

Table S1 Differences in acute hangover scale between the sample and placebo groups (FAS)

Variables	Sample (n=30)	Placebo (n=30)	p-value ¹⁾
Total score	8.07±7.32	8.87±8.19	0.5971
Hangover	1.07±1.68	1.20±1.47	0.6737
Thirst	1.77±1.57	1.83±1.84	0.8438
Tired	2.20±1.73	2.50±1.78	0.4546
Headache	1.10±1.77	1.30±1.93	0.5575
Dizziness/faintness	0.20±0.61	0.23±0.63	0.8130
Loss of appetite	0.37±0.76	0.47±0.90	0.3256
Stomachache	0.30±0.70	0.47±1.20	0.4752
Nausea	0.70±1.32	0.57±1.01	0.5803
Heart racing	0.37±1.00	0.30±0.99	0.4888

Sample: 4.5% SKE, 5% glucose, 0.15% citrus flavor, and 0.04% enzymatically modified stevia mixture;
Placebo: 0.09% caramel color, 0.15% citrus flavor, and 0.04% enzymatically modified stevia mixture.

Data values were expressed as mean ± SD.

¹⁾Analyzed using Paired t-test (Compared between groups).

Table S2 Flavonoid content of SKE

(ppm)	SKE
Ampelopsin	137.58 ± 0.41
Hesperidin	25.01 ± 0.09
Narirutin	99.75 ± 0.16

SKE: *Citrus unshiu* fruit vinegar and *Hovenia dulcis* fruit extract mixture

Data values were expressed as mean ± SEM (n=3).

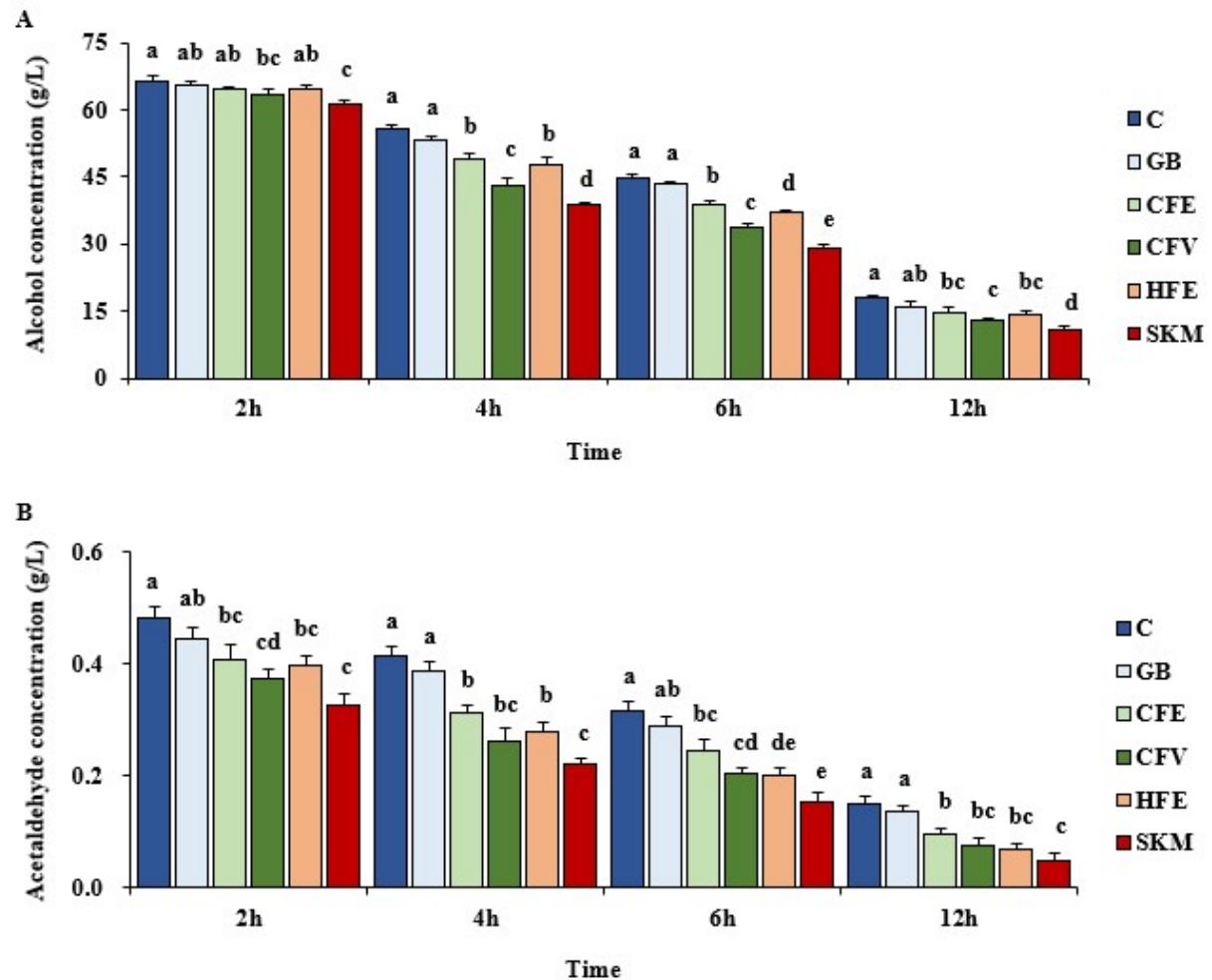


Fig. S1 Effects of SK on serum alcohol and acetaldehyde concentrations in acute alcohol-fed rats. (A) Alcohol concentration in serum. (B) Acetaldehyde concentration in serum. C: alcohol group; GB: glucose group; CFE: *Citrus unshiu* fruit extract; CFV: *Citrus unshiu* fruit extract fermented vinegar group; HFE: *Hovenia dulcis* fruit extract group; SKM: *Citrus unshiu* fruit

vinegar, *Hovenia dulcis* fruit extract, and glucose mixture group. Data were expressed as mean \pm SEM (n=8) and analyzed by one-way ANOVA followed by Duncan's test ($p < 0.05$).

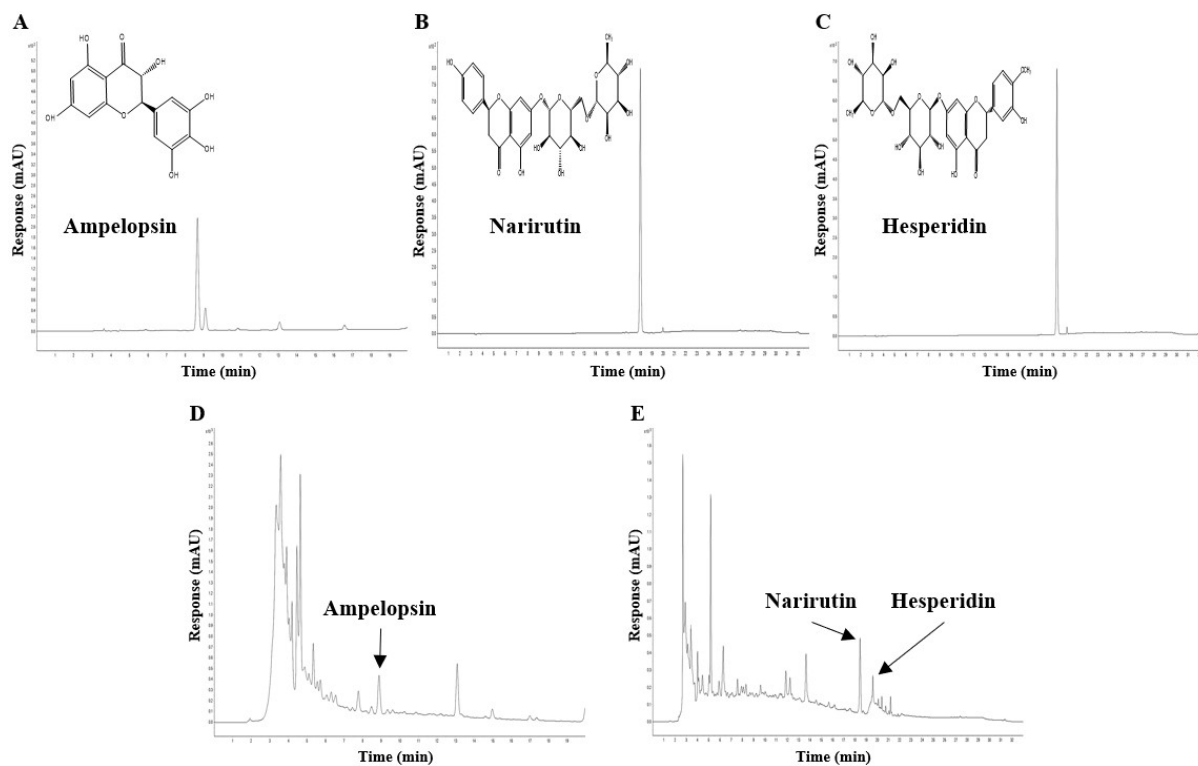


Fig. S2 HPLC chromatogram of the SKE. (A) Standard ampelopsin; (B) standard narirutin; (C) standard hesperidin; (D) chromatogram of SKE showing the presence of ampelopsin; (E) chromatogram of SKE indicating the presence of narirutin and hesperidin. SKE: *Citrus unshiu* fruit vinegar and *Hovenia dulcis* fruit extract mixture