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Letter to the Editor

Anti-Fatigue Effects of Acute Red Ginseng Intake in Recovery from Repetitive Anaerobic Exercise

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Dear Editor-in-Chief,

Ginseng root is one of the traditional medical remedies used for promotion of health and treatment of disease in many Asian countries (1). One particular kind of ginseng, red ginseng, has been the focus of a number of studies and has also demonstrated a positive effect on sports performance as an anti-fatigue (2) and anti-inflammation agent (3) along with ability to mitigate exercise-related muscle damage (4). Most of these studies have focused on medium to long-term intake of red ginseng root. Our study focused on the effect of acute red ginseng intake as a possible nutritional ergogenic aid. We confirmed the effect of acute intake of this plant root on markers of repeated anaerobic capacity namely fatigue, and muscle damage.

Subjects of the present study were 11 volunteers, male aged 20.62 ± 0.09 yr. The study was of a "crossover" design. After a one-week washout period, study participants were divided into a placebo group (PG; n=11) and a red ginseng group (RG; n=11, 5 g/day). Repeated anaerobic exercise capacity was evaluated by peak power and mean power measures by five times of the Wingate Test (Lode Excalibur Ergometer, Lode Medical Technology, Netherlands)..

Blood samples were taken at rest, immediately after exercise, at 30 min and 60 min post-exercise. Blood fatigue markers tested were lactate (Accutrend, Roche, Germany) and ammonia levels (Modular Analytics PE, Roche, Germany); muscle damage markers measured were creatine kinase (CK) and lactate dehydrogenase (LDH) levels (Modular Analytics PE, Roche, Germany). In the present study, we used the non-parametric test, Mann-Whitney *U*-test; this was as the subjects in each group were less than 30, and the data would not allow for a normal distribution (5). Statistical significance was set at $P<0.05$ (SPSS, Chicago IL, USA).

The peak power and mean power were no significant differences in the two groups (Table 1). The results of blood fatigue and muscle damage markers of the RG and PG are presented in Table 2.

There was significant difference in the lactate levels between the two groups at 30 min ($P= .030$) and 60 min ($P < .001$) and in ammonia levels at 30 min ($P = 0.039$) recovery from exercise. However, there were no significant differences in CK and LDH between the two groups at any point in time. These results indicate that acute red ginseng intake had only a marginal impact on muscle damage markers, but was effective in lowering blood fatigue markers in the recovery phase. As such, we expect minimal or no effects following acute red ginseng intake on the prevention of muscle damage.

Table 1: Differences in mean power and peak power of Wingate Test in PG and RG

Variables / set		PG (n = 11)	RG (n = 11)	*z*	*p*
Mean Power (watt)	1	578.72 ± 25.65	585.09 ± 18.80	-.098	.922.
	2	451.18 ± 18.62	459.90 ± 20.74	.000	1.000
	3	370.00 ± 13.59	382.54 ± 18.32	-.164	.870
	4	332.45 ± 14.15	352.09 ± 18.87	-.558	.606
	5	313.45 ± 14.07	330.54 ± 18.03	-.624	.562
Peak Power (watt)	1	902.27 ± 31.62	903.36 ± 44.46	-.131	-895
	2	753.90 ± 28.08	758.45 ± 43.23	-.525	.599
	3	665.27 ± 25.29	658.81 ± 36.04	-.033	.974
	4	612.54 ± 28.72	602.72 ± 38.63	-.033	.974
	5	571.72 ± 30.34	551.63 ± 35.54	-.230	.818

Data are presented as mean ± standard error.

Table 2: Differences in fatigue- and muscle damage markers during recovery from repetitive anaerobic exercise in PG and RG

Variables		PG (*n* =11)	RG (*n* = 11)	*z*	*P*
Lactate (mmol/L)	Rest	2.63 ± .22	2.89 ± .21	-1.323	.186
	R_0	13.05 ± .57	12.29 ± .76	-.592	.554
	R_{30}	10.01 ± .36	8.35 ± .46	-2.169	.030
	R_{60}	5.98 ± .60	3.60 ± .18	-3.587	<.001
Ammonia (umol/L)	Rest	51.27 ± 4.29	53.09 ± 4.09	-.394	.693
	R_0	386.90 ± 32.73	291.63 ± 35.61	-1.839	.066
	R_{30}	229.90 ± 22.59	168.18 ± 16.96	-2.069	.039
	R_{60}	103.72 ± 15.44	84.18 ± 6.90	-.296	.767
CK (IU/L)	Rest	377.54 ± 65.81	417.63 ± 65.73	-.953	.341
	R_0	451.63 ± 74.77	493.18 ± 63.86	-.723	.470
	R_{30}	391.90 ± 66.85	430.54 ± 61.75	-.689	.491
	R_{60}	389.18 ± 65.17	403.72 ± 56. 32	-.492	.622
LDH (IU/L)	Rest	319.63 ± 14.54	326.27 ± 21.69	-.197	.844
	R_0	388.00 ± 15.00	388.18 ± 24.17	-.492	.622
	R_{30}	353.72 ± 15.62	346.18 ± 20.88	-.460	.646
	R_{60}	323.36 ± 11.40	329.00 ± 20.66	-.263	.793

Data are presented as mean ± standard error.
R_0; immediately after exercise, R_{30}; recovery 30 min, R_{60}; recovery 60 min

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References

1. Wang CZ, Yuan CS (2008). Potential role of ginseng in the treatment of colorectal cancer. *Am J Chin Med*, 36(6):1019-28.
2. Kim HG, Cho JH, Yoo SR, Lee JS, Han JM, Lee NH, Ahn YC, Son CG (2013). Antifatigue effects of Panax ginseng C.A. Meyer: a randomised, double-blind, placebo-controlled trial. *PLoS One*, 8(4):e61271.
3. Choi KS, Song H, Kim EH, Choi JH, Hong H, Han YM, Hahm KB (2012). Inhibition of Hydrogen Sulfide-induced Angiogenesis and Inflammation in Vascular Endothelial Cells: Potential Mechanisms of Gastric Cancer Prevention by Korean Red Ginseng. *J Ginseng Res*, 36(2):135-45.
4. Jung HL, Kwak HE, Kim SS, Kim YC, Lee CD, Byurn HK, Kang HY (2011). Effects of Panax ginseng supplementation on muscle damage and inflammation after uphill treadmill running in humans. *Am J Chin Med,* 39(3):441-50.
5. Johnson RA, Bhattacharyya GK (2010). *Statistics: Principles and methods*. New York, NY: John Wiley.