Supplementary Table 1. Yields of 20(S)-Rg3, Rk1, and Rg5 in red ginseng and sun ginseng (*n = 3*)

Control	20(S)-Rg3 (mg/g dw)	Rk1 (mg/g dw)	Rg5 (mg/g dw)
Red ginseng	0.29 ± 0.02	0.19 ± 0.03	0.43 ± 0.06
Sun ginseng	1.48 ± 0.07	1.86 ± 0.05	3.71 ± 0.10

dw, dry weight.

Supplementary Table 2. Antioxidant activities of the control group (*n = 3*)

Control	Total phenol content (mg GA/g dw)	TEAC (μM Trolox/100 g dw)	
		ABTS	DPPH
Red ginseng	2.09 ± 0.08	70.5 ± 4.29	19.2 ± 1.26
Sun ginseng	5.27 ± 0.09	86.5 ± 1.17	38.4 ± 0.48

ABTS, 2,2′-azino-bis (3-ethylbenzothiazo-line-6-sulfonic acid); DPPH, 2,2-diphenyl-1-picrylhydrazyl; GA, gallic acid; TEAC, trolox equivalent antioxidant capacity.

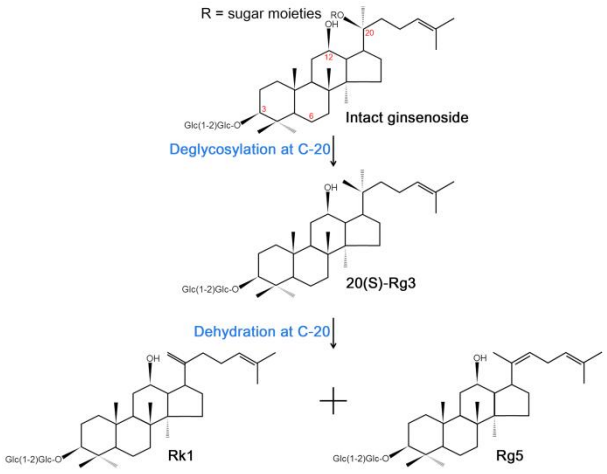
Supplementary Table 3. Elemental analysis of ginseng extract and ginseng powder (*n = 3*)

Element	Ginseng extract (wt%)	Ginseng powder (wt%)
Nitrogen	0.81 ± 0.02	1.89 ± 0.04
Carbon	41.8 ± 0.17	43.2 ± 0.07
Hydrogen	7.11 ± 0.04	6.33 ± 0.01

wt, weight.

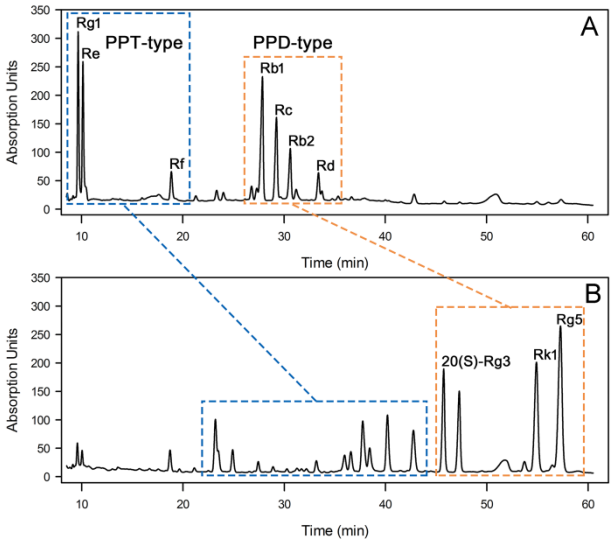
Supplementary data

Supplementary Fig. 1. Transformation process of protopanaxadiol-type intact ginsenosides.

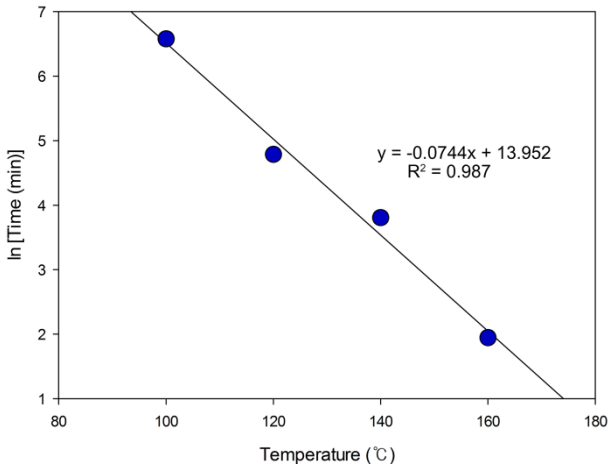


Supplementary Fig. 2. (A) HPLC chromatograms of unprocessed ginseng extract. (B) HPLC chromatograms of hydrothermally processed ginseng extract.

PPD, protopanaxadiol.



Supplementary Fig. 3. Linear relation between the natural logarithm of the reaction time and the temperature in the hydrothermal process.



Supplementary Fig. 4. Antioxidant activities of hydrothermally reacted samples obtained by

evaluating the (A) total phenol content, (B) ABTS radical cation scavenging, and (C) DPPH radical scavenging.

ABTS, 2,2′-azino-bis (3-ethylbenzothiazo-line-6-sulfonic acid); DPPH, 2,2-diphenyl-1-picrylhydrazyl; dw, dry weight; TEAC, trolox equivalent antioxidant capacity.