THE EFFECTS OF GINSENG AND EXERCISE APPLICATIONS IN SEDENTARY INDIVIDUALS AND WOMEN ATHLETES ON ANTIOXIDANTS

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ABSTRACT

Objective: In this study, the effects of ginseng and exercise applications in women athletes on plasma Glutathion (GSH), Catalase (CAT) and Super oxide Dysmutase (SOD) 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 500mg 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 + 4ºC degree, thus plasma samples were obtained. Plasma GSH, CAT and SOD levels were determined with calorimetric method from the samples.

Result: No significant difference was seen statistically both among and intra-groups in the findings gained.

Discussion and conclusion: Consequently in this study, it can be said that performed exercise protocol and ginseng supply showed no significant effect for stated antioxidant levels

Key Words: Exercise, Ginseng, Antioxidants

Introduction

It is recorded that there is a positive relation between ginseng intake and the increase in activity of antioxidants which keeps the body`s oxidative status in activities such exercises (Y.V. Yuan, D.D. Kitts, 1996).

Superoxide dismutases are metalloproteinase structured enzymes and converts superoxide radical into peroxide (L. Frederic, 1990). SOD catalyzes 2 molecule superoxide into hydrogen peroxide and molecular oxygen and accepted as a cellular hydrogen peroxide source (R. Perez-Campo, M. Lepez-Torres, and C. Rojas, 1993).

Catalase catalyzes hydrogen peroxide into molecular oxygen and water. It also has a function such detoxifying of different substances such alcohol and phenol by the reduction of hydrogen peroxide (I. Fridovich, 1999, B. Halliwell 1999). Antioxidative role of catalase minimizes the formation of hydroxyl radical from peroxide by fenton reactions which catalysed by Cu and Fe ions. Contaction of catalase to NADPH protects enzyme from inactivation and increases the effectiveness (H.N. Kirkman, M. Roifo, A.M. Ferraris, 1999, S.E. Terblanche 2000).

Glutathione is an antioxidant which contains thiol,has less molecular weight, tripeptid structure (R. Dringen 2000, N.H.P. Cnubben, I.M.C.M. Rietjens, H. Wortelboer, 2001) and exists in all aerobic cells with milimolar concentrations (R. Dringen 2000).

It is specified that role of ginseng components in supporting of defense mechanisms originated from direct activation of cellular defense mechanisms. It is showed that ginseng has an protective effect against hepatoksisite and so it is also against to the peroxidation reactions which are toxin induced (B.H. Han, M.H. Park, Y.N. Han, 1985).

Some researchers recommended to the athletes that to take more antioxidant for reducing the negative effects of lipid peroxidation and stressed that especially those who have irregular heavy training need to be sure from adequate levels of antioxidants (S.M. Somani, S. Frank, L.P. Rybak, 1995, H.M. Alesso and A.H. Goldfarb 1988).

In an experiment that made by sastra and colleagues the GSH level not changed after an treadmill exercise applied to the a group of trained men, but GSSG level increased by 72% and become normal after one hour

In this research it is aimed that to detect how ginseng changes the levels of GSH, CAT, and SOD on sedentary or athletes.

RESULT

Table 1. SOD levels of groups before and after exercise (u/ml)

SOD (u/ml)				
Grup	**N**	**Before Mean±SD**	**After Mean±SD**	**P**
C	7	4,46±0,97	4,74±0,73	0,46
E	7	4,97±1,37	5,28±1,36	0,43
GE	7	5,09±1,18	5,52±0,91	0,07

Groups within and between groups is no significant difference in SOD levels. (P<0, 05)

Table 1. CAT levels of groups before and after exercise (nmol/dk/ml)

CAT (nmol/dk/ml)				
Grup	**N**	**Before Mean±SD**	**After Mean±SD**	**P**
C	7	20,98±4,91	21,66±6,30	0,38
E	7	21,98±2,73	22,59±7,80	0,87
GE	7	20,83±2,47	24,88±4,94	0,13

Groups within and between groups is no significant difference in CAT levels. (P<0, 05)

Table 1. GSH levels of groups before and after exercise (µmol/l)

GSH (µmol/l)				
Grup	**N**	**Before Mean±SD**	**After Mean±SD**	**P**
C	7	38,39±8,48	39,82±10,46	0,24
E	7	37,48±3,74	38,97±11,31	0,72
GE	7	38,15±3,19	45,40±11,52	0,07

Groups within and between groups is no significant difference in GSH levels. (P<0, 05)

MATERIALS

21 volunteers (14 healthy athletes and 7 sedentary women) included to the work with age

range of 20-23 and body weight range 55-65 kg. And separated into 3 groups.

Group 1: Control C

Group 2: Exercise E

Group 3: Exercise with Ginseng GE

E & GE groups were performed on a regular basis along the 5 days per week for 6 weeks in subjects 20 m shuttle run test.

Method

Included in the GE group subjects during the 45 days at 10:00 pm each morning and evening at 19:00 am or orally at a dose of 500mg/kg ginseng that was provided. (GNC, Gold Ginseng, Korean White Ginseng Root, USA).All subjects before beginning the exercise period and ginseng supplements were taken blood samples. After 45 days ginseng supplementation and exercise period of the second blood samples were collected from all groups.

Exercise test:

E and GE groups in order to bring about fatigue in the subjects applied 20 m shuttle run test is a multistage test, the first stage is heated. Subjects ran 20 meters distance as roundtrip. Running speed at certain intervals which tone was controlled with a tape. Subjects began running in his first tone and until second tone the other line reached. The second signal is heard again when returning to the starting line came and this running went on this condition signal. When subjects hear the signal at the other end of the runway at the second signal they will be added to set their own pace. Especially the slow speed which is first, increased gradually at every 10 seconds. Subject missed the first signal tone but caught up the second and continued the test. If subject misses two consecutive tests may have been terminated. In this way at the end of the test exhausting was existed at subjects.

Analysis:

Duly received as vena elbows in blood samples (ETDA) transferred to tubes containing the 15 minutes, 4 degrees immediately centrifuged at 3500 rpm the plasma samples were brought into place.From plasma samples; Cayman kits were used in the brand and GSH, CAT, SOD levels were determined as colorimetric.

Statistical analysis

Obtained statistical analysis making were used to SPSS. Applications of all subjects before and after application were calculated. Of the mean value and standard error of the measured parameters. Significance of differences between groups by analysis of variance, Duncan's Multiple Range test was used. Each group before and after application of the difference between the values in the control of the Paired-Samples T test was used.

Discussion and conclusions

The findings to all groups within the group in both between groups aren't seen as statistically significant a difference.

There is conflicting information about how is affects GSH levels of exercise. While F. Marzatiko, O. Pansarasa, L. Bertorelli, (1997) A. Childs, C. Jacobs, T. Kaminski, (2001), M. İnal, F. Akyüz, A. Turgut, (2001) in their study, exercise with increasing GSH levels mentioned, G.G. Duthie, J.D. Robertson, P.C. Morrice, (1990), Y. Hellsten, B. Sjodin, E.A. Richter, (1998) Y. Hellsten, M. Svensson, B. Sjodin, (2001), D. Thompson, C. Williams, P. Garcia-Roves, (2003) in their study were identified subjects which in a significant decrease in GSH values were recorded. Unlike S. Çolakoğlu, M. Çolakoğlu, M. Kırkalı, (1999) in their study the GSH levels of the subjects reported that a significant difference could not be determined.

Studies; G.G. Duthie, J.D. Robertson, P.C. Morrice, (1990) Hellsten, B. Sjodin, E.A. Richter, (1998) Hellsten, M. Svensson, B. Sjodin, (2001) M. Svensson, B. Ekblom, L. Cotgreave, (2002), Thompson, C. Williams, P. Garcia-Roves, (2003) are consistent with the findings. The increase in GSH levels in the exercise of other researchers (N. Ortenblad, K. Madsen, M.S. Djurhuus, 1997, A. Childs, C. Jacobs, T. Kaminski,.2001, F. Marzatiko, O. Pansarasa, L. Bertorelli, 1997, İnal, F. Akyüz, A. Turgut, 2001) or no changes (S. Çolakoğlu, M. Çolakoğlu, M. Kırkalı, 1999) reported findings that may be associated type of exercise with differences in severity and duration. Thus Gahil and colleagues who determined a reduction in the blood GSH level of people with intense physical exercises noted that it is open to discussion to find the origination of these various result if originated from various exercise programs or various test program or other differences. D.J. Humphreys, (2001) who notified that intake of ginseng during exercise reduces the amount of reactive oxygen, recorded oxidative state of body balanced by either with

enzymatic (SOD,CAT,GSHpx) and nonenzymatic (Tokferol, Beta-carotene, glutathione) activities and these systems prevent the damage which generated by free radicals in cells.

The effects of exercises on CAT enzyme that different researchers obtained show a variety. In each research applying different exercise programs to the subjects can cause these varieties (L.L. Ji, and S. Leichtweis, 1997). The information given by C. Leewenburgh, P.A. Hansen, J.O. Holloszy, (1999) , İnal, F. Akyüz, A. Turgut, (2001), J. Finaud, G. Lac, E. Filaire, (2006) shows that CAT activities of antioxidant enzymes in the blood increases after aerobic exercises in both animals and humans. But P. Mena, M. Maynar, J.M. Gutierrez, (1991) determined reduce in the CAAT values in cyclists.

There could not be the same idea about the results of works about the relationship between SOD parameters and exercise, as in other antioxidant parameters. Thus by the notes of L.L. Ji, and R. Fu, (1993) C. Leewenburgh, P.A. Hansen, J.O. Holloszy, (1999), İnal, F. Akyüz, A. Turgut, (2001)SOD activities of antioxidant enzymes in the blood increases after aerobic exercises in either animals and humans. Again F. Marzatiko, O. Pansarasa, L. Bertorelli, (1997) determined that SOD values increase in sprinters and half marathoners. By the same way, A. Turgut, C. Özgürbüz, O. Azboy, (1999) determined an increase in the SOD level of 800 meters freestyle swimmers after swimming. There are also works that show SOD value does not change in acute and chronic exercises. M.M. Kanter, L.A. Nolte, J.O. Holloszy, (1993) determined that SOD value does not change after 80 metered run. N. Ortenblad, K. Madsen, M.S. Djurhuus, (1997) determined that SOD level does not change in volleyball players, G.G. Duthie, J.D. Robertson, P.C. Morrice, (1990) determined that SOD level does not change in half marathon runners, H. Ohno, T. Yahata, Y. Şato, (1988) determined that SOD level does not change in sedentary students.

As a result in this research there can not be found a solution and we can say that ginseng applied with exercise can increase the parameters of antioxidant but this increase has no meaning.

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