

THE EFFECTS OF GINSENG AND EXERCISE APPLICATIONS IN SEDENTARY INDIVIDUALS IN WOMEN ATHLETES ON LIPID HYDROPEROXIDE AND NITRIC OXIDE

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ABSTRACT

Objective: In this study, the effects of ginseng and exercise applications in women athletes on plasma hydroperoxide (LOOH) and lipid nitric oxide levels are aimed to be determined

Material and method: As in total 21 volunteered subjects; 14 healthy women athletes whose weight are 55-65 and age 20-23 years old and 7 healthy women sedentary participated in the study. Subjects separated in 3 groups equally; Control group (C), Exercise (E), Ginseng supported exercise (GE). 20 m. shuttle run test was applied to the subjects in E and GE groups 5 days in week for 6 weeks. The subjects in GE group were provided ginseng tablets in 500 mg dosage as oral at 10.00 am and 07.00 pm for every 45 days. Blood samples had been taken from all the subjects before starting the exercise period and ginseng supplement. Second blood samples were taken from all the subjects after the exercise period and ginseng supplement for 45 days. Blood samples that were taken from elbow vena in accordance with procedures were then transformed into tubes including ethylenediaminetetraacetic acid (EDTA) and centrifuged immediately at 3500 rpm and 15min + 4°C degree, thus plasma samples were obtained. Plasma LOOH and NO levels were determined with calorimetric method from the samples.

Result: When intra-group LOOH levels of C and GE groups were examined, no significant difference was observed in pre and post application, however a significant ($p>0.05$) increase in LOOH levels of group E was observed. As to inter-group LOOH levels have no significant difference. When NO levels of the groups were observed, it was seen that there was no difference in C group, and NO levels of groups E and GE were increased significantly ($p>0.05$). In inter-groups NO levels, it was seen that there was no difference in pre application and a significant ($p>0.05$) increase was observed in groups E and GE comparing with C group in the post application.

Discussion and conclusion: Consequently in this study, it can be said that performed exercise protocol increased stated formation of free radicals and the ginseng supply performed with this exercise protocol showed no significant effect.

Key Words: Exercise, Ginseng, free radicals

Introduction

Exercise is an important factor that makes body under stress depending on it is period and density (E.D. Higuchi., L.J. Cartier., M, Chen., 1992). While it is stated that irregular, long-lasting and heavy exercises triggered free radical production and weakened antioxidant system by increasing oxidative stress in some experiments (G.V. Şaşmaz., 1997) but in some other ones, it is stated that regular and middle severe exercise strengthened antioxidant system by having an important affect on it (R. Aslan., 1997).

Free radical production and antioxidant activity increases with exercise. It must be discussed that this increasing is related to exercise's intense and period or not (N. Ortenblad., and K. Mad., 1997, S.K. Powers., and L.L. Ji., 1999). However, body's natural antioxidant system can sometimes be insufficient on removing of the free radicals that level's increasing in blood due to the oxidative stress arising during exercise, depending on exercise's density either. When the antioxidant defense

system is always in activity being close but on condition that not to exceed highest capacity limit, it is informed that GSH level in blood decreased being indicator of this system is active (K. Gohil., C. Viguie., W.C. Stanley., 1988).

Increasing in muscular activity increases production and consumption of energy so flowing of blood and using oxygen in working muscle at important degree. However, while energy is taken out from organic molecules, using too much oxygen have organism faced harmful effects of toxic oxygen products. For that reason, they are always faced with free oxygen radicals having too much aerobic organism toxicities. Even in simple, calm life, free oxygen products are always produced at low levels during metabolic activities. The number of free oxygen arising increasing of metabolic activity increases. Nitric oxide, hydroperoxide can be seen between this oxygen products named free radical.

Ginseng is a plant used in medicine in Far East countries. Plant has an a lot of affects like regulator of blood pressure, strengthener of heart, dropper of blood cholesterol, getter centre

nerve system action, giver of people's more eating need, healer of tiredness. It is put forward that it is the most effective increaser resistance spy between all healing plants and it is thought that it may has positive effects on oxidative stress. It is targeted that when it is taken these affects into consideration, ginseng, being made it's tablets in our day, with the sedentary given ginseng and not given in this experiment and changes in plasma nitrioxide, hydoreperoxide levels being found out by doctors, it's contributing available information and so sport physiology.

Material

21 volunteer people whose ages are between 20-23, weights are 55-65,14 women sportswomen and 7 healthy women sedentary of 21 volunteer were added this experiment. Group1:Control; C (n: 7), Group2: Exercise; E (n:7), Group3: Exercise reinforced Ginseng; GE (n: 7).

Method

Mecic running test has regularly done to people in E and Ge groups during 6 weeks, 5 days in a week. It is ensured that the people in GE group took orally Ginseng (GNC®, Ginseng gold, Korean White Ginseng root, USA) at 10.00 am and 07:00 pm during 45 days. Blood examples were taken from all people being in experiment before starting Ginseng reinforcement and exercise period. Blood examples were secondly taken after Ginseng reinforcement and exercise period lasting 45 days.

Exercise Test

20 m mecic running test which applied to people being in experiment is multi-leveled test aiming getting tired of people and its first level is

warming up tempo. People run first 20 m distance as coming and going. Running speed is controlled with a tape giving signal voice. People started running when they firstly heard signal voice and reached the line by second signal voice. When they heard second signal voice they were backed to starting line by turning back and the running went on with these signals.The people set their own tempos as being on the other side of the patch when they heard the signal. The running which was slow at the beginning is increased at ever 10 seconds. If a person can't reach the line before signal, but if she can reach other signal, person went on the test. If person can't reach 2 signals after and after, test is finished. The tiredness is formed on people with this way.

Analyses

The blood examples taken from elbow vena suitably to it's method, put into having ethylenediaminetetraacetic acid (EDTA) tubes and the plasma examples were obtained by centrifuging at 4 degree and at 3500 rpm for 15 minutes. Nitric Oxide and Lipid hydroperoxide levels are found as colorimetric by Cayman® brand kits using from plasma examples.

Statistical Analyses

SPSS packet programme was used while making statistical analyses of the information taken from the test. Measured parameter's average values and standard faults of all people in experiment were calculated before and after application. Duncan's Multiple Range test was used by Variance Analyze is done during importance control between groups. Paired-Samples T test was benefited during the control of differences of value before and after application.

Results

Table 1. Groups LH levels before application and after applications (umol/I)

* The difference is important in same line according to after application value.(P<0,05).

LOOH (µmol/l)				
Group	N	Before Mean±SD	After Mean±SD	P
C	7	285,82±44,63	299,90±79,87	0,71
E	7	274,82±61,06	327,34±69,55	0,02*
GE	7	269,97±76,58	271,23±75,64	0,87

It is seen that there was no important difference between before application and after

application at LOOH levels C and Ge inside of group but it is seen that there is an important(p>0.05) increasing group E's LOOH level.LOOH levels between groups, there is no important difference.

Table 2. Plazma NO levels of the groups before application and after application

Grup	N	NO (µmol/l)		
		Before Mean±SD	After Mean±SD	P
C	7	3,02±1,15	2,99±0,48 ^b	0,96
E	7	3,15±1,51	6,09±1,03 ^a	0,00*
GE	7	3,04±1,57	6,01±0,95 ^a	0,01*

a,b: Difference between information in same line but having different words is important.

*The difference is important in same line according to after application value

It was seen that there was no difference at NO levels in C group, It was seen that E and GE group's NO level, importantly ($p>0.05$) increased. It was seen that there was no difference between group's NO level before application, Increasing in E and GE groups is more important ($p>0.05$) than increasing in C group.

Discussion and conclusions

Although antioxidant substances were applied they showed that DNA damaging is increased during endurance training on M. Belviranlı., and H. Gökbel., (2006). It is agreed that physical exercise have free radical formation increased although there is contradiction information (M.M. Kanter., G.R. Lesmes., L.A. Kaminsky., 1988). Heavy exercise can increase taking oxygen into the body nearly 20x, moreover, it increases consumption of oxygen nearly 200 x (A. Childs., C. Jacobs., T. Kaminski., 2001). At the result of these events, it is stated that there is increasing on free radical producing due to biochemical reactions growing on mitochondria during exercise. (R.R. Jenkins., and A. Goldfarb., 1993). Intensive physical activity causes the oxidative damage in the blood and the various tissues of human and also animals. (A.H. Goldfarb., M.K. McIntosh., Bt. Boyer., 1996, V. Reddy., C. Kumar., T. Prasad., 1992. Again A. Öztürk., A.K. Baltacı., and R. Mogulkoç., (2003) reported that acute swimming exercise increases the lipid peroxidation in rats. Similarly K. Jana., P.K. Samanta., and I. Manna., (2008) reported that intensive swimming exercise make a significant increase in the MDA level of plasma by causing oxidative stress in the tests of rats.

NO production increases during the reduction or lack of blood flow in the organism. On the other hand NO can be produced by the transformation of xanthine oxidase which is the source of superoxide anion into xanthine dehydrogenase (M. Joannidis., G. Gstraunthaler., W. Pfaller., 1990, M. Saito., and I. Miyagawa., 2000). Although nitric oxide level can be increased in the medium and high level exercises. It is recorded that if there is a correlation between

CAT activity and NO during moderate exercise, it could be the result of the increase of the antioxidant activity provided by exercise (H. Düzova., M.H. Emre., Y. Karakoç., et al 2006, E. Güllü 2007) regular chronic exercise also causes vasodilation by increasing the level of NO.

Experiments on various animals show that ginseng reducing free radicals, protecting cells from toxic effects (D.D. Kitts., and C. Hu., 2008, J. Voces., A.I. Alvarez., L. Vila., 1999). It is indicated that the effects of ginseng were performed by increasing the activity of GSHpx, CAT, SOD and decreasing the level of MDA and NO. It was also recorded that ginseng show an antioxidant activity by increasing the throwing NO in urine by indirect way, prevention of damaging of body tissues due to free radicals depends on dose (B.H. Han., M.H. Park., Y.N. Han., 1985). So it can be considered that differences between E and GE groups originated from dosage differences and implementation period.

When LOOH levels of groups were examined there was not a significant difference between groups, but after the application raise of LOOH level in E group is important, and this raise was not in K and GE groups so it can be considered that ginseng has an effect on LOOH level.

As a result it can be said that ginseng increases the NO and LOOH levels in women athletes and sedentary individuals, this increase originated from exercise not from the quantity of ginseng.

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