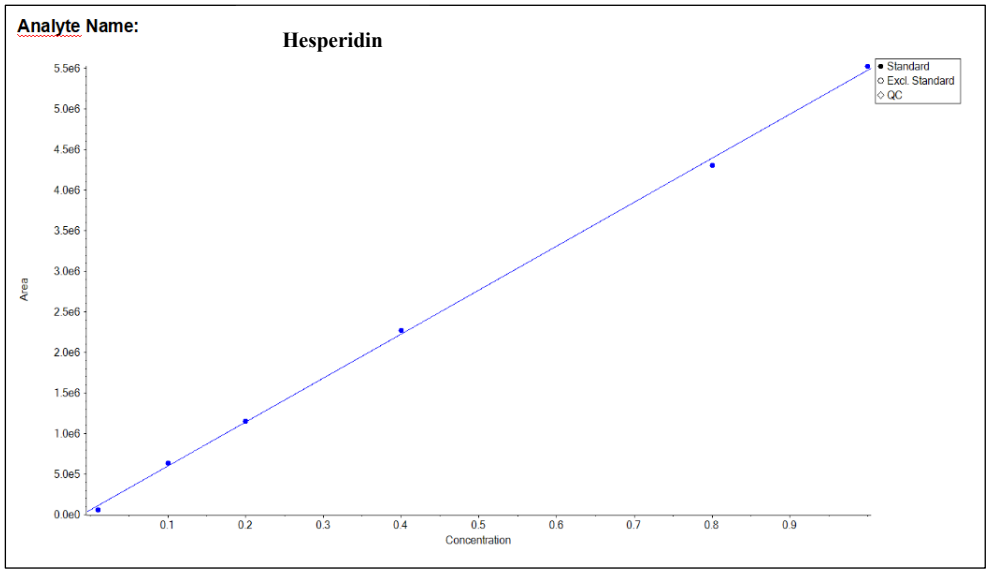
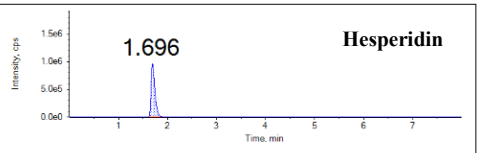
Table S1. Concentration (μg/mL) of hesperidin, nobiletin, and tangeretin in Guang Chenpi extract (GCE) as determined by LC-MS/MS.

Repeats	Hesperidin (μg/mL)	Nobiletin (μg/mL)	Tangeretin (μg/mL)
1-1	251.9587	111.7441	122.4873
1-2	242.6099	107.296	124.1428
1-3	243.1892	108.086	135.5818
2-1	272.6815	139.8907	135.8201
2-2	271.3509	138.7193	134.7874
2-3	273.0085	138.3674	123.2226
3-1	211.2341	104.2564	123.7456
3-2	209.9966	104.2347	121.5735
3-3	208.4285	102.2202	122.4873
Mean	242.7175	117.2016	127.3480
SD	27.2912	16.5717	6.1115

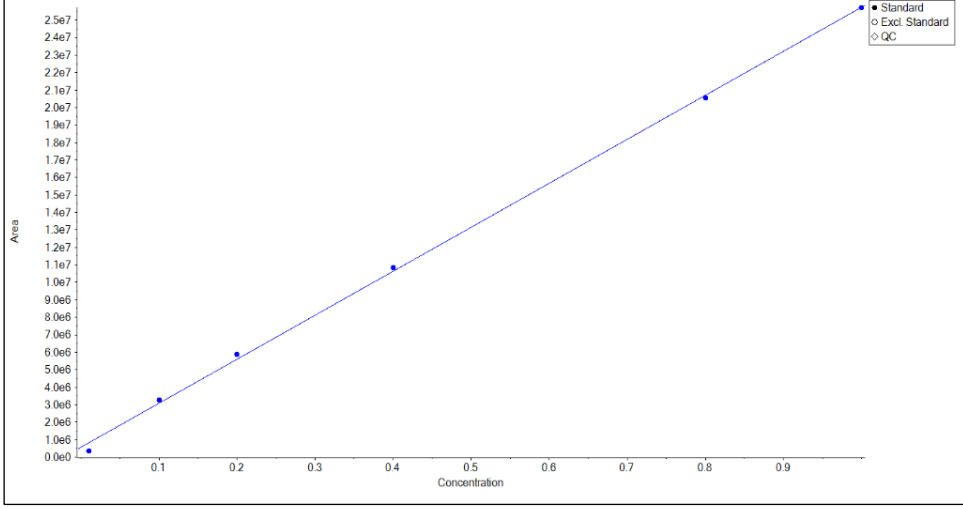
Figure S1. LC-MS/MS analysis representative figures for hesperidin, nobiletin, and tangeretin.



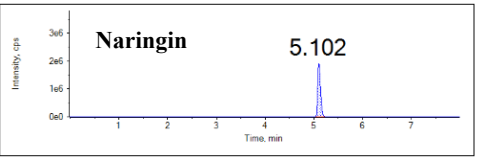
(609.0 / 301.1)	
RT (Exp. RT):	1.70 (1.69) min
Calculated conc:	9.434e-1 ug/mL
Area Ratio:	N/A
Sample Type:	(Unknown)



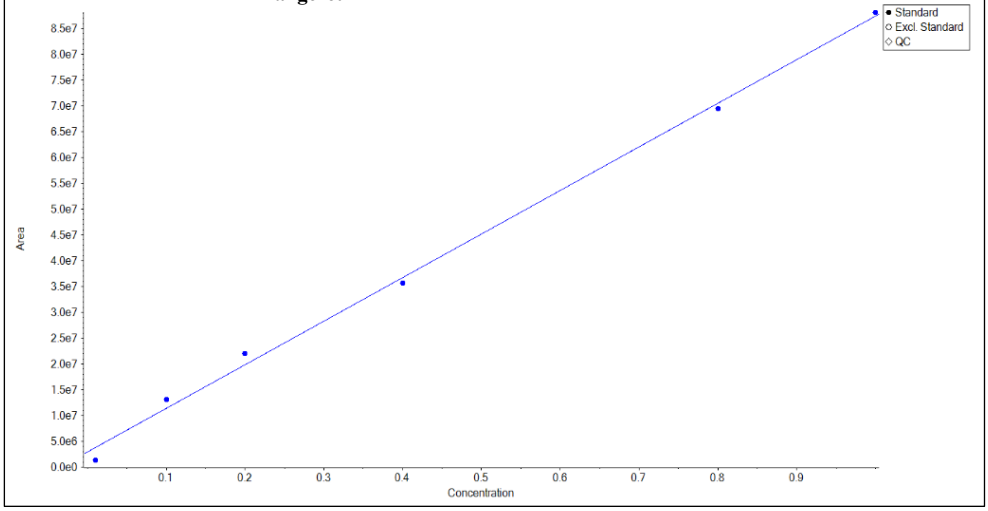
Analyte Name: **Naringin**



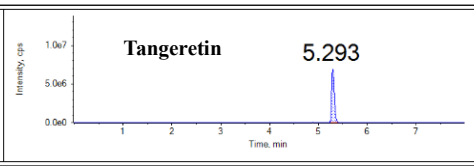
(403.0 / 388.0)	
RT (Exp. RT):	5.10 (5.10) min
Calculated conc:	2.831e-1 ug/mL
Area Ratio:	N/A
Sample Type:	(Unknown)



Analyte Name: **Tangeretin**



(373.0 / 358.0)	
RT (Exp. RT):	5.29 (5.28) min
Calculated conc:	2.880e-1 ug/mL
Area Ratio:	N/A
Sample Type:	(Unknown)



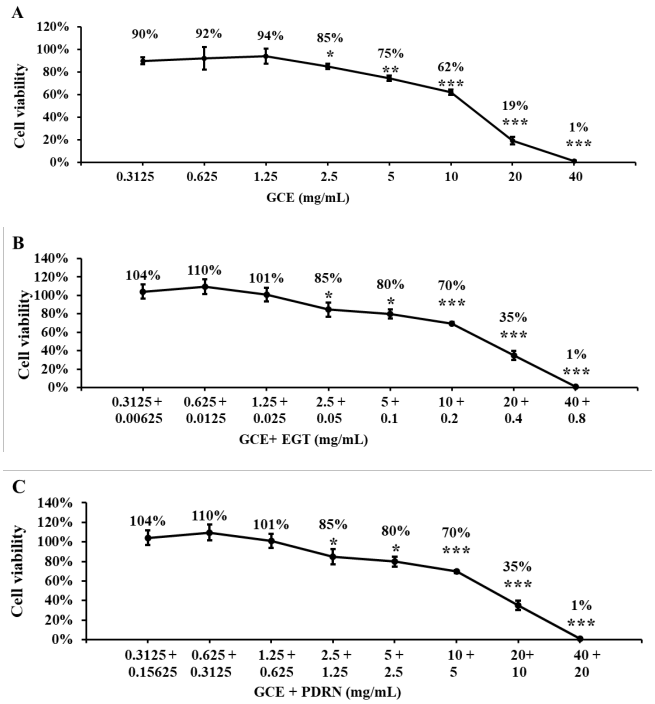


Figure S2. Cytotoxicity of GCE, GCE + EGT, and GCE + PDRN to melanocytes. Human primary melanocytes (P2 generation, (batch No. MC25090901, Guangdong Biocell Biotechnology Co., Ltd., Guangdong, China) were seeded in 96-well plates at 8×10^3 cells/well and cultured overnight to 50-60% confluence. Cells were treated for 72 h with eight concentration gradients of GCE alone (0.3125-40 mg/mL) and in combination with EGT or PDRN, using 1% DMSO as solvent control and 10% DMSO as toxicity control. Cell viability was assessed using MTT assay, where 0.5 mg/mL formazan crystals were dissolved in DMSO after 4h incubation and absorbance measured at 490 nm. Relative viability was calculated as [(OD_sample - OD_blank)/ (OD_solvent control - OD_blank)] ×100%. Toxicity positive control (10% DMSO) resulted in a significant reduction in cell viability to 2.72% ± 0.48% ($p < 0.001$) compared to the solvent control (1% DMSO), confirming the assay's responsiveness. GCE at concentrations up to 1.25 mg/mL, GCE + EGT at up to 1.25 + 0.025 mg/mL, and GCE + PDRN at up to 1.25 + 0.625 mg/mL demonstrated no significant cytotoxicity ($p > 0.05$), thereby establishing their safety thresholds. Data are denoted as percentage difference (mean ± SD) over the solvent control. Compared with the solvent control, * $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.