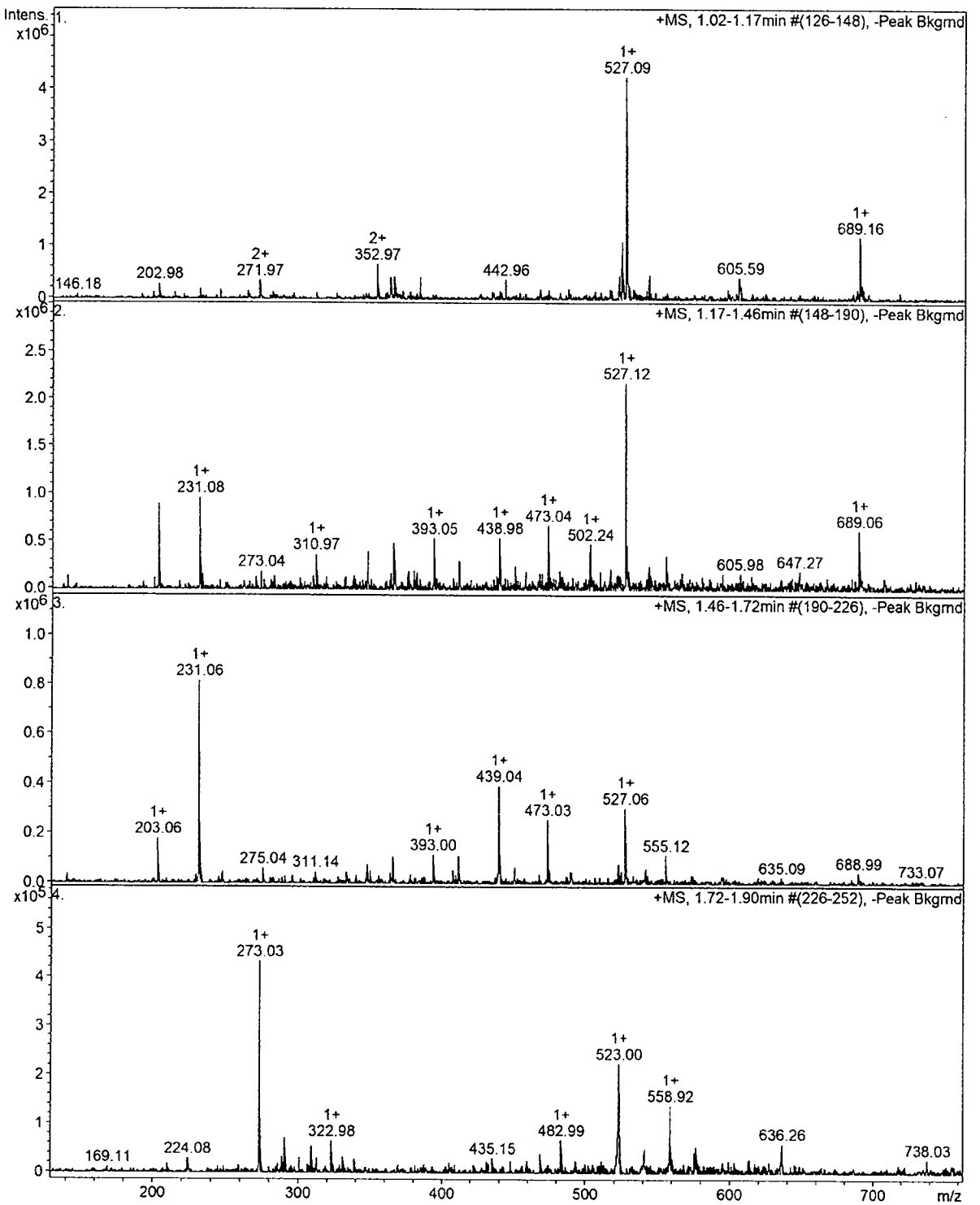
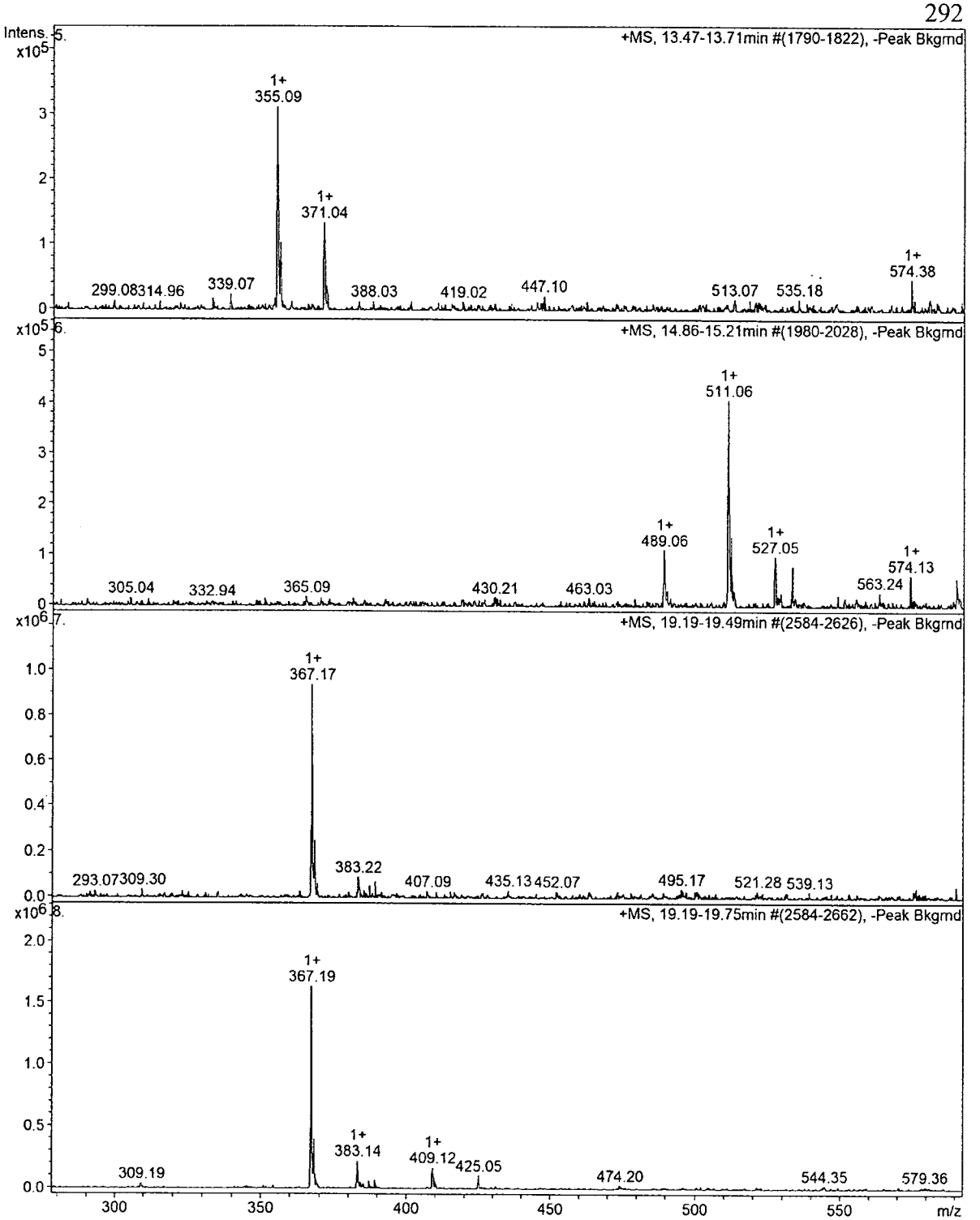
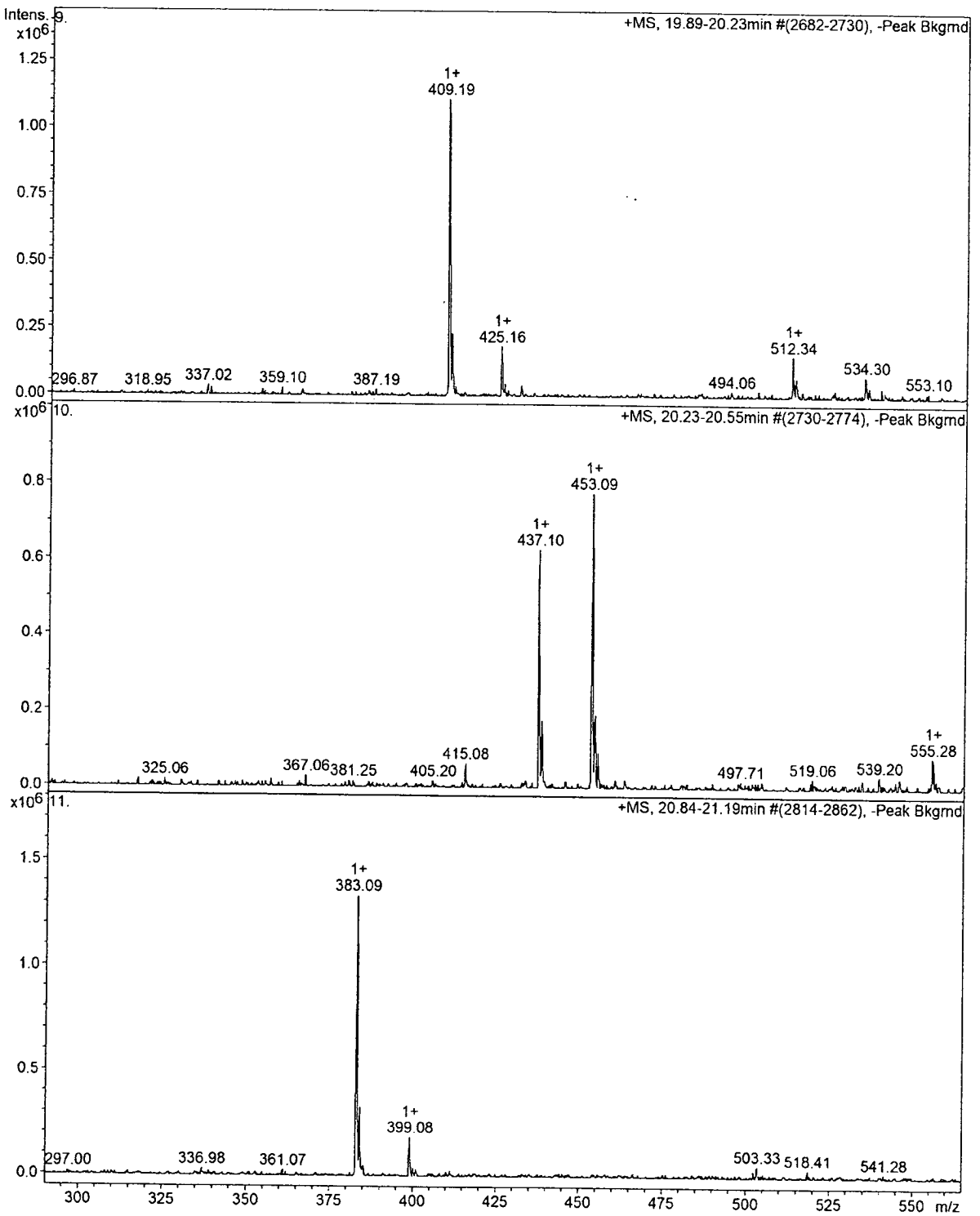

Intens.
9.
x10^5
+MS, 20.03-20.19min #(2698-2720), -Peak Bkgrnd
1+
409.18
275.06
317.22
369.27
459.18
504.33
590.23
627.24
652.52
10.
x10^5
+MS, 20.32-20.53min #(2738-2768), -Peak Bkgrnd
1+
437.12
1+
453.09
1+
555.23
241.14
337.09
402.14
503.43
636.58
668.18
11.
x10^6
+MS, 22.24-22.52min #(3006-3044), -Peak Bkgrnd
1+
367.18
345.17
408.97
443.04
525.18
575.18
643.22
666.32
m/z

Figure 95 A representative LC/MS spectrums from *Oroxylum indicum* root of compound 1-11




Intens.
x10^5
5.
+MS, 13.47-13.71min #(1790-1822), -Peak Bkgrnd
1+
355.09
1+
371.04
1+
574.38
299.08
314.96
339.07
388.03
419.02
447.10
513.07
535.18
x10^5
6.
+MS, 14.86-15.21min #(1980-2028), -Peak Bkgrnd
1+
511.06
1+
489.06
1+
527.05
1+
574.13
305.04
332.94
365.09
430.21
463.03
563.24
x10^6
7.
+MS, 19.19-19.49min #(2584-2626), -Peak Bkgrnd
1+
367.17
293.07
309.30
383.22
407.09
435.13
452.07
495.17
521.28
539.13
x10^6
8.
+MS, 19.19-19.75min #(2584-2662), -Peak Bkgrnd
1+
367.19
1+
383.14
1+
409.12
309.19
425.05
474.20
544.35
579.36
300
350
400
450
500
550
m/z


Intens.
9.
x10^6
+MS, 19.89-20.23min #(2682-2730), -Peak Bkgmd
1+
409.19
1+
425.16
1+
512.34
296.87
318.95
337.02
359.10
387.19
494.06
534.30
553.10
10.
+MS, 20.23-20.55min #(2730-2774), -Peak Bkgmd
1+
453.09
1+
437.10
1+
555.28
325.06
367.06
381.25
405.20
415.08
497.71
519.06
539.20
11.
+MS, 20.84-21.19min #(2814-2862), -Peak Bkgmd
1+
383.09
1+
399.08
297.00
336.98
361.07
503.33
518.41
541.28
m/z

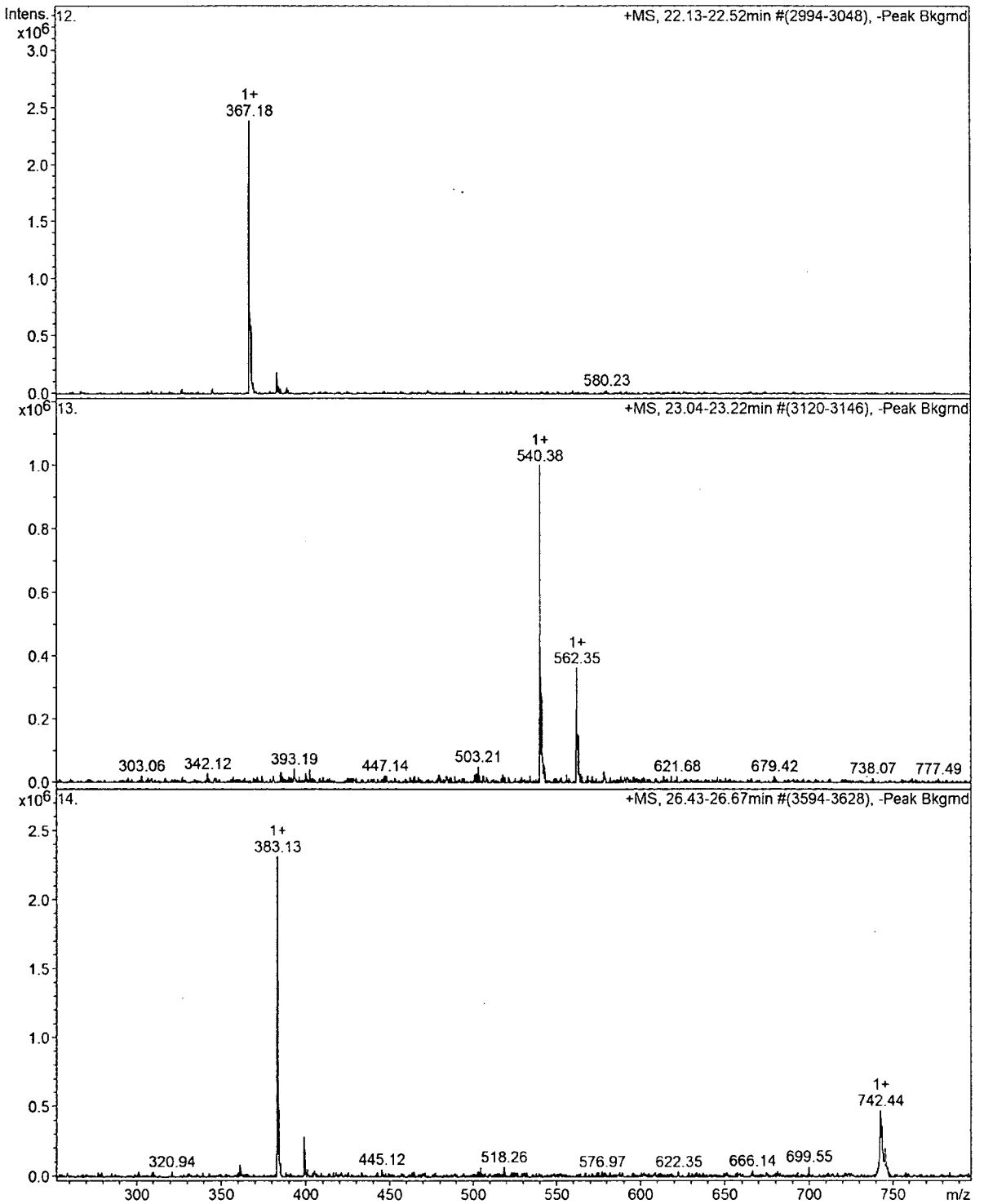
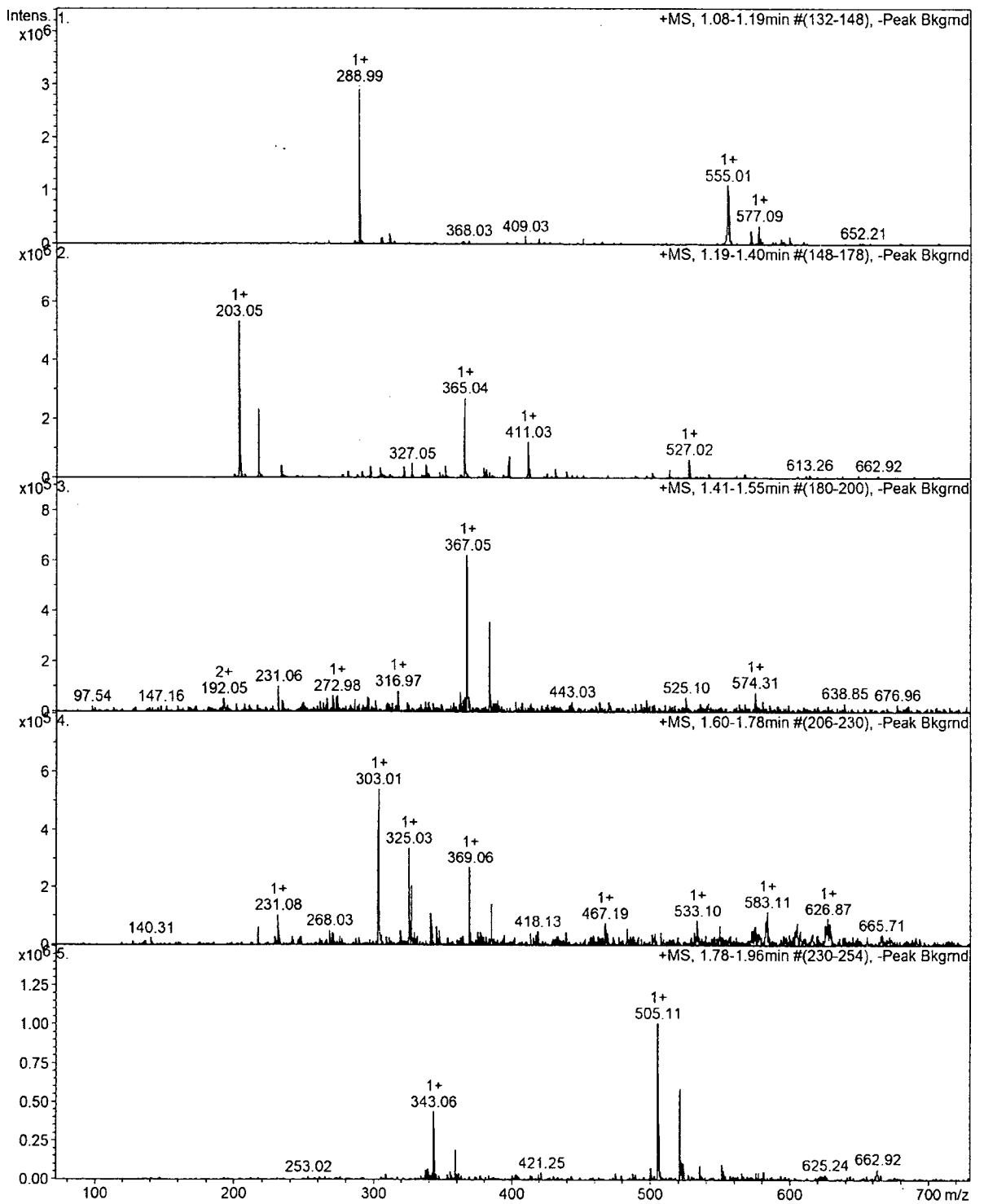
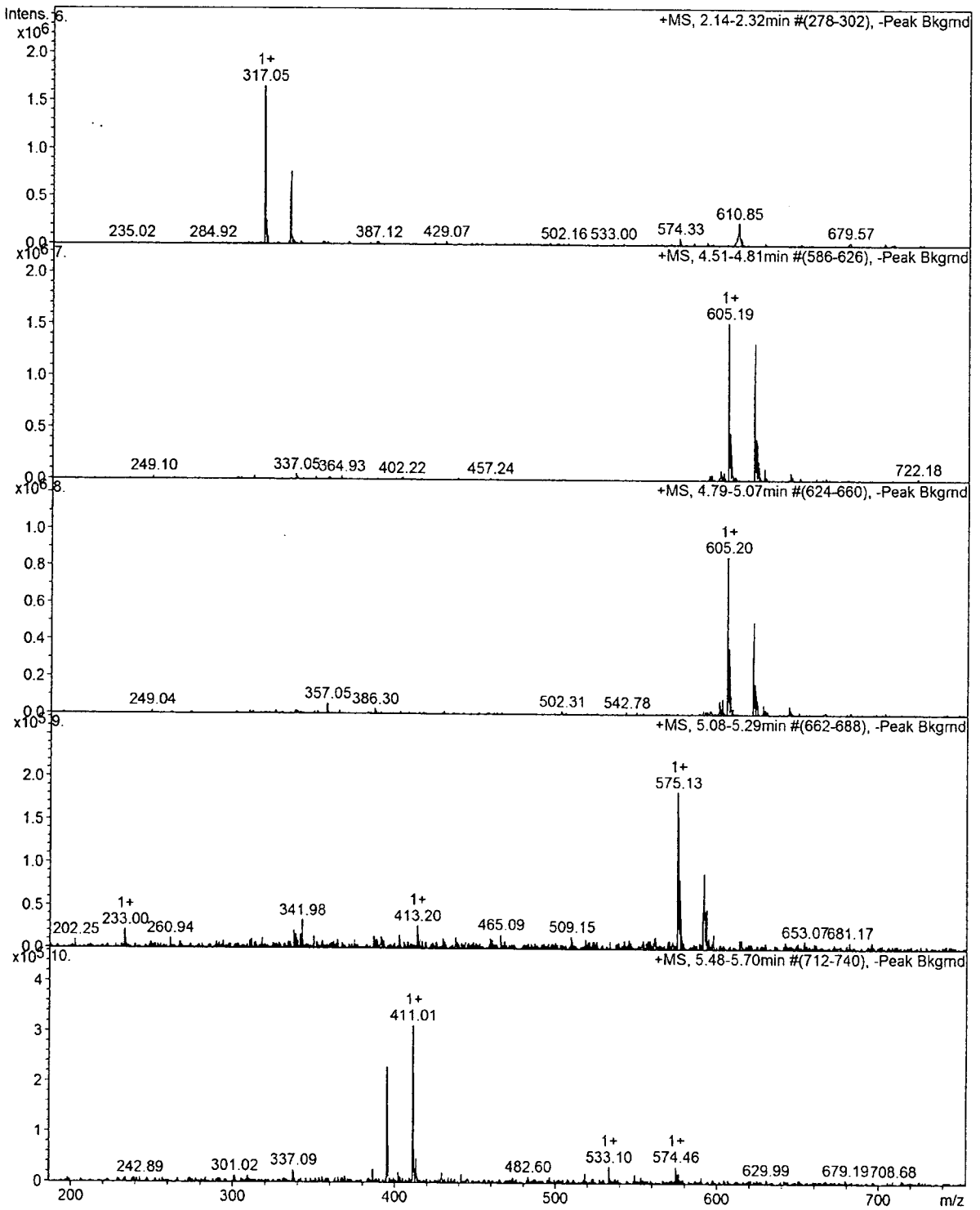
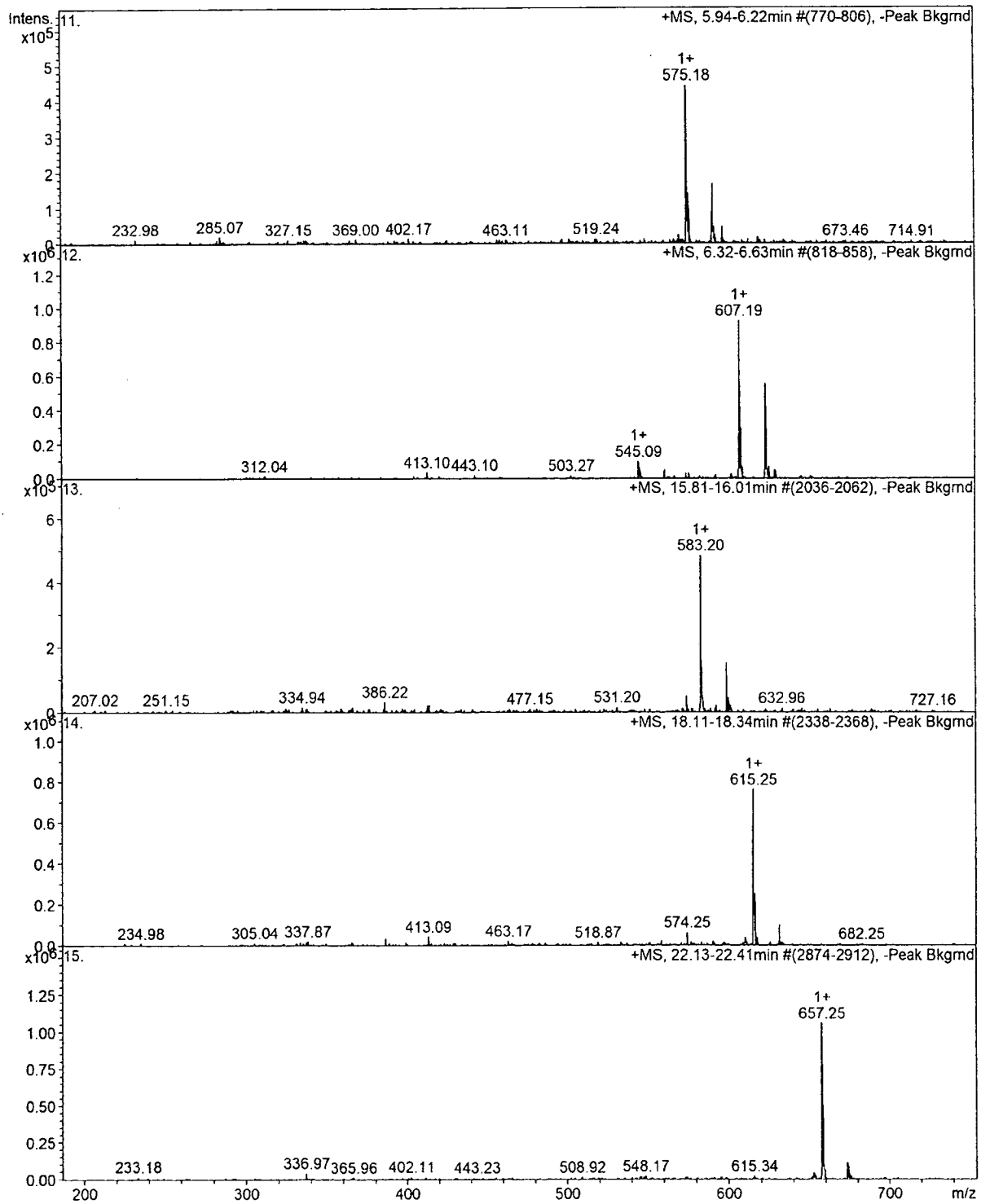
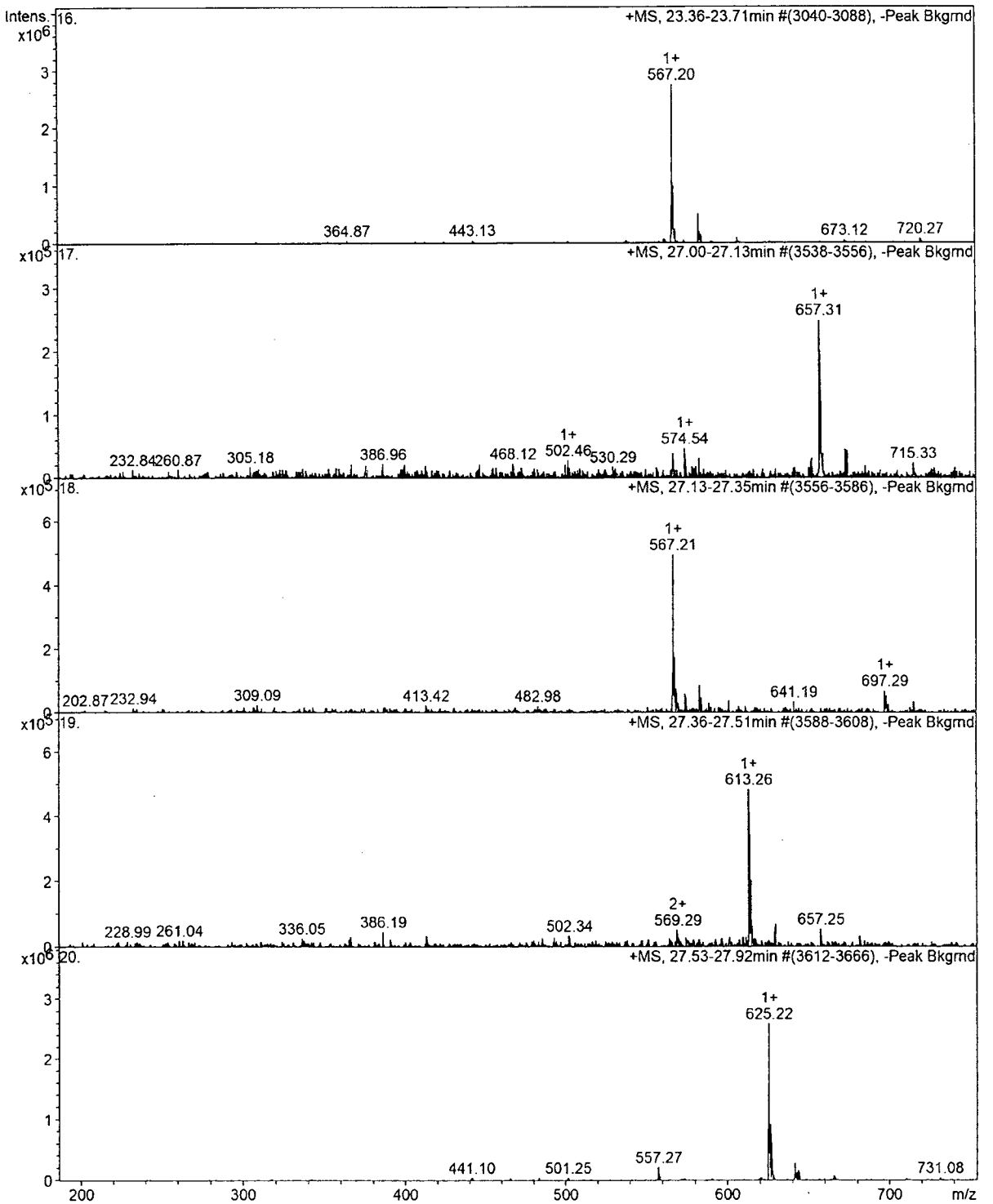

Intens.
12.
+MS, 22.13-22.52min #(2994-3048), -Peak Bkgmd
x10^6
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1+
367.18
580.23
13.
+MS, 23.04-23.22min #(3120-3146), -Peak Bkgmd
1+
540.38
1+
562.35
303.06
342.12
393.19
447.14
503.21
621.68
679.42
738.07
777.49
14.
+MS, 26.43-26.67min #(3594-3628), -Peak Bkgmd
1+
383.13
1+
742.44
320.94
445.12
518.26
576.97
622.35
666.14
699.55
300
350
400
450
500
550
600
650
700
750
m/z

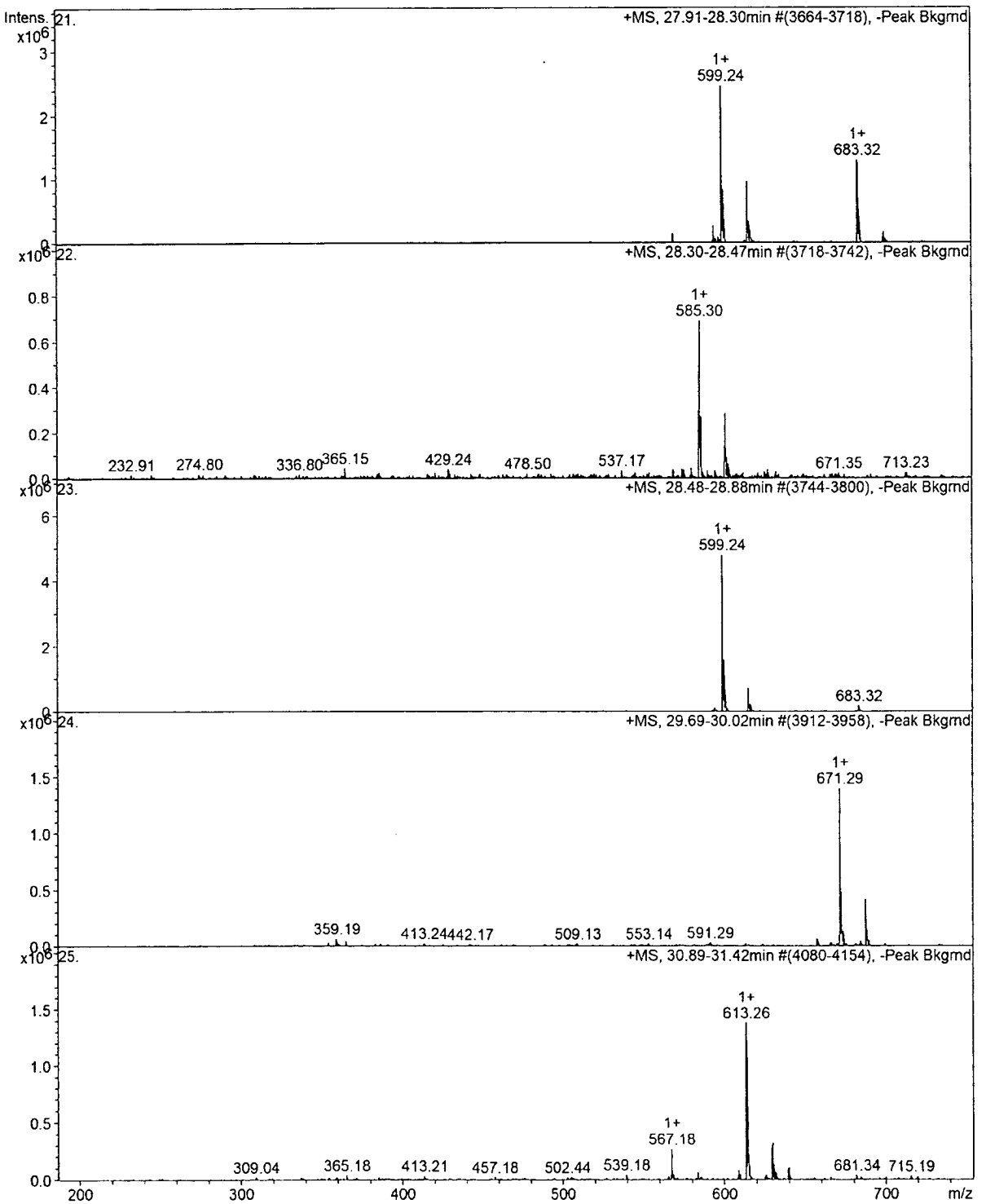
Figure 96 A representative LC/MS spectrums from *Walsura trichostemon* root of compound 1-56

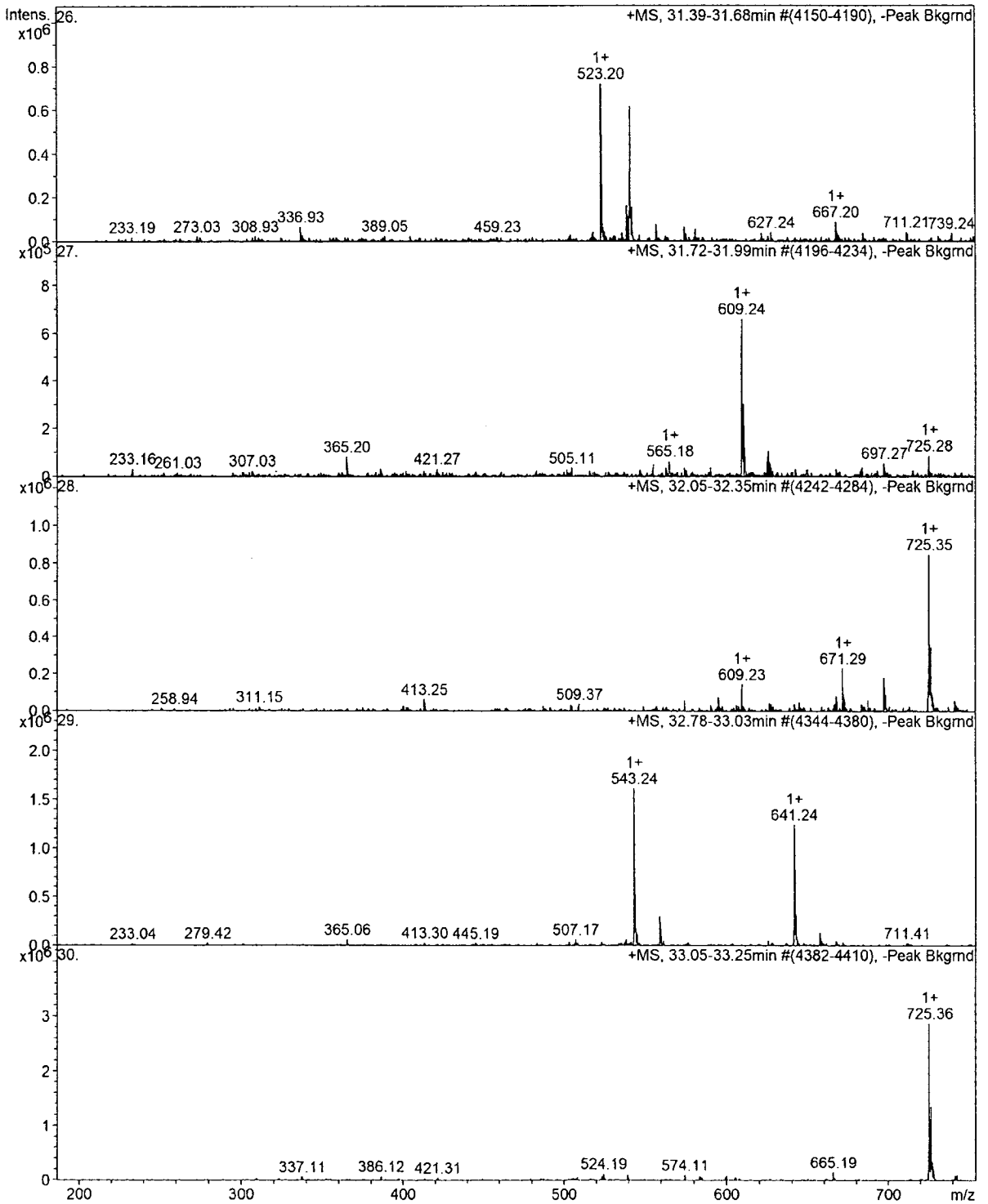


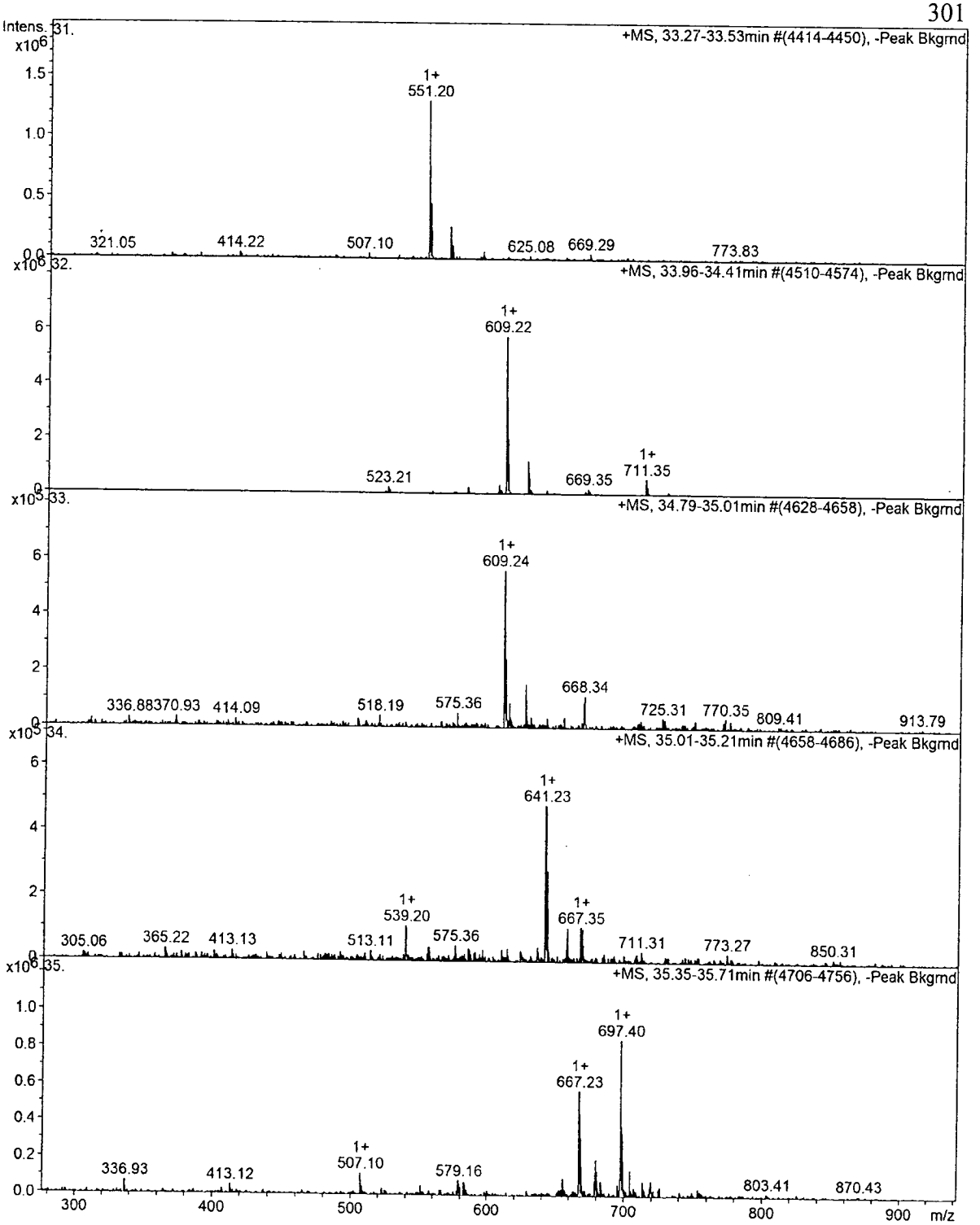

Intens.
6.
x10^6
+MS, 2.14-2.32min #(278-302), -Peak Bkgrnd
1+
317.05
235.02
284.92
387.12
429.07
502.16
533.00
574.33
610.85
679.57
7.
+MS, 4.51-4.81min #(586-626), -Peak Bkgrnd
1+
605.19
249.10
337.05
364.93
402.22
457.24
722.18
8.
+MS, 4.79-5.07min #(624-660), -Peak Bkgrnd
1+
605.20
249.04
357.05
386.30
502.31
542.78
9.
x10^5
+MS, 5.08-5.29min #(662-688), -Peak Bkgrnd
1+
575.13
1+
233.00
1+
413.20
202.25
260.94
341.98
465.09
509.15
653.07
681.17
10.
+MS, 5.48-5.70min #(712-740), -Peak Bkgrnd
1+
411.01
1+
533.10
1+
574.46
242.89
301.02
337.09
482.60
629.99
679.19
708.68
200
300
400
500
600
700
m/z

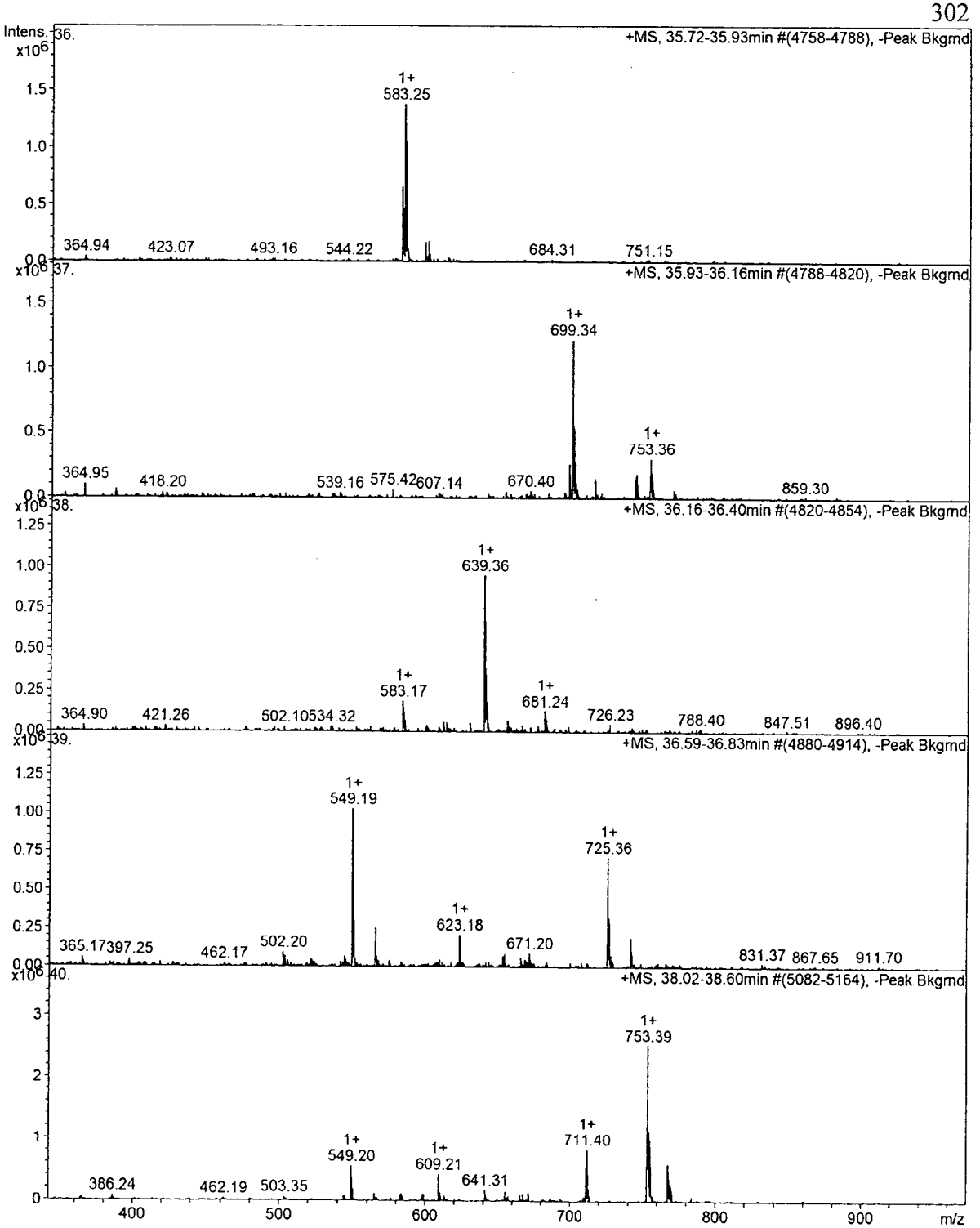

Intens.
11.
+MS, 5.94-6.22min #(770-806), -Peak Bkgrnd
1+
575.18
232.98
285.07
327.15
369.00
402.17
463.11
519.24
673.46
714.91
12.
+MS, 6.32-6.63min #(818-858), -Peak Bkgrnd
1+
607.19
1+
545.09
312.04
413.10
443.10
503.27
13.
+MS, 15.81-16.01min #(2036-2062), -Peak Bkgrnd
1+
583.20
207.02
251.15
334.94
386.22
477.15
531.20
632.96
727.16
14.
+MS, 18.11-18.34min #(2338-2368), -Peak Bkgrnd
1+
615.25
234.98
305.04
337.87
413.09
463.17
518.87
574.25
682.25
15.
+MS, 22.13-22.41min #(2874-2912), -Peak Bkgrnd
1+
657.25
233.18
336.97
365.96
402.11
443.23
508.92
548.17
615.34
200
300
400
500
600
700
m/z

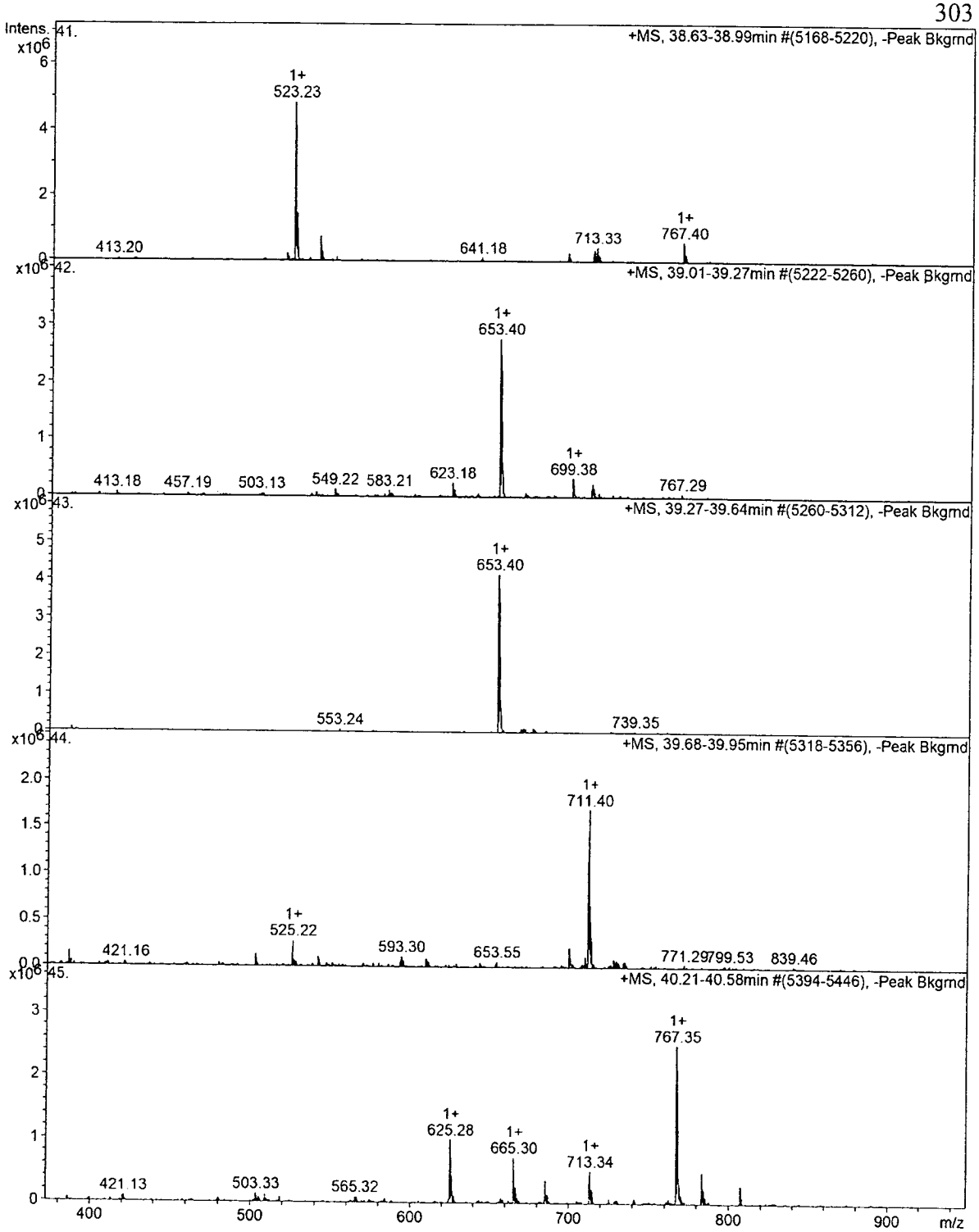

Intens.
16.
+MS, 23.36-23.71min #(3040-3088), -Peak Bkgrnd
1+
567.20
364.87
443.13
673.12
720.27
17.
+MS, 27.00-27.13min #(3538-3556), -Peak Bkgrnd
1+
657.31
1+
574.54
1+
502.46
232.84
260.87
305.18
386.96
468.12
530.29
715.33
18.
+MS, 27.13-27.35min #(3556-3586), -Peak Bkgrnd
1+
567.21
1+
697.29
202.87
232.94
309.09
413.42
482.98
641.19
19.
+MS, 27.36-27.51min #(3588-3608), -Peak Bkgrnd
1+
613.26
2+
569.29
228.99
261.04
336.05
386.19
502.34
657.25
20.
+MS, 27.53-27.92min #(3612-3666), -Peak Bkgrnd
1+
625.22
441.10
501.25
557.27
731.08
200
300
400
500
600
700
m/z

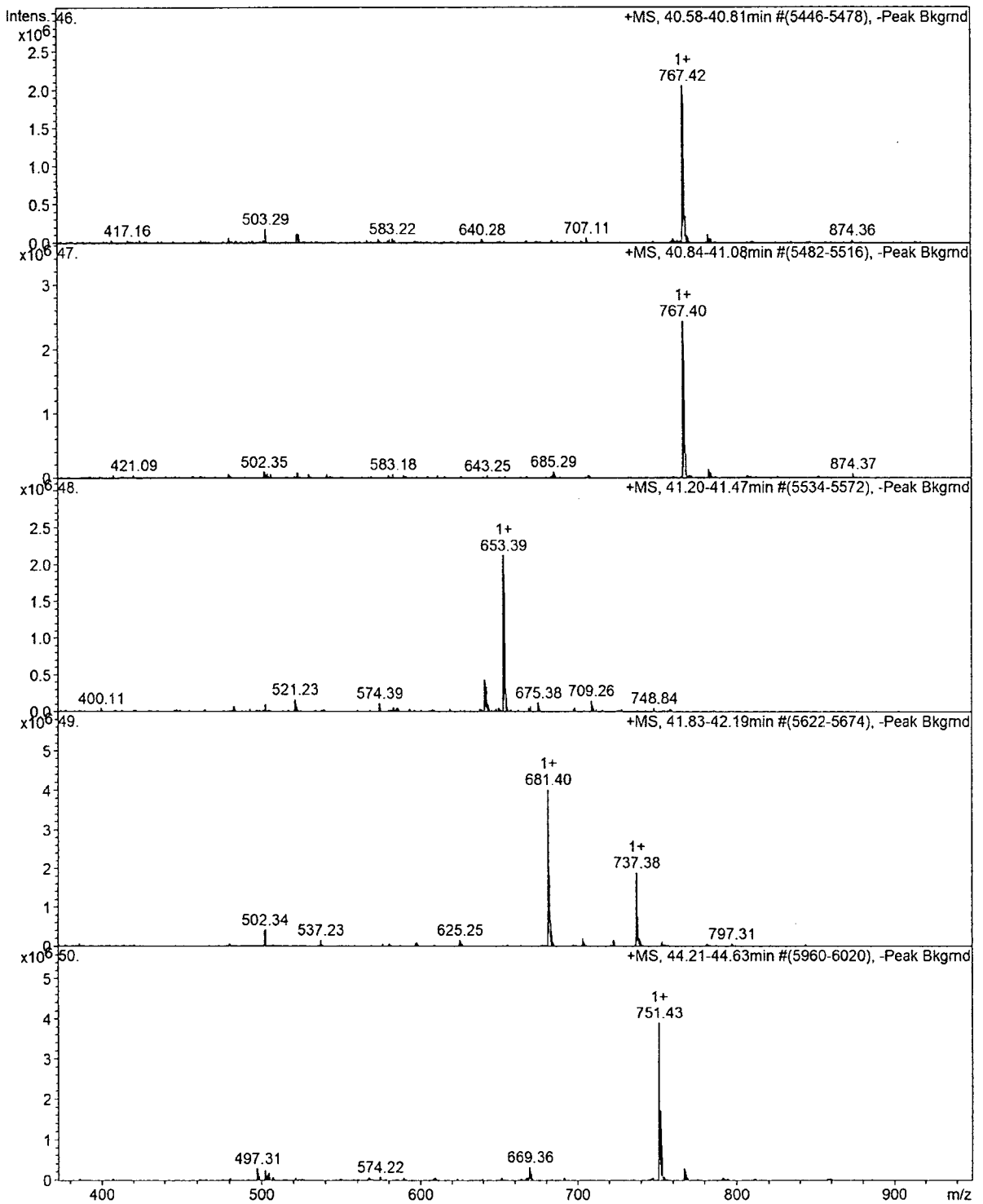

Intens.
21.
+MS, 27.91-28.30min #(3664-3718), -Peak Bkgrnd
1+
599.24
1+
683.32
22.
+MS, 28.30-28.47min #(3718-3742), -Peak Bkgrnd
1+
585.30
232.91
274.80
336.80
365.15
429.24
478.50
537.17
671.35
713.23
23.
+MS, 28.48-28.88min #(3744-3800), -Peak Bkgrnd
1+
599.24
683.32
24.
+MS, 29.69-30.02min #(3912-3958), -Peak Bkgrnd
1+
671.29
359.19
413.24442.17
509.13
553.14
591.29
25.
+MS, 30.89-31.42min #(4080-4154), -Peak Bkgrnd
1+
613.26
1+
567.18
309.04
365.18
413.21
457.18
502.44
539.18
681.34
715.19
200
300
400
500
600
700
m/z


Intens.
26.
+MS, 31.39-31.68min #(4150-4190), -Peak Bkgrnd
x10^6
1+
523.20
1+
667.20
233.19
273.03
308.93
336.93
389.05
459.23
627.24
711.21
739.24
27.
+MS, 31.72-31.99min #(4196-4234), -Peak Bkgrnd
x10^5
1+
609.24
1+
565.18
1+
725.28
233.16
261.03
307.03
365.20
421.27
505.11
697.27
28.
+MS, 32.05-32.35min #(4242-4284), -Peak Bkgrnd
x10^6
1+
725.35
1+
671.29
1+
609.23
258.94
311.15
413.25
509.37
29.
+MS, 32.78-33.03min #(4344-4380), -Peak Bkgrnd
x10^6
1+
543.24
1+
641.24
233.04
279.42
365.06
413.30
445.19
507.17
711.41
30.
+MS, 33.05-33.25min #(4382-4410), -Peak Bkgrnd
x10^6
1+
725.36
337.11
386.12
421.31
524.19
574.11
665.19
200
300
400
500
600
700
m/z


Intens.
31.
+MS, 33.27-33.53min #(4414-4450), -Peak Bkgrnd
1+
551.20
321.05
414.22
507.10
625.08
669.29
773.83
32.
+MS, 33.96-34.41min #(4510-4574), -Peak Bkgrnd
1+
609.22
523.21
669.35
1+
711.35
33.
+MS, 34.79-35.01min #(4628-4658), -Peak Bkgrnd
1+
609.24
336.88370.93
414.09
518.19
575.36
668.34
725.31
770.35
809.41
913.79
34.
+MS, 35.01-35.21min #(4658-4686), -Peak Bkgrnd
1+
641.23
1+
539.20
1+
667.35
305.06
365.22
413.13
513.11
575.36
711.31
773.27
850.31
35.
+MS, 35.35-35.71min #(4706-4756), -Peak Bkgrnd
1+
697.40
1+
667.23
1+
507.10
336.93
413.12
579.16
803.41
870.43
m/z


Intens.
36.
+MS, 35.72-35.93min #(4758-4788), -Peak Bkgrnd
1+
583.25
364.94
423.07
493.16
544.22
684.31
751.15
37.
+MS, 35.93-36.16min #(4788-4820), -Peak Bkgrnd
1+
699.34
1+
753.36
364.95
418.20
539.16
575.42
607.14
670.40
859.30
38.
+MS, 36.16-36.40min #(4820-4854), -Peak Bkgrnd
1+
639.36
1+
583.17
1+
681.24
364.90
421.26
502.10
534.32
726.23
788.40
847.51
896.40
39.
+MS, 36.59-36.83min #(4880-4914), -Peak Bkgrnd
1+
549.19
1+
725.36
1+
623.18
365.17
397.25
462.17
502.20
671.20
831.37
867.65
911.70
40.
+MS, 38.02-38.60min #(5082-5164), -Peak Bkgrnd
1+
753.39
1+
711.40
1+
549.20
1+
609.21
386.24
462.19
503.35
641.31
400
500
600
700
800
900
m/z


Intens.
41.
+MS, 38.63-38.99min #(5168-5220), -Peak Bkgrnd
1+
523.23
413.20
641.18
713.33
1+
767.40
42.
+MS, 39.01-39.27min #(5222-5260), -Peak Bkgrnd
1+
653.40
413.18
457.19
503.13
549.22
583.21
623.18
1+
699.38
767.29
43.
+MS, 39.27-39.64min #(5260-5312), -Peak Bkgrnd
1+
653.40
553.24
739.35
44.
+MS, 39.68-39.95min #(5318-5356), -Peak Bkgrnd
1+
711.40
1+
525.22
421.16
593.30
653.55
771.29
799.53
839.46
45.
+MS, 40.21-40.58min #(5394-5446), -Peak Bkgrnd
1+
767.35
1+
625.28
1+
665.30
1+
713.34
421.13
503.33
565.32
400
500
600
700
800
900
m/z


Intens.
x10^6
46.
+MS, 40.58-40.81min #(5446-5478), -Peak Bkgrnd
1+
767.42
417.16
503.29
583.22
640.28
707.11
874.36
47.
+MS, 40.84-41.08min #(5482-5516), -Peak Bkgrnd
1+
767.40
421.09
502.35
583.18
643.25
685.29
874.37
48.
+MS, 41.20-41.47min #(5534-5572), -Peak Bkgrnd
1+
653.39
400.11
521.23
574.39
675.38
709.26
748.84
49.
+MS, 41.83-42.19min #(5622-5674), -Peak Bkgrnd
1+
681.40
1+
737.38
502.34
537.23
625.25
797.31
50.
+MS, 44.21-44.63min #(5960-6020), -Peak Bkgrnd
1+
751.43
497.31
574.22
669.36
400
500
600
700
800
900
m/z

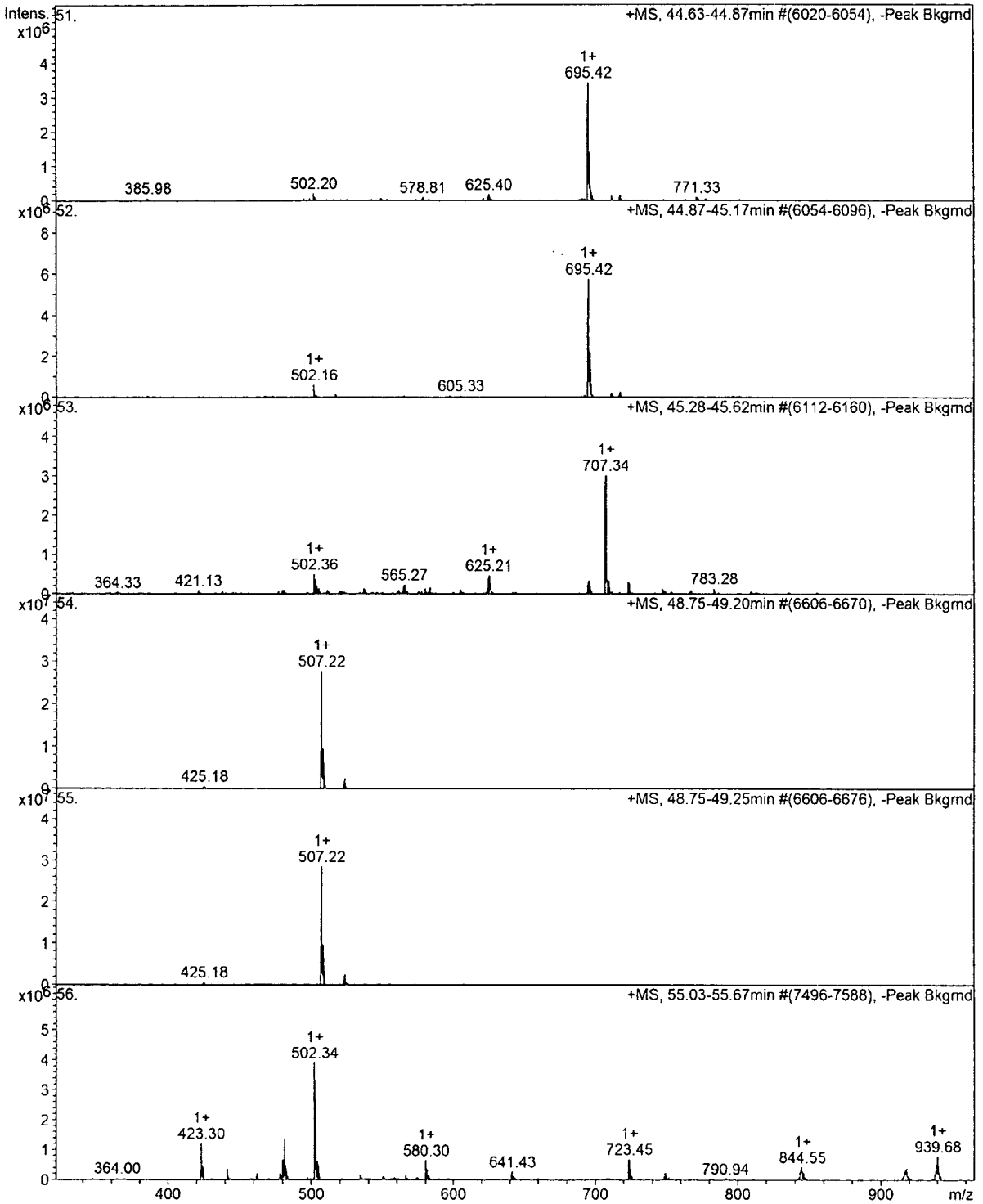
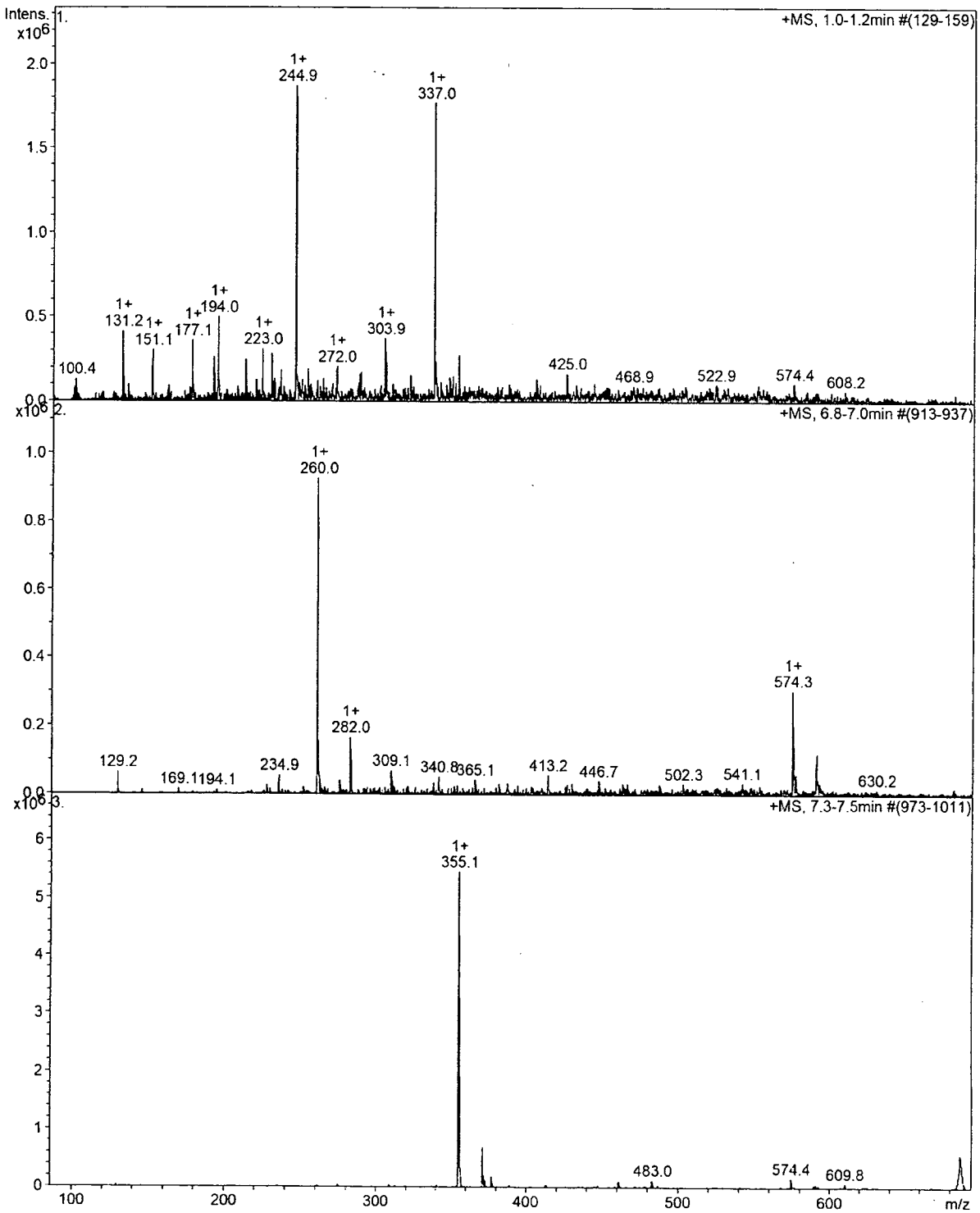
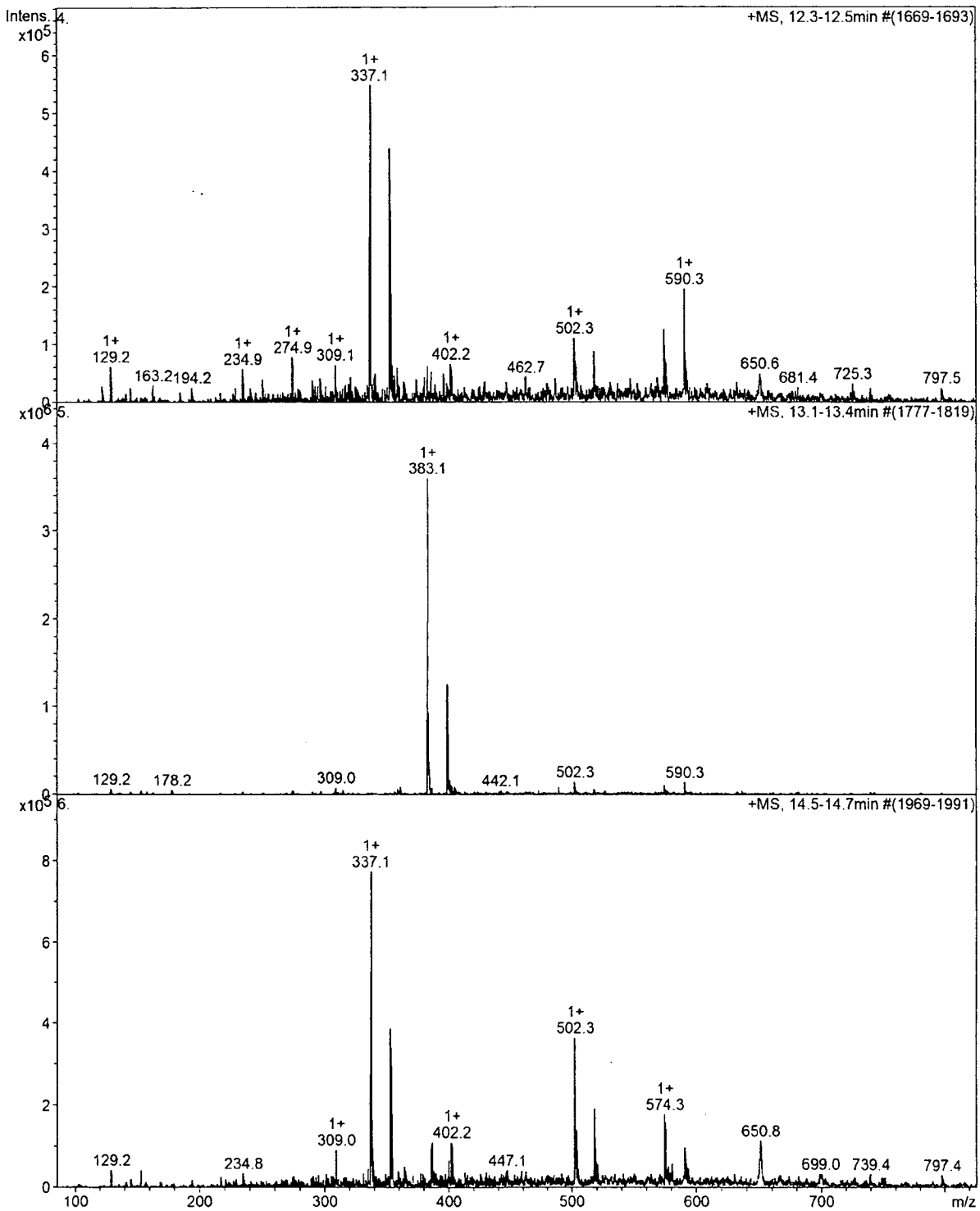

Intens.
51.
+MS, 44.63-44.87min #(6020-6054), -Peak Bkgrnd
1+
695.42
385.98
502.20
578.81
625.40
771.33
52.
+MS, 44.87-45.17min #(6054-6096), -Peak Bkgrnd
1+
695.42
1+
502.16
605.33
53.
+MS, 45.28-45.62min #(6112-6160), -Peak Bkgrnd
1+
707.34
1+
502.36
1+
625.21
364.33
421.13
565.27
783.28
54.
+MS, 48.75-49.20min #(6606-6670), -Peak Bkgrnd
1+
507.22
425.18
55.
+MS, 48.75-49.25min #(6606-6676), -Peak Bkgrnd
1+
507.22
425.18
56.
+MS, 55.03-55.67min #(7496-7588), -Peak Bkgrnd
1+
502.34
1+
423.30
1+
580.30
1+
723.45
1+
844.55
1+
939.68
364.00
641.43
790.94
400
500
600
700
800
900
m/z

Figure 97 A representative LC/MS spectrums from Ben-Cha-Moon-Yai remedy extract of compound 1-6




Intens.
x10^5
4.
+MS, 12.3-12.5min #(1669-1693)
1+ 337.1
1+ 590.3
1+ 502.3
1+ 129.2
1+ 234.9
1+ 274.9
1+ 309.1
1+ 402.2
163.2
194.2
462.7
650.6
681.4
725.3
797.5
x10^5
5.
+MS, 13.1-13.4min #(1777-1819)
1+ 383.1
129.2
178.2
309.0
442.1
502.3
590.3
x10^5
6.
+MS, 14.5-14.7min #(1969-1991)
1+ 337.1
1+ 502.3
1+ 574.3
1+ 309.0
1+ 402.2
650.8
129.2
234.8
447.1
699.0
739.4
797.4
100
200
300
400
500
600
700
m/z

APPENDIX C

Mutagenic activity

Table 56 Mutagenicity of Ben-Cha-Moon-Yai Remedy and its ingredients (200 mg/ml) in acid solution pH3.0-3.5 on *Salmonella typhimurium* **TA98** (frameshift mutation) without metabolic activation

Sample	Amount of extract (mg/plate)	Number of revertants/plate[a]			
		Ethanolic extract		Water extract	
		w/o nitrite	With nitrite	w/o nitrite	With nitrite
Ben-Cha-Moon-Yai Remedy	Positive[b]		1562.33± 205.06		
	Spontaneous[c]	19.33 ± 4.04	17.5 ± 0.71		
	0.4	29 ± 2.65	102 ± 17.09		
	0.8	27.67 ± 7.09	191 ± 75.43		
	1.6	18.33 ± 4.93	251.67 ± 63.57		
	3.2	18 ± 2.65	347 ± 18.36		
Aegle marmelos	Positive[b]				3800 ± 746.70
	Spontaneous[c]	17.5 ± 6.36	44.67 ± 16.26	34.67 ± 8.33	15.67 ± 5.69
	0.4	23.5 ± 13.44	83.67 ± 13.65	37 ± 4.24	35.67 ± 8.02
	0.8	14.67 ± 5.51	136.33 ± 41.43	47 ± 21	50 ± 7
	1.6	14.67 ± 0.58	151.33 ± 7.37	102.33±39.11	131 ± 42.43
	3.2	17 ± 4	221 ± 7	787.6 ± 26.84	183.5 ± 16.26
Oroxylum indicum	Positive[b]		1562.33 ±205.06		
	Spontaneous[c]	17.5 ± 6.36	17.5 ± 0.71	34.67 ± 8.33	17.5 ± 0.71
	0.4	23.33 ± 4.04	217.67 ± 39.26	23.33 ± 0.58	20 ± 10.54
	0.8	23.33 ± 4.16	210.33 ± 25.50	25 ± 8.49	51 ± 10.82
	1.6	13.67 ± 6.43	253.67 ± 35.23	28.67 ± 8.39	90.67 ± 19.86
	3.2	16 ± 3.46	155.67 ± 19.22	21.67 ± 7.23	123.67 ± 32.87
Dimocarpus longan	Positive[b]		1562.33± 205.06		3800 ± 746.70
	Spontaneous[c]	19.33 ± 4.04	17.5 ± 0.71	34.67 ± 8.33	15.67 ± 5.69
	0.4	22.33 ± 3.79	217.67 ± 39.26	27.67 ± 6.66	45 ± 15.56
	0.8	24 ± 3.61	210.33 ± 25.50	27 ± 1.41	208.5 ± 4.95
	1.6	22.67 ± 3.79	253.67 ± 35.23	25.67 ± 1.53	73 ± 16.97
	3.2	13 ± 1.41	155.67 ± 19.22	18.33 ± 6.81	125.55 ± 90.79

Walsura trichostemon	Positive[b]				1872.33± 48.18
	Spontaneous[c]	17.5 ± 6.36	44.67 ± 16.26	34.67 ± 8.33	36.33 ± 5.13
	0.4	27 ± 4.36	27.33 ± 2.08	19 ± 3	58 ± 8.19
	0.8	27.33 ± 3.51	29.67 ± 7.37	20 ± 0	80.33 ± 19.86
	1.6	28 ± 17.06	57.33 ± 14.29	29.33 ± 3.21	102.33 ± 6.66
	3.2	24 ± 5.66	159.67 ± 75.53	28.33 ± 4.93	68.67 ± 5.51
Dolichandrone serrulata	Positive[b]		1872.33 ± 48.18		
	Spontaneous[c]	19.33 ± 4.04	36.33 ± 5.13	34.67 ± 8.33	17.5 ± 0.71
	0.4	51 ± 18.38	32 ± 2.65	28.33 ± 10.07	16.67 ± 2.52
	0.8	58.67 ± 22.28	29.67 ± 5.69	20.67 ± 7.02	21.33 ± 5.51
	1.6	72 ± 1.41	23.33 ± 5.13	32.67 ± 11.06	23.33 ± 2.08
	3.2	57.33 ± 3.21	21.33 ± 2.08	40.33 ± 12.22	26 ± 5

Table 57 Mutagenicity of Ben-Cha-Moon-Yai Remedy and its ingredients (200 mg/ml) in acid solution pH3.0-3.5 on *Salmonella typhimurium* **TA100** (basesubstitution mutation) without metabolic activation

Sample	Amount of extract (mg/plate)	Number of revertants/plate[a]			
		Ethanolic extract		Water extract	
		w/o nitrite	With nitrite	w/o nitrite	With nitrite
Ben-Cha-Moon-Yai Remedy	Positive[b]		481 ± 51.16		
	Spontaneous[c]	80 ± 1.53	49.67 ± 3.06		
	0.4	78.67 ± 11.85	215 ± 35.64		
	0.8	94 ± 25.12	194.67 ± 24.99		
	1.6	79.33 ± 18.82	276 ± 19.52		
	3.2	79.33 ± 18.82	392.33 ± 62.61		
Aegle marmelos	Positive[b]				864.33 ±151.66
	Spontaneous[c]	127 ± 9.54	134.67 ± 43.14	127 ± 9.54	126.67 ± 14.01
	0.4	104.67 ± 16.20	195.67 ± 8.74	112±12.73	285.67 ± 40.53
	0.8	119.33 ± 0.94	205.33 ± 50.05	135.67±12.01	371.67 ± 20.43
	1.6	146 ± 1.15	296 ± 2.83	169±44.24	425.67 ± 7.37
	3.2	134.33 ± 22.23	141.67 ± 38.55	819.5±6.36	513.33 ± 37.00
Oroxylum indicum	Positive[b]		481 ± 51.16		
	Spontaneous[c]	80 ± 1.53	49.67 ± 3.06	127 ± 9.54	49.67 ± 3.06
	0.4	82 ± 24.25	244.33 ± 86.38	85.33±30.27	175.67 ± 51.78
	0.8	86 ± 22.65	343.33 ± 88.08	116.33±39.55	206.67 ± 37.31
	1.6	87 ± 11.53	366.5 ± 143.39	128.33±11.06	313.33 ± 27.30
	3.2	98.67 ± 34.53	428 ± 78.46	139.5±7.78	370.33 ± 25.54
Dimocarpus longan	Positive[b]		481 ± 51.16		864.33 ±151.66
	Spontaneous[c]	80 ± 1.53	49.67 ± 3.06	127 ± 9.54	126.67 ± 14.01
	0.4	71.33 ± 8.02	131.67 ± 24.34	97±25.12	338.67± 103.36
	0.8	62.33 ± 2.08	140.33 ± 26.58	106±20.30	293.33 ± 84.11
	1.6	61 ± 4	198.67 ± 39.00	81.33±32.01	350.67 ± 94.16
	3.2	62 ± 6.93	187.33 ± 36.12	86±20.07	406 ± 52.94

Walsura trichostemon	Positive[b]				864.33 ±151.66
	Spontaneous[c]	127 ± 9.54	134.67 ± 43.14	127 ± 9.54	126.67 ± 14.01
	0.4	108±0.85	116.5 ± 26.16	71.67±17.16	305.33 ± 72.98
	0.8	108.33±42.90	160.67 ± 22.59	93.33±16.07	396 ± 83.44
	1.6	88±28.83	222 ± 44.24	122.33±15.14	346 ± 33.87
	3.2	96.97±30.27	206 ± 33.51	90.33±19.86	432 ± 66.47
Dolichandrone serrulata	Positive[b]				
	Spontaneous[c]	80 ± 1.53	134.67 ± 43.14	127 ± 9.54	49.67 ± 3.06
	0.4	61.67 ± 10.26	118 ± 28.48	111.33±11.50	98.33 ± 18.45
	0.8	63.67 ± 5.69	98.67 ± 12.10	112±21.66	116.33 ± 23.97
	1.6	99.67 ± 7.02	71 ± 23.64	112±18.52	152.33 ± 23.63
	3.2	76 ± 15.52	70.33 ± 21.96	113±20.07	162.33 ± 29.14

*a is a number of revertant colonies per plate

b is a number of revertant colonies after nitrite treated 1-aminopyrine

c is a number of spontaneous revertant colonies