

Supplementary materials

Supplementary materials included ten figures and one table.

Figures captions:

Figure S1. *Malvaviscus arboreus* Cav. sample of fresh flower (a), Drying flower (b), flower powder by grinding (c).

Figure S2. Extracted ion chromatogram (EIC) of the flavonoid glucosides extracted from MACF by UAATPE.

Figure S3. MS/MS spectra and the fragmentation pattern for catechin glucoside.

Figure S4. MS/MS spectra and the fragmentation pattern for cyanidin glucoside.

Figure S5. MS/MS spectra and the fragmentation pattern for pelargonidin glucosides.

Figure S6. MS/MS spectra and the fragmentation pattern for quercetin glucosides.

Figure S7. MS/MS spectra and the fragmentation pattern for kaempferol glucosides.

Figure S8. Extracted ion chromatogram (EIC) of the main flavonoid aglycones obtained by UAAH.

Figure S9. MS/MS spectra and fragmentation pattern of the main flavonoid aglycones in the hydrolysate.

Figure S10. The chromatograms of the extract before (a) and after (b) hydrolysis by HPLC-DAD detection.



Figure S1. *Malvaviscus arboreus* Cav. sample of fresh flower (a), Drying flower (b), flower powder by grinding (c).

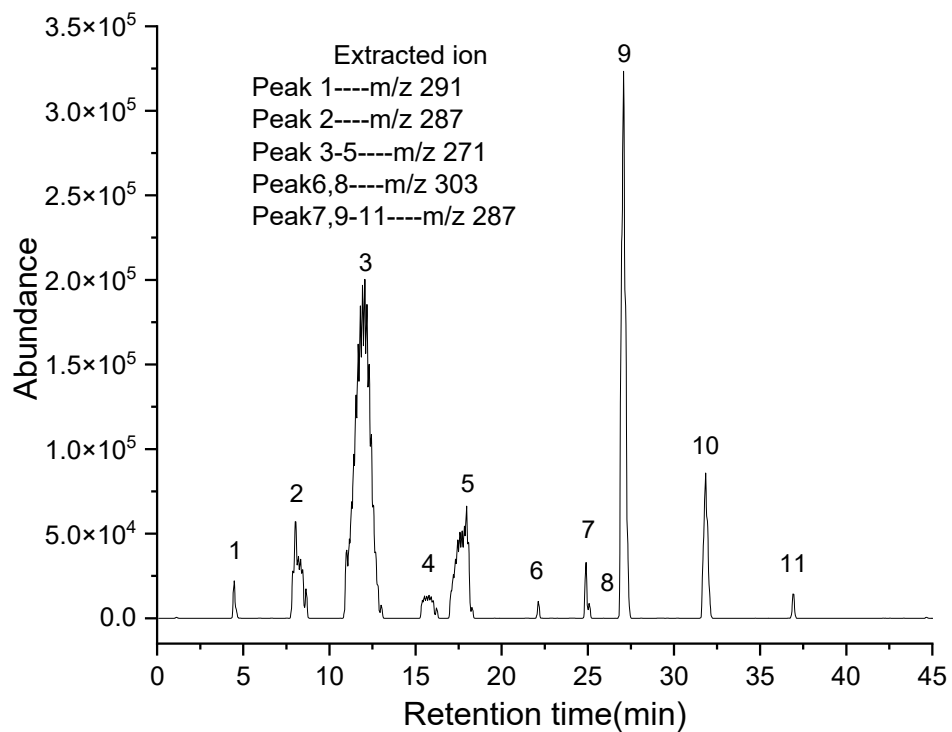


Figure S2. Extracted ion chromatogram (EIC) of the flavonoid glucosides extracted from MAC by UAATPE.

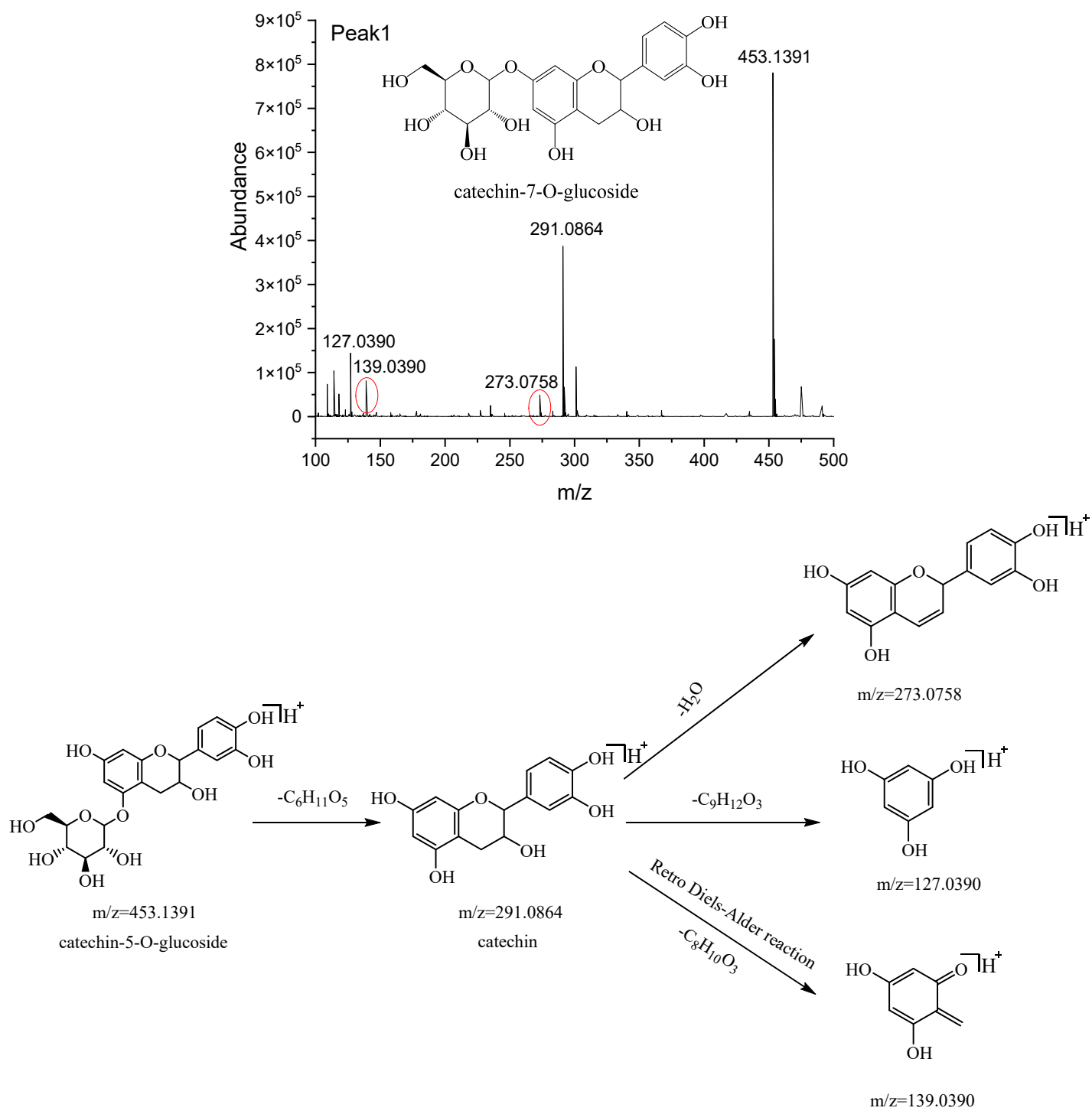
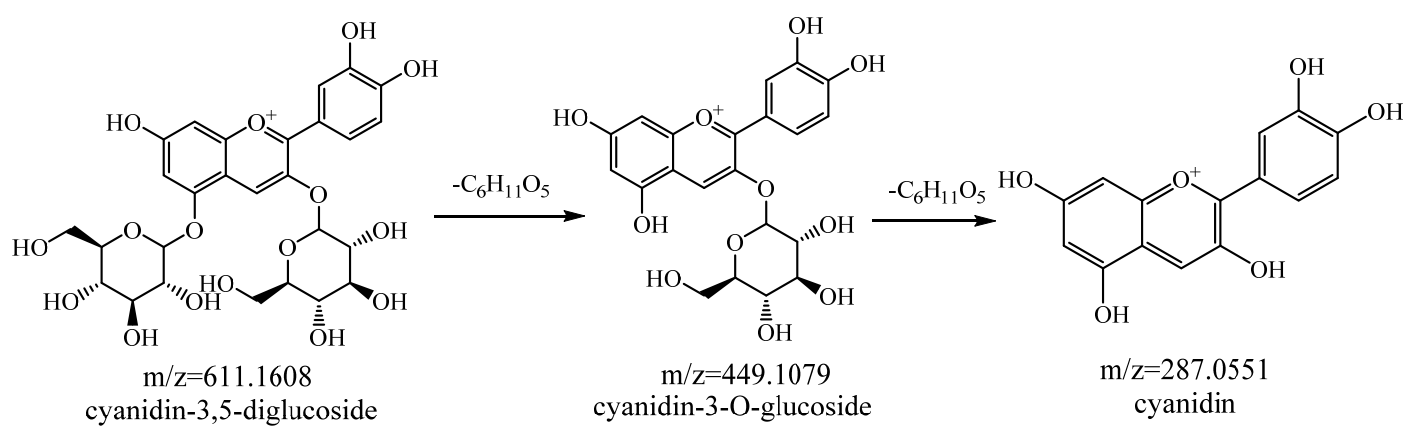


Figure S3. MS/MS spectra and the fragmentation pattern for catechin glucoside.



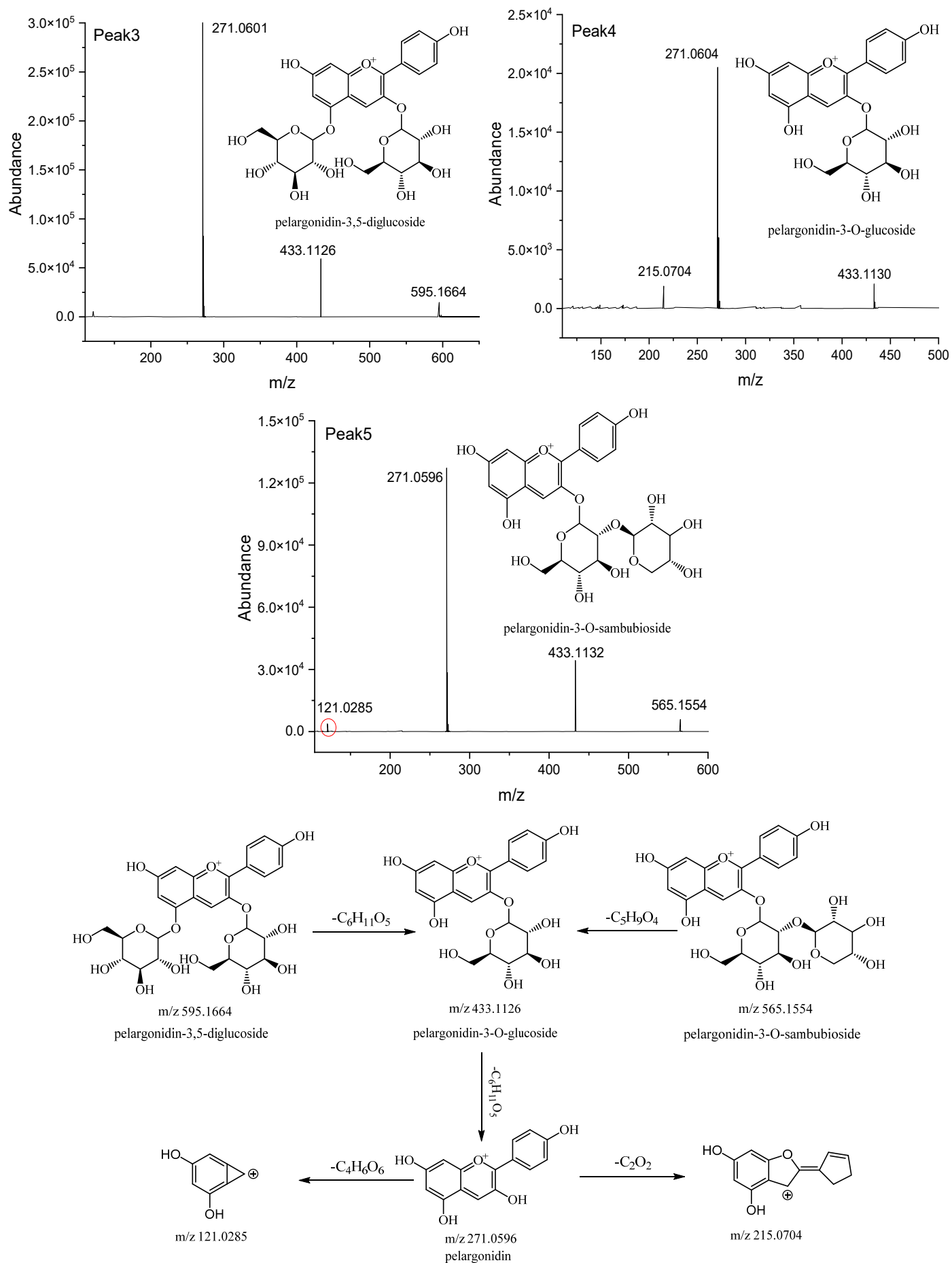


Figure S5. MS/MS spectra and the fragmentation pattern for pelargonidin glucosides.

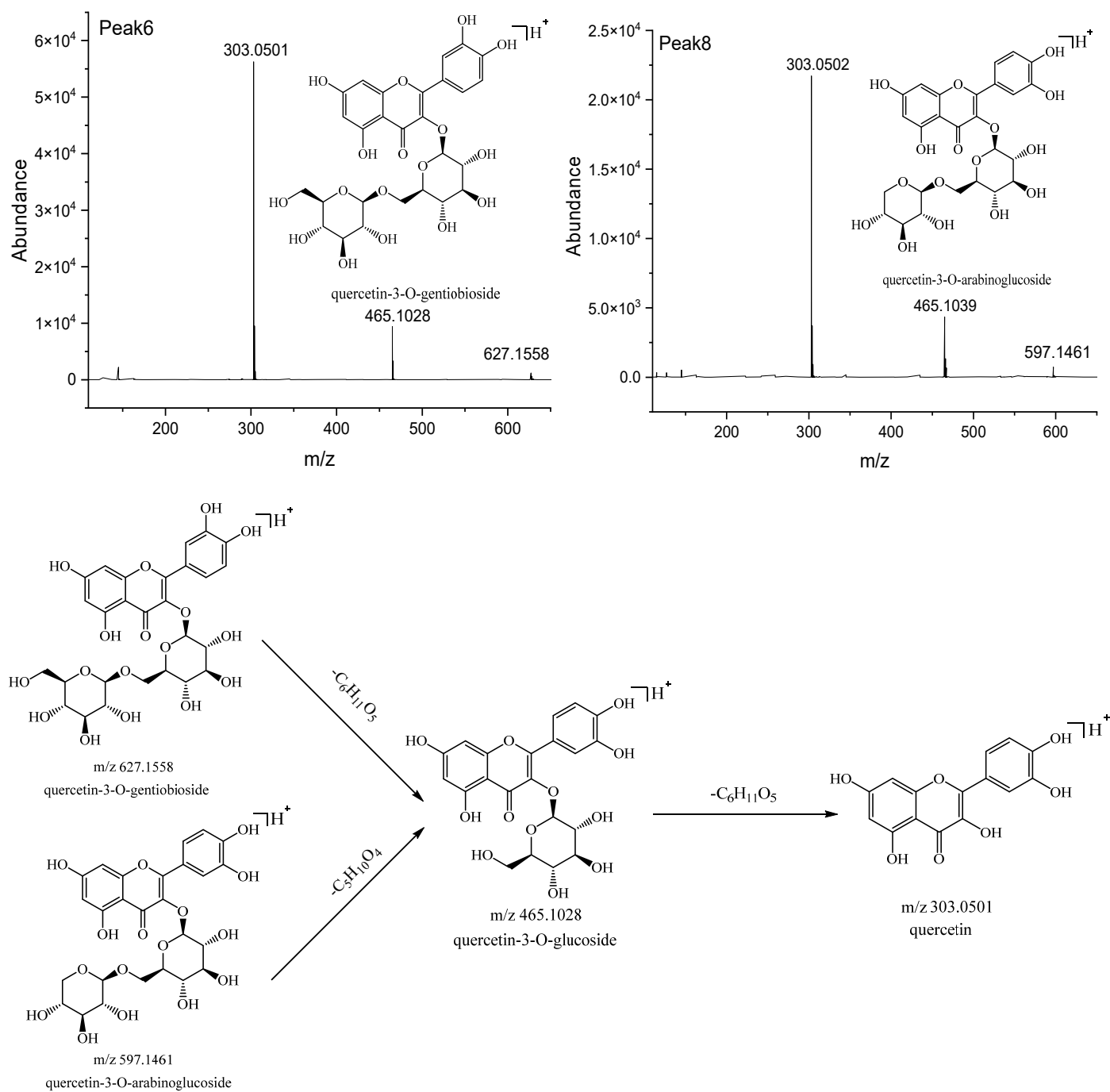


Figure S6. MS/MS spectra and the fragmentation pattern for quercetin glucosides.

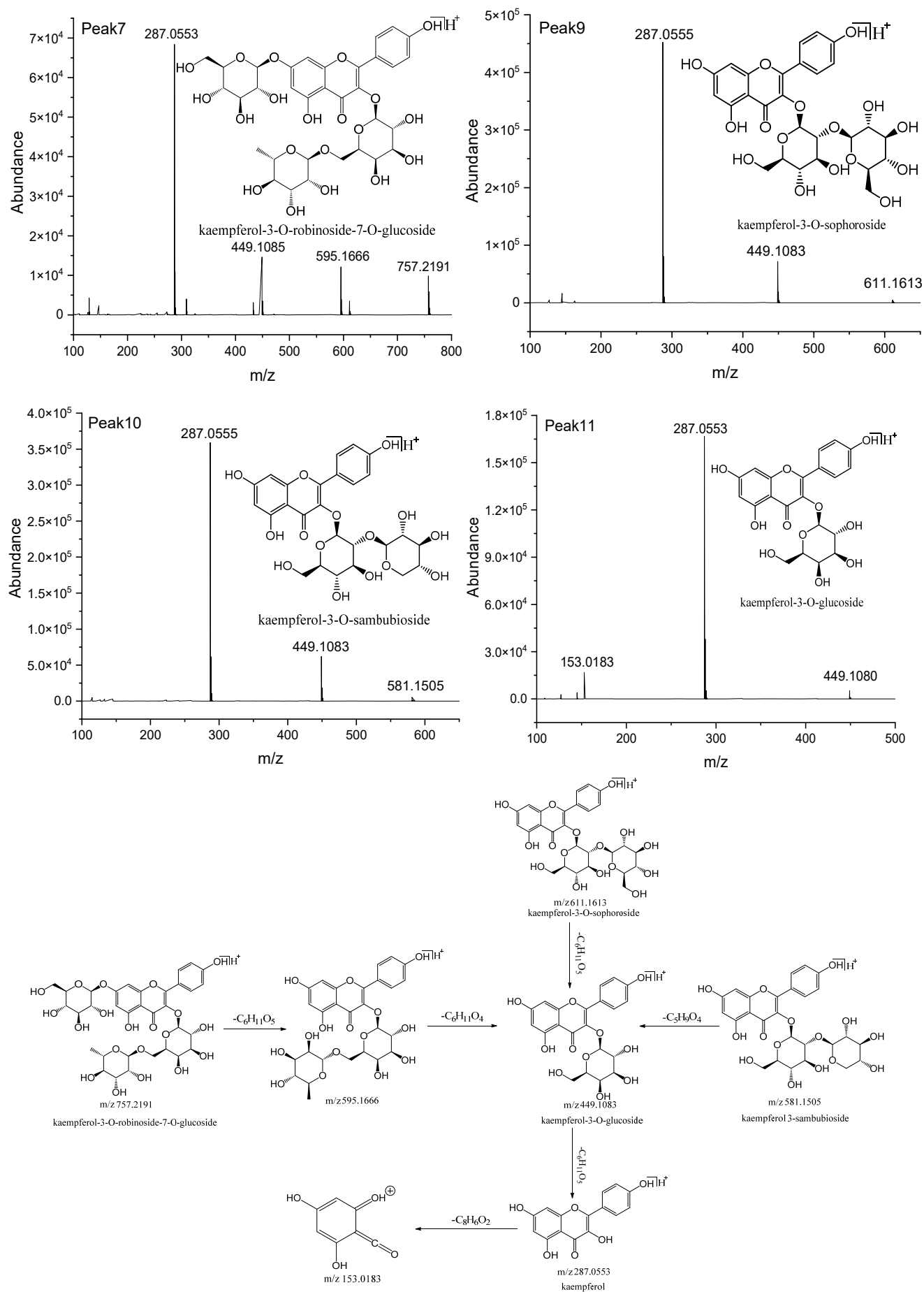


Figure S7. MS/MS spectra and the fragmentation pattern for kaempferol glucosides.

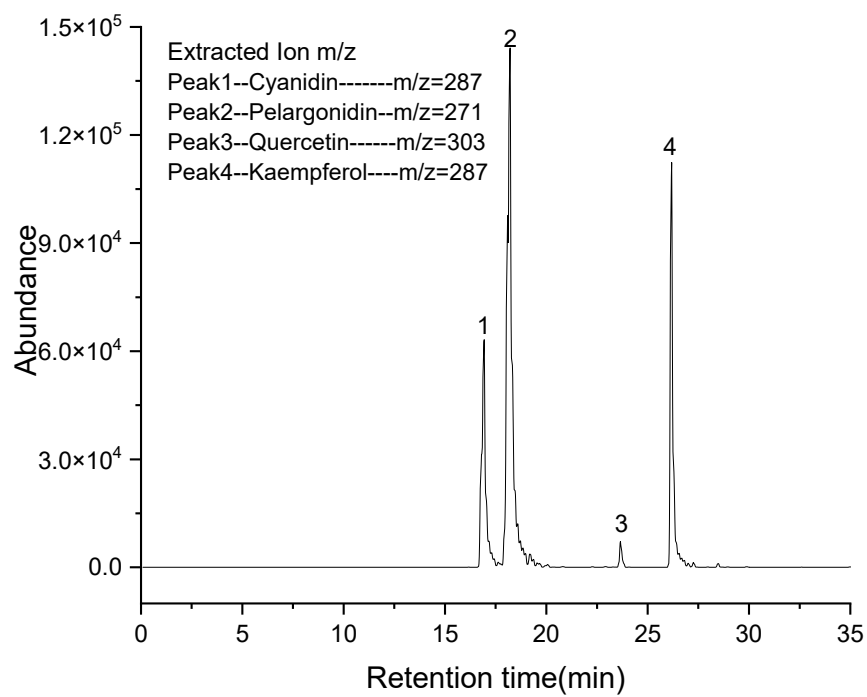
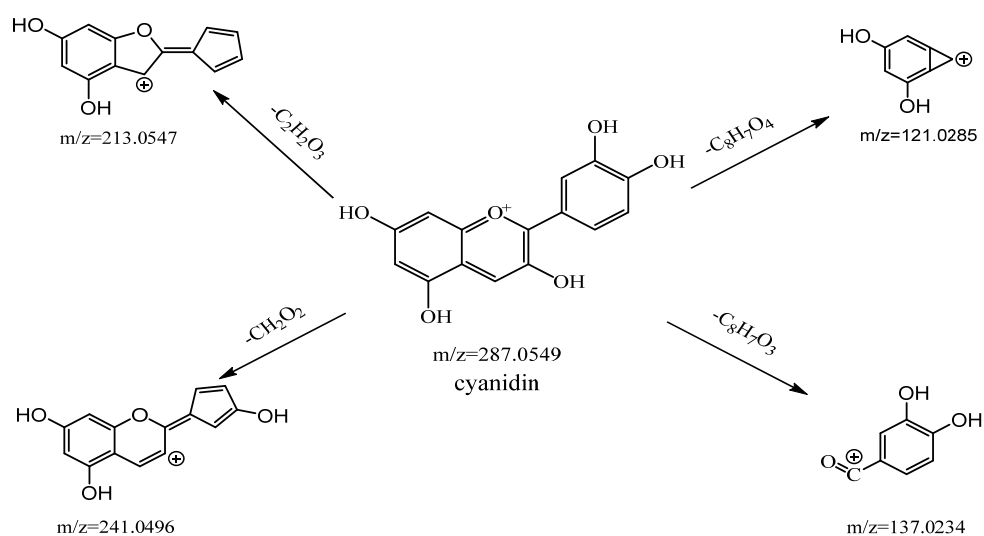
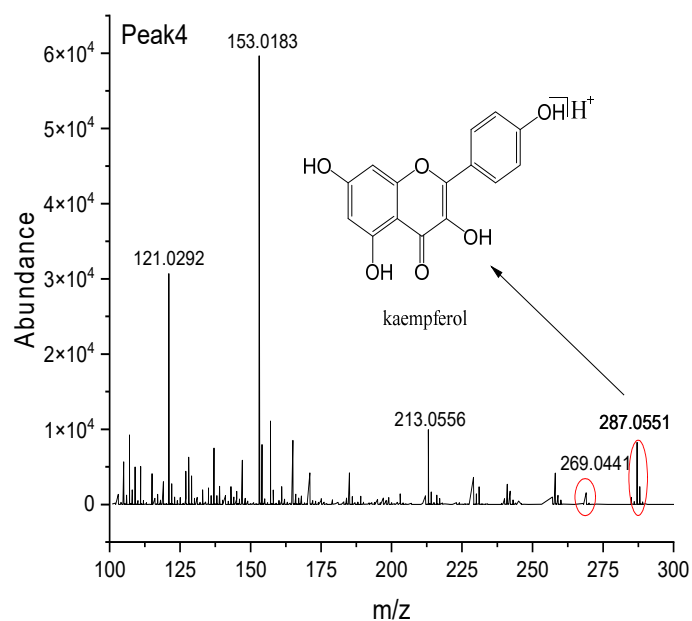
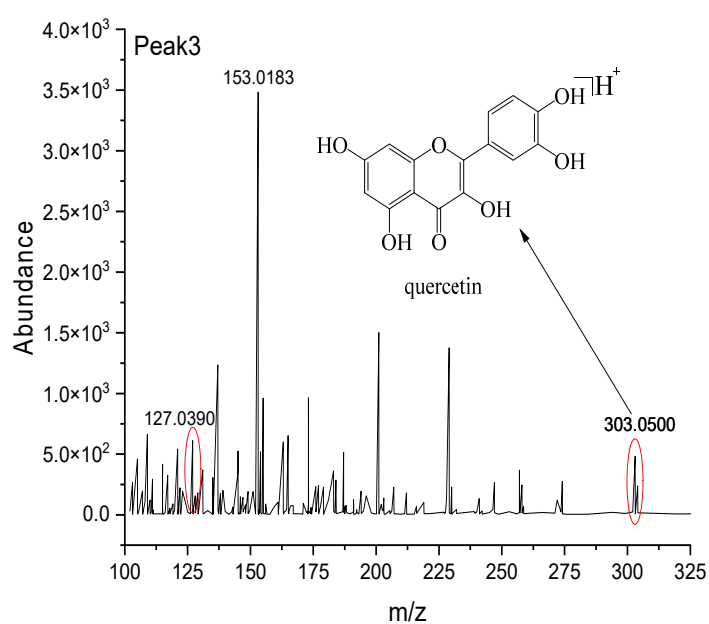
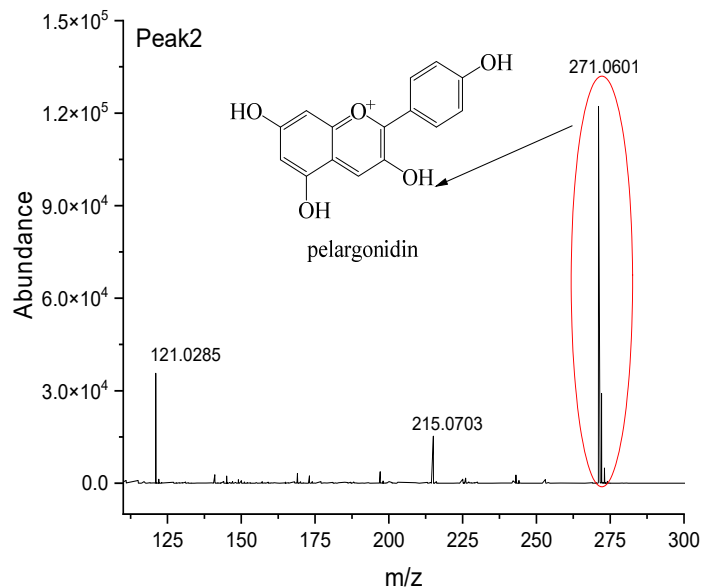
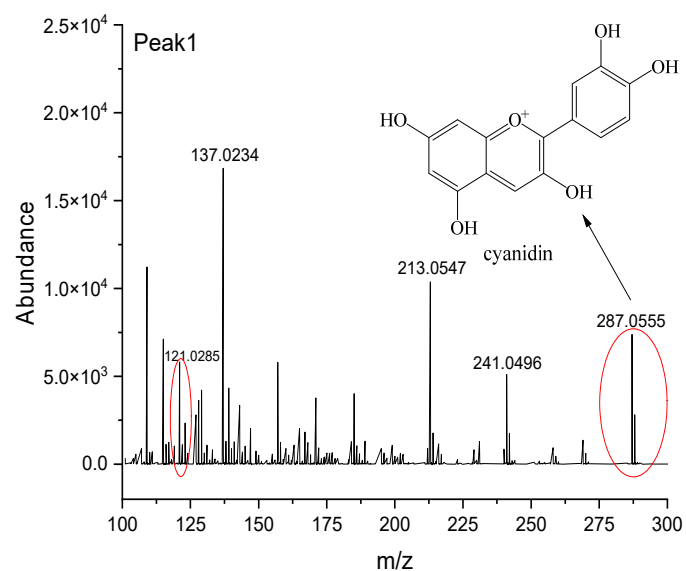


Figure S8. Extracted ion chromatogram (EIC) of the main flavonoid aglycones obtained by UAAH.



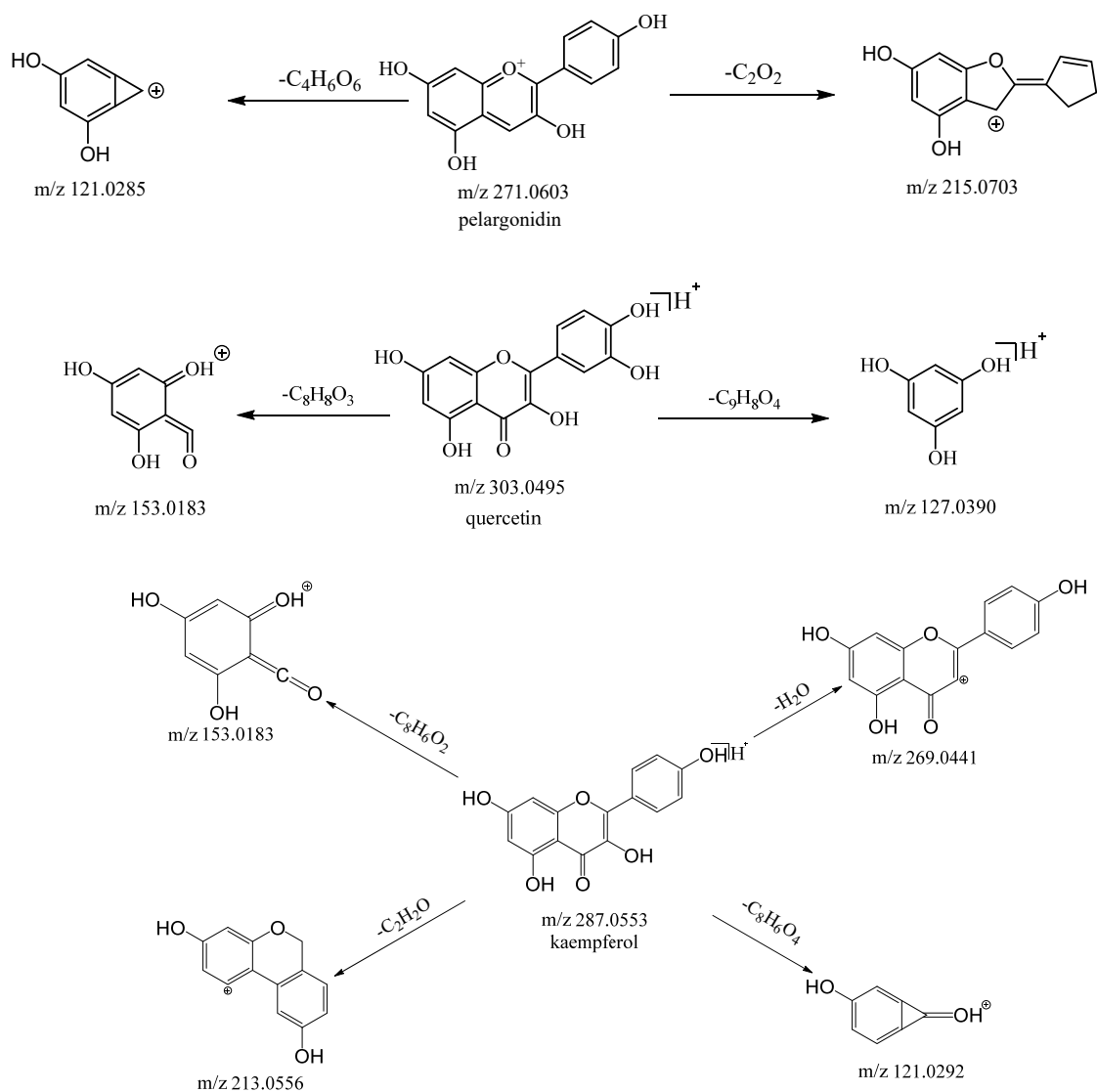


Figure S9. MS/MS spectra and fragmentation pattern of the main flavonoid aglycones in the hydrolysate.

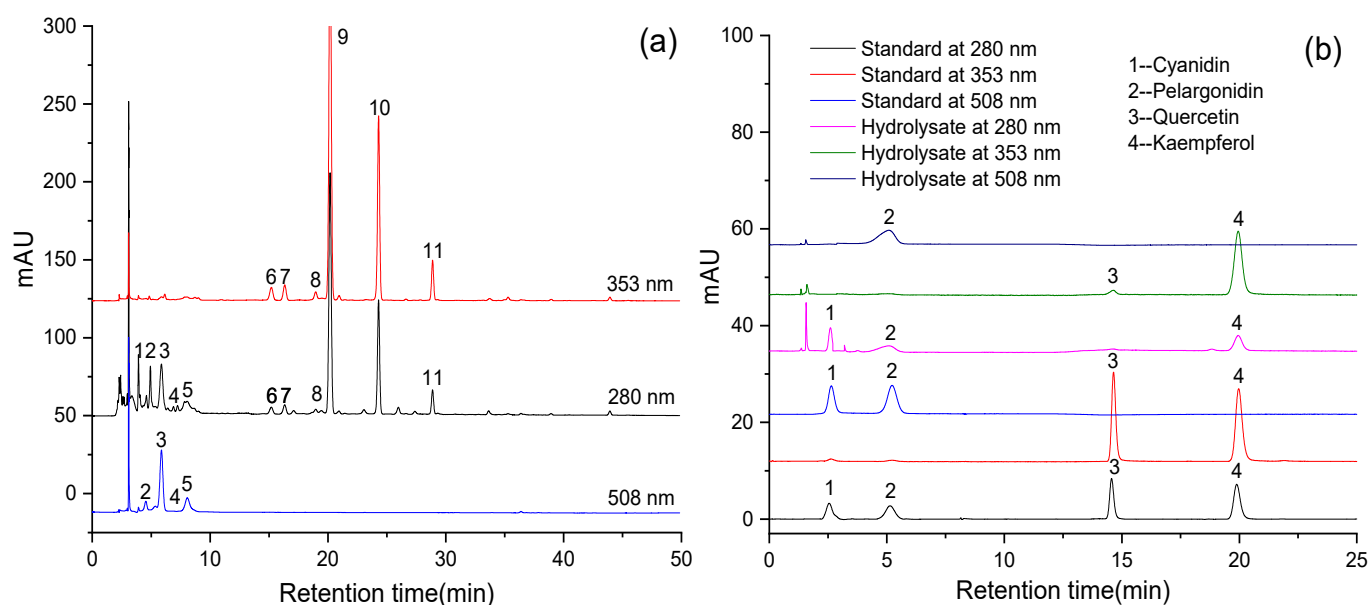


Figure S10. The chromatograms of the extract before (a) and after (b) UAAH hydrolysis by HPLC-DAD detection.

Table S1. The experimental results for Box-Behnken Design: salt concentration (X_1), extraction temperature (X_2), ultrasonic power (X_3) and solvent-to-solid ratio (X_4).

Run	Factors				Extraction yield (mg/g)
	X_1 (% w/w)	X_2 (°C)	X_3 (%)	X_4 (mL/g)	
1	0 (18)	-1 (60)	0 (70)	1 (80)	27.42
2	0 (18)	0 (70)	0 (70)	0 (70)	37.26
3	1 (19)	0 (70)	1 (80)	0 (70)	33.48
4	0 (18)	0 (70)	-1 (60)	1 (80)	26.78
5	1 (19)	1 (80)	0 (70)	0 (70)	33.04
6	0 (18)	0 (70)	0 (70)	0 (70)	36.21
7	0 (18)	0 (70)	1 (80)	-1 (60)	28.74
8	0 (18)	1 (80)	-1 (60)	0 (70)	29.08
9	0 (18)	0 (70)	1 (80)	1 (80)	34.45
10	0 (18)	1 (80)	1 (80)	0 (70)	33.18
11	0 (18)	0 (70)	0 (70)	0 (70)	36.88
12	1 (19)	0 (70)	0 (70)	1 (80)	32.51
13	-1 (17)	0 (70)	1 (80)	0 (70)	29.49
14	0 (18)	0 (70)	-1 (60)	-1 (60)	28.47
15	1 (19)	-1 (60)	0 (70)	0 (70)	27.73
16	0 (18)	1 (80)	0 (70)	-1 (60)	30.25
17	0 (18)	0 (70)	0 (70)	0 (70)	36.19
18	1 (19)	0 (70)	0 (70)	-1 (60)	29.76
19	0 (18)	-1 (60)	0 (70)	-1 (60)	26.95
20	-1 (17)	0 (70)	0 (70)	1 (80)	30.18
21	-1 (17)	-1 (60)	0 (70)	0 (70)	26.36
22	0 (18)	-1 (60)	1 (80)	0 (70)	27.86
23	0 (18)	1 (80)	0 (70)	1 (80)	33.35
24	0 (18)	0 (70)	-1 (60)	0 (70)	25.21
25	-1 (17)	-1 (60)	0 (70)	-1 (60)	28.96
26	1 (19)	0 (70)	-1 (60)	0 (70)	26.58
27	-1 (17)	1 (80)	0 (70)	0 (70)	31.24
28	-1 (17)	0(70)	-1 (60)	0 (70)	27.54
29	0 (18)	0(70)	0 (70)	0 (70)	36.79