

Electronic Supplementary Information

**Antiplatelet aggregation and antithrombotic benefits of terpenes
and flavones from hawthorn leaf extract isolated using activity-
guided method**

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Supp 1-1 Antiplatelet aggregation activities of different fractions at the dose of 250 μ g mL⁻¹

Supp 1-2 Antithrombotic activity of different fractions on transgenic zebrafish system

Supp 2-1 Antiplatelet aggregation activities of compounds **1-7, 10, 11, 17, 20, 23**

Supp 2-2 Antiplatelet aggregation activities of compounds **8, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25** from the reference

Supp 3-1 Antithrombotic activity of compounds **1, 7, 12** on transgenic zebrafish system

Supp 3-2 Antithrombotic activity of compounds **8, 15, 22, 24** on transgenic zebrafish system from the reference

Supp 4 The base peak intensity (BPI) chromatogram of some compounds under negative ion mode.

Supp 5 The base peak intensity (BPI) chromatogram of mixed reference compounds in positive ion mode by HPLC-QTOF-MS. The mixed A were reference compounds **1-7, 9-11, 24**. The mixed B were reference compounds **12, 14-17, 19-23**.

Supp 1-1 Antiplatelet aggregation activities of different fractions at the dose of 250 $\mu\text{g mL}^{-1}$

Fractions	Dosage ($\mu\text{g mL}^{-1}$)	Inhibition rate (%) ^a	Fractions	Dosage ($\mu\text{g mL}^{-1}$)	Inhibition rate (%) ^a
LP	250	55.23 \pm 3.31	Fr.C-1	250	91.52 \pm 9.16
Fr.B	250	63.19 \pm 2.12	Fr.C-2	250	72.47 \pm 5.90
Fr.C	250	77.85 \pm 7.64	Fr.C-3	250	35.57 \pm 8.17
Fr.D	250	6.61 \pm 12.61	Aspirin	250	88.34 \pm 5.01

Supp 1-2 Antithrombotic activity of different fractions on transgenic zebrafish system

Fractions	Dosage	Thrombosis time ^a	Fractions	Dosage	Thrombosis time ^a
control	0.1% DMSO	4.40 \pm 0.40	Fr.C	50 $\mu\text{g mL}^{-1}$	6.80 \pm 0.73
				100 $\mu\text{g mL}^{-1}$	11.60 \pm 1.60*
Heparin Sodium ^b	20U/ml	11.40 \pm 0.51*	Fr.C-1	50 $\mu\text{g mL}^{-1}$	9.60 \pm 0.40*
				150 $\mu\text{g mL}^{-1}$	11.60 \pm 0.75*
LP	50 $\mu\text{g mL}^{-1}$	6.80 \pm 0.86	Fr.C-2	50 $\mu\text{g mL}^{-1}$	6.80 \pm 0.73
	150 $\mu\text{g mL}^{-1}$	5.20 \pm 0.49		150 $\mu\text{g mL}^{-1}$	11.20 \pm 0.58*
Fr.B	50 $\mu\text{g mL}^{-1}$	6.00 \pm 0.55	Fr.C-3	50 $\mu\text{g mL}^{-1}$	5.20 \pm 0.61
	150 $\mu\text{g mL}^{-1}$	7.20 \pm 0.49		150 $\mu\text{g mL}^{-1}$	6.90 \pm 0.45

Supp 2-1 Antiplatelet aggregation activities of compounds 1-7, 10, 11, 17, 20, 23

Samples	Dosage	Inhibition rate (%) ^a
Aspirin ^b	250 $\mu\text{g mL}^{-1}$	83.67 \pm 3.25
1	250 $\mu\text{g mL}^{-1}$	84.01 \pm 4.01
2	250 $\mu\text{g mL}^{-1}$	78.12 \pm 2.16
3	250 $\mu\text{g mL}^{-1}$	61.03 \pm 4.38
4	250 $\mu\text{g mL}^{-1}$	15.68 \pm 16.27
5	250 $\mu\text{g mL}^{-1}$	67.2 \pm 3.52
6	250 $\mu\text{g mL}^{-1}$	37.41 \pm 8.22
7	250 $\mu\text{g mL}^{-1}$	99.83 \pm 2.62
10	250 $\mu\text{g mL}^{-1}$	89.59 \pm 3.15
11	250 $\mu\text{g mL}^{-1}$	12.6 \pm 21.58
17	250 $\mu\text{g mL}^{-1}$	70.81 \pm 1.99
20	250 $\mu\text{g mL}^{-1}$	24.18 \pm 2.68
23	250 $\mu\text{g mL}^{-1}$	15.6 \pm 5.66

Supp 2-2 Antiplatelet aggregation activities of compounds **8, 12, 13, 15, 16, 18, 19, 21, 22, 24** and **25** from the reference

Samples	Dosage	Inhibition rate (%) ^a	reference
Aspirin ^b	250 $\mu\text{g mL}^{-1}$	82.64 \pm 4.65	15
8	0.25 mg mL ⁻¹	73.61 \pm 2.22	24
12	0.4 mg mL ⁻¹	38.75 \pm 1.11	8
13	0.25 mg mL ⁻¹	0.87 \pm 2.27	8
15	0.25 mg mL ⁻¹	84.50 \pm 4.56	24
16	0.4 mg mL ⁻¹	29.18 \pm 1.33	8
18	0.4 mg mL ⁻¹	39.18 \pm 1.23	8
19	0.4 mg mL ⁻¹	30.7 \pm 2.21	8
21	0.25 mg mL ⁻¹	8.93 \pm 10.49	15
22	0.4 mg mL ⁻¹	63.26 \pm 7.29	15
24	0.25 mg mL ⁻¹	74.00 \pm 4.51	15
25	0.4 mg mL ⁻¹	7.38 \pm 2.05	8

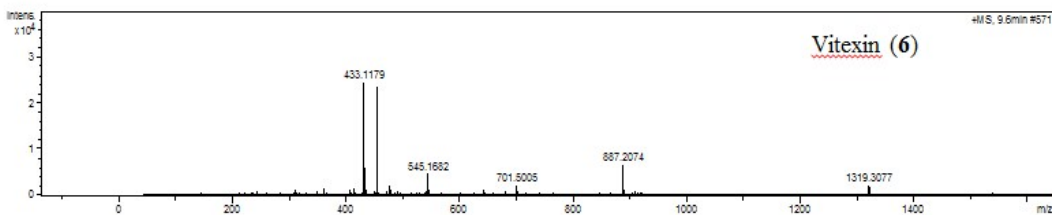
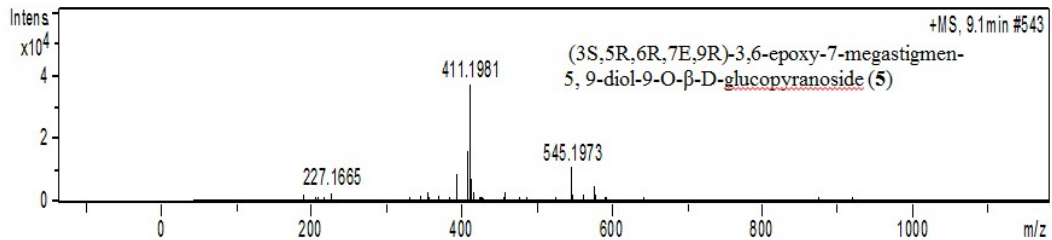
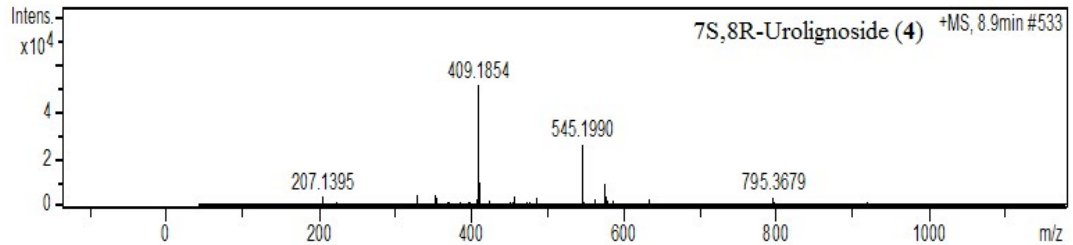
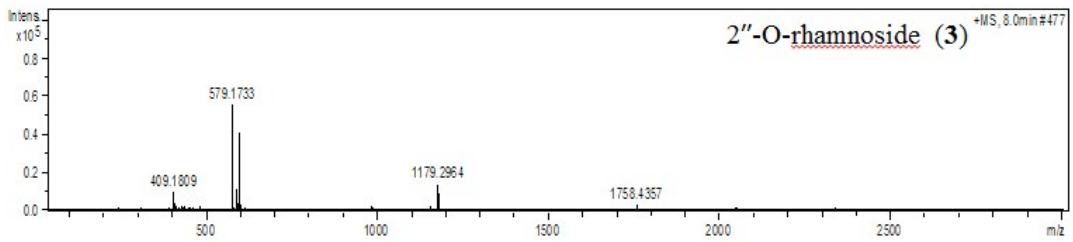
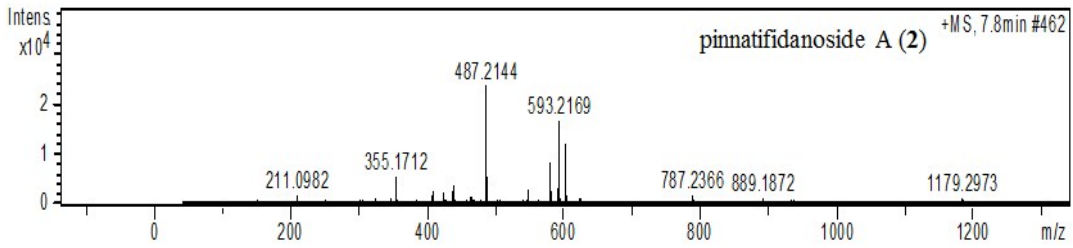
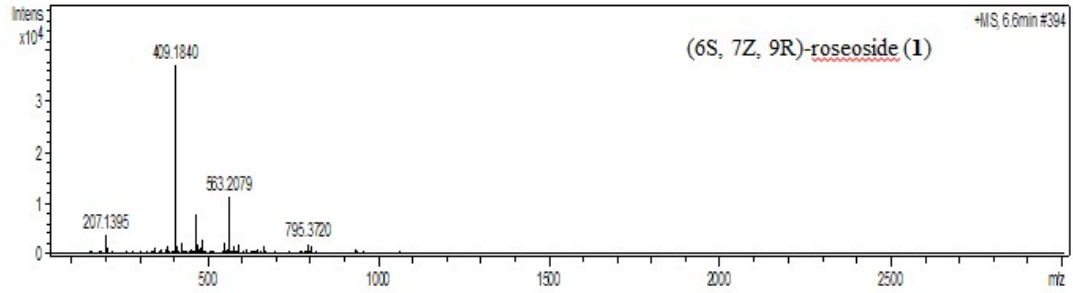
Supp 3-1 Antithrombotic activity of compounds **1, 7, 12** on transgenic zebrafish system

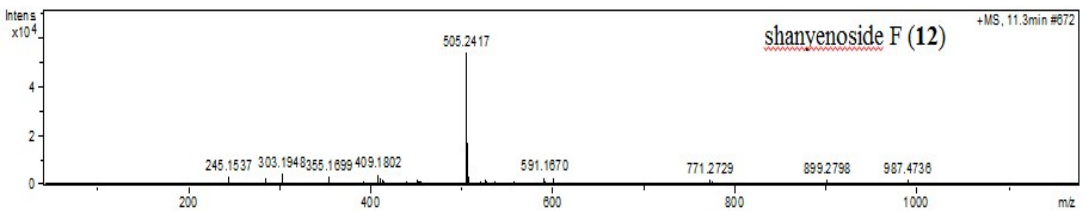
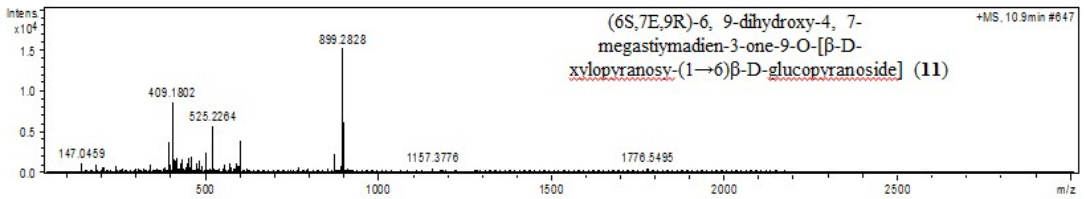
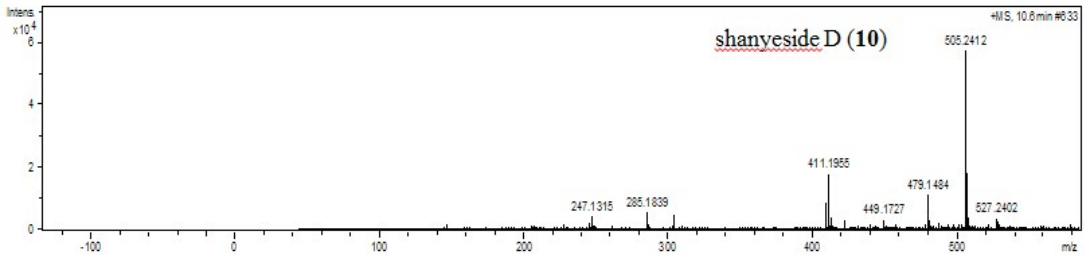
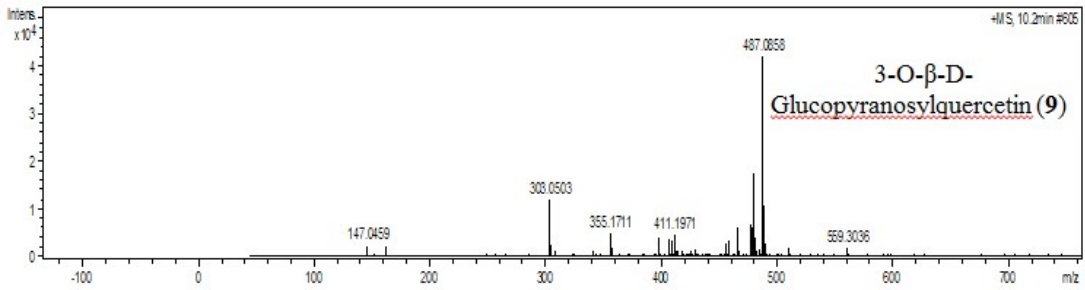
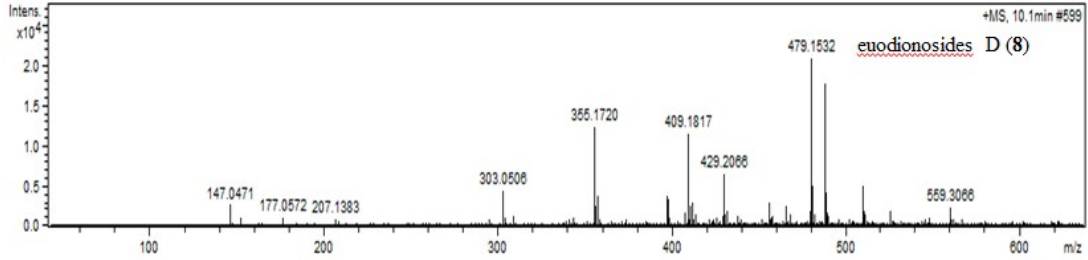
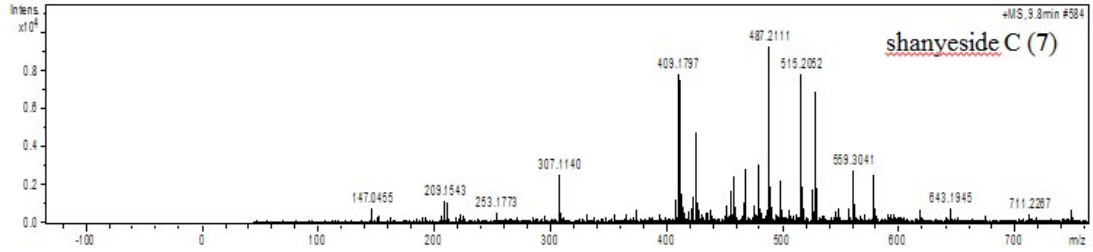
Smample	Dosage	Inhibition rate (%)
control	0.1%DMSO	4.40 \pm 0.40
Heparin Sodium	20 U ml ⁻¹	11.40 \pm 0.51*
1	50 $\mu\text{g mL}^{-1}$	5.80 \pm 0.73
	150 $\mu\text{g mL}^{-1}$	5.40 \pm 0.51
7	50 $\mu\text{g mL}^{-1}$	5.60 \pm 0.40
	150 $\mu\text{g mL}^{-1}$	4.20 \pm 0.20
12	50 $\mu\text{g mL}^{-1}$	6.00 \pm 0.89
	150 $\mu\text{g mL}^{-1}$	6.00 \pm 0.45*

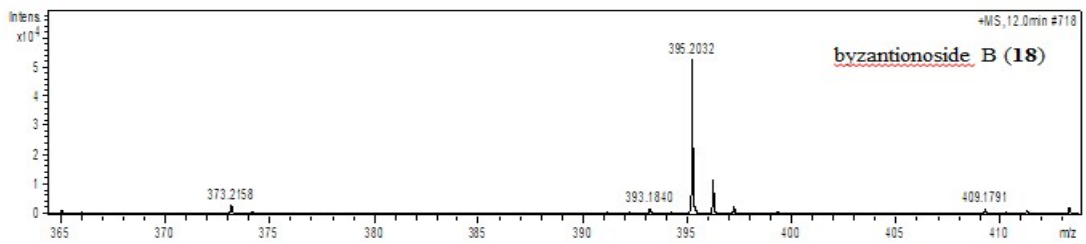
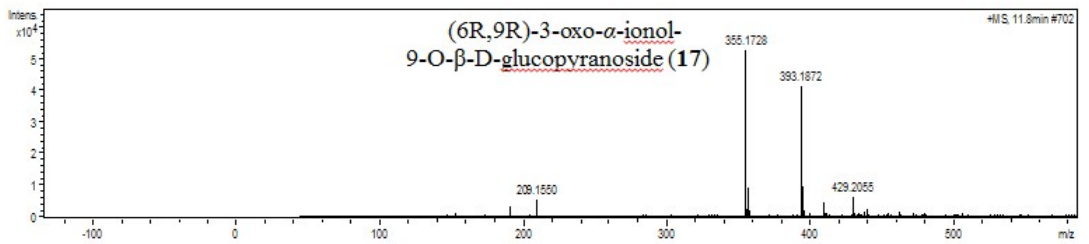
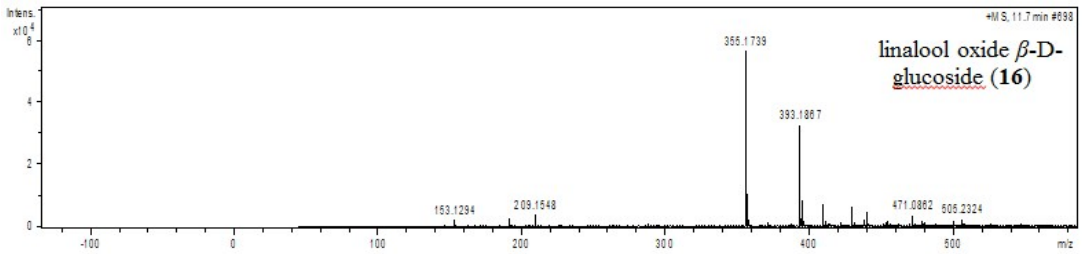
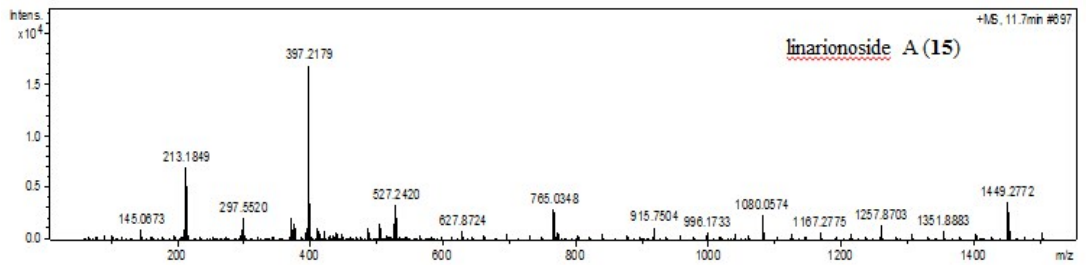
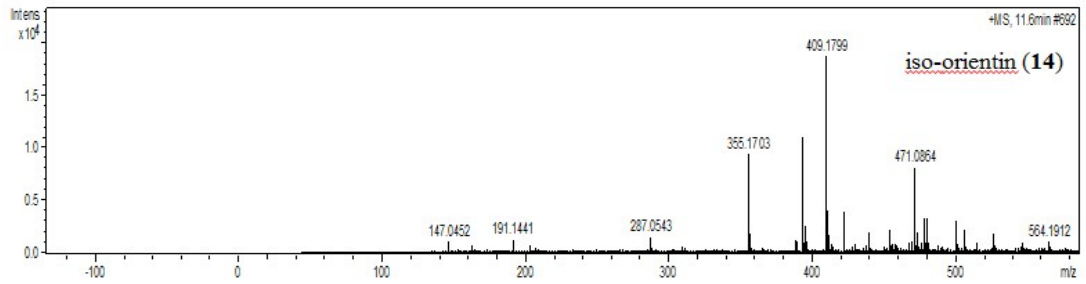
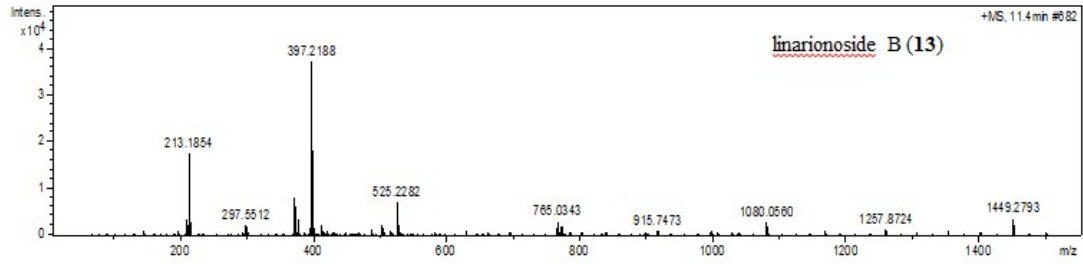
Supp 3-2 Antithrombotic activity of compounds **8, 15, 22, 24** on transgenic zebrafish system from the reference

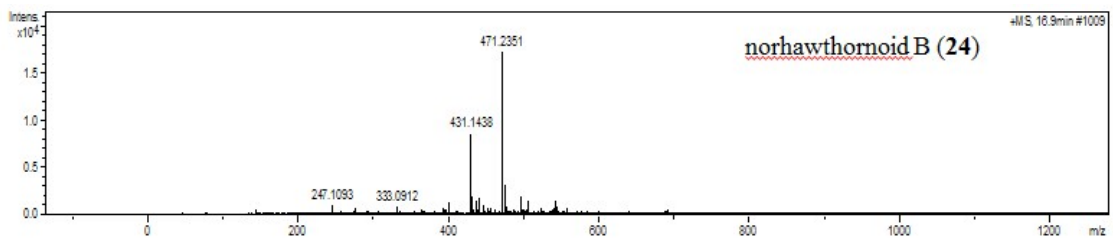
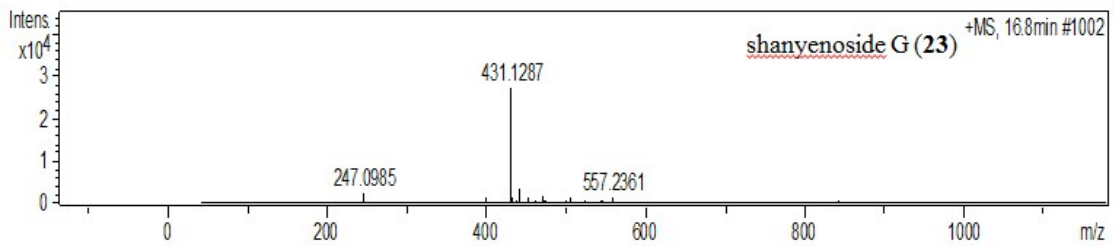
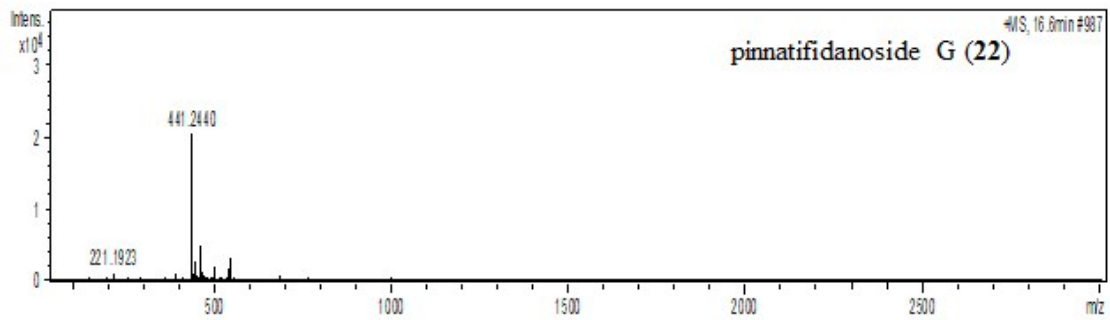
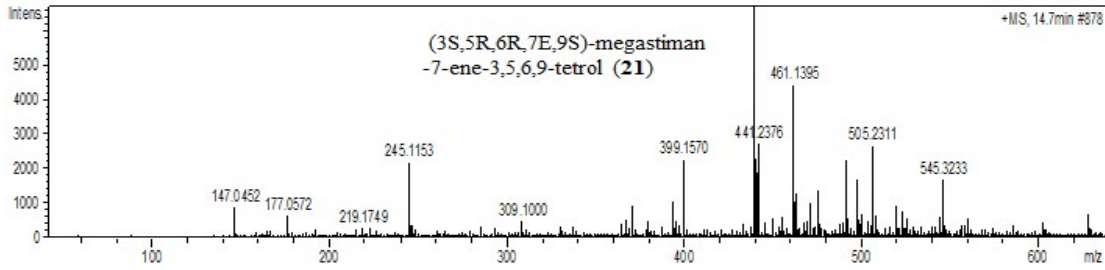
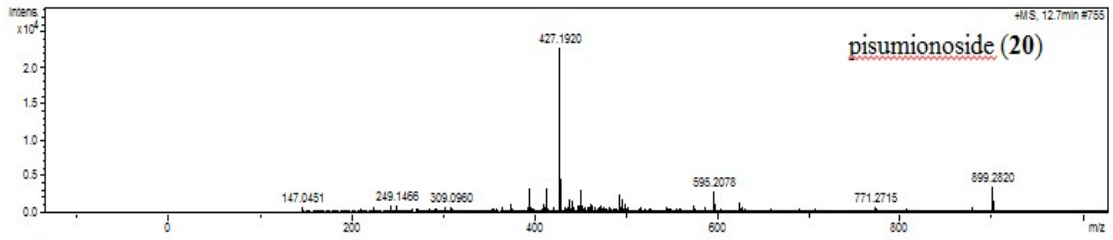
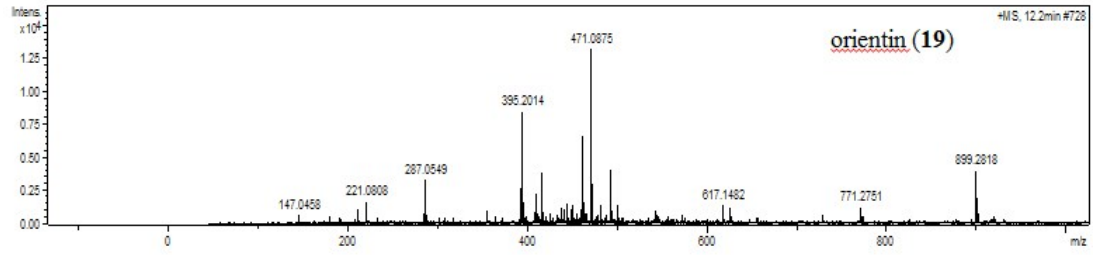
Smample	Dosage	Inhibition rate (%)	reference
8	50 $\mu\text{g mL}^{-1}$	6.80 \pm 1.07	24
	150 $\mu\text{g mL}^{-1}$	5.80 \pm 0.49	
15	50 $\mu\text{g mL}^{-1}$	6.40 \pm 0.24	24
	150 $\mu\text{g mL}^{-1}$	5.60 \pm 0.24	
22	50 $\mu\text{g mL}^{-1}$	6.60 \pm 0.51	15
	100 $\mu\text{g mL}^{-1}$	5.40 \pm 0.51	
24	50 $\mu\text{g mL}^{-1}$	6.60 \pm 0.75	15
	100 $\mu\text{g mL}^{-1}$	8.80 \pm 0.37*	

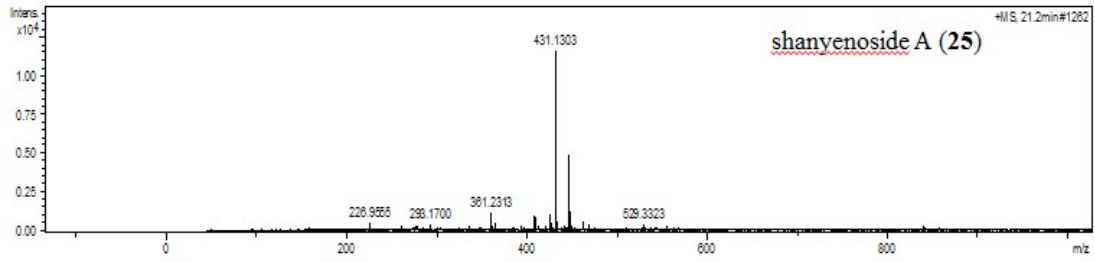
Supp 4 The base peak intensity (BPI) chromatogram of 25 compounds under positive ion mode.











Supp 5 The base peak intensity (BPI) chromatogram of mixed reference compounds in positive ion mode by HPLC-QTOF-MS. The mixed A were reference compounds **1-7, 9-11, 24**. The mixed B were reference compounds **12, 14-17, 19-23**.

