

Table S1. Morphological characteristics of ‘QN’ at different stages of development.

Flower Development Stage	Flower Morphological Characteristics
Green bud stage (S1)	Green bud, green outside petals, no red accumulation or trace red accumulation at the top of the inner side and blue accumulation at the bottom.
Coloring stage (S2)	The outer side of flower petal is green, the top of inner side has obvious red accumulation, the bottom has obvious deep purplish red accumulation and the middle part is green.
Budding stage (S3)	The outer petals of the flower begin to unfold, there is a small amount of red accumulation on the outside of the outer petals and the inner side is completely colored.
Complete coloring stage (S4)	The flowers become larger, the inner and outer sides of the petals are completely colored, the outer side is red and the inner side is dark purplish red.
Blooming stage (S5)	The flowers become larger, the inner and outer sides of the petals are completely colored and the inner and outer sides are dark purplish red and nearly black.

Table S2. Standards used in UPLC-Q-TOF-MS.

No.	Standard Name	Type	Manufacturer
1	Rutin		
2	Quercetin		Shanghai Yuanye Biotechnology Co. (Shanghai, China)
3	Kaempferol		
4	Apigenin	Anthoxanthin	
5	Isorhamnetin		
6	Naringin		Shanghai Macklin Biochemical Technology Co. (Shanghai, China)
7	European Pharmacopoeia Reference Standard	Anthocyanin	EDQM, France

Note: [7] is mixed standard, including 20 anthocyanin standards such as Malvidin 3-O-glucoside, Delphinidin 3-O-glucoside, Petunidin 3-O-glucoside, Cyanidin 3-O-glucoside, Peonidin 3-O-glucoside, etc.

Table S3. Standard curves constructed by relevant standard compounds.

Standard Compounds	Standard Curves
Rutin	$y = 7244.2x - 2358.9$, $R^2 = 0.9999$
Quercetin	$y = 8094x + 4774.6$, $R^2 = 0.9996$
Kaempferol	$y = 16774x + 4255.5$, $R^2 = 0.9996$
Apigenin	$y = 17391x - 797.15$, $R^2 = 0.9948$
Naringin	$y = 20832x - 550.8$, $R^2 = 0.9993$
Isorhamnetin	$y = 15124x - 637.56$, $R^2 = 1$
Malvidin-3-o-galactoside	$y = 362.75x - 5771.8$, $R^2 = 0.9974$

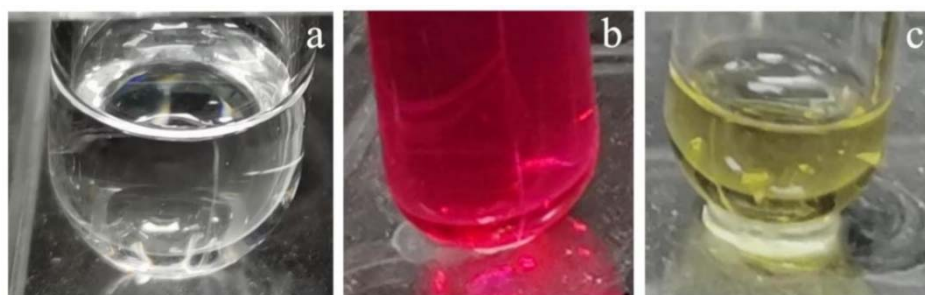


Figure S1. Color reaction of petal pigment of 'QN'. (a) Color reaction in petroleum ether. (b) Color reaction in the hydrochloric acid. (c) Color reaction in the ammonia.

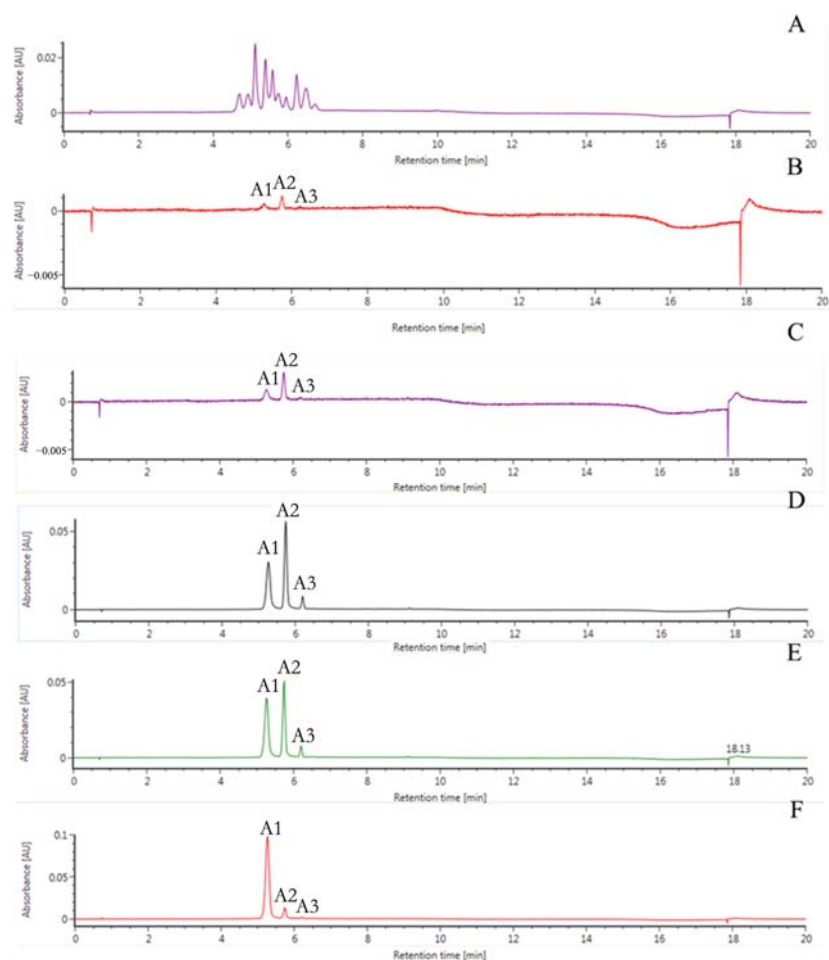


Figure S2. UPLC separation diagram at 520 nm of 'QN' at different stages of development. (A) Anthocyanin stand compounds. (B) The petal exaction of 'QN' at S1. (C) The petal exaction of 'QN' at S2. (D) The petal exaction of 'QN' at S3. (E) The petal exaction of 'QN' at S4. (F) The petal exaction of 'QN' at S5.

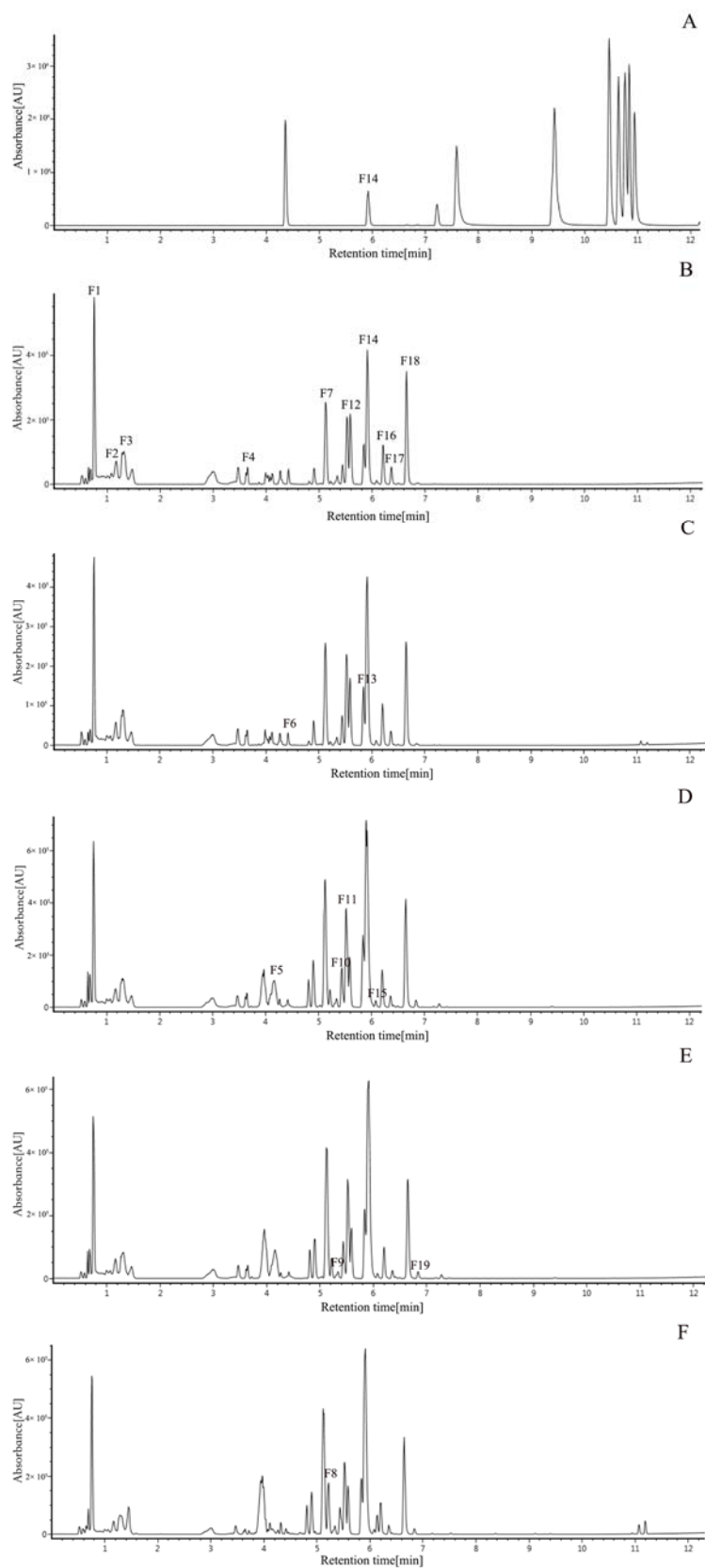


Figure S3. UPLC separation diagram at 350 nm of 'QN' at different stages of development. (A) Anthoxanthins stand compounds. (B) The petal exaction of 'QN' at S1. (C) The petal exaction of 'QN' at S2. (D) The petal exaction of 'QN' at S3. (E) The petal exaction of 'QN' at S4. (F) The petal exaction of 'QN' at S5.