

EFFECT OF DIFFERENT DOSES OF GREEN TEA ON OXIDATIVE STRESS AND MUSCLE SORENESS IN DOWNHILL TREADMILL RUNNINGM.R.MORADPOURIAN^{1,2}, Z.ASHKAVAND³, C.VENKATESH², B.S.VISHWANATH³¹ Department of physical education and sport science, Islamic Azad University of Khoramabad, Iran. ² Department of physical education and sport science, Mysore University, India. ³ Dos in Biochemistry, Manasagangotri, Mysore University, India.

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ABSTRACT

Objectives: we assessed the effects of green tea on biomarkers of treadmill downhill running induced oxidative status and muscle soreness were measured in young male untrained voluntaries.

Methods: Participants were assigned to six groups Group1:200mg Group2:400mg, Group3: 600, Group 4:800, Group5:1000mg and group six drank green tea for 12 weeks.

Results: Green tea consumption has decreased significantly the level MDA, Ck, Glutathione and increased the level of catalase in higher concentration of 1000 mg.

Conclusion: Green tea may have selective protective effects within the body, especially after treadmill downhill running.

Keywords: oxidative stress, Treadmill downhill, Green tea, muscle soreness

INTRODUCTION

Many studies have reported that exercise induced oxidative stress which can result in increased level of free radicals [1]. Strenuous exercise such as downhill treadmill running is associated with an overproduction of ROS that can lead to increased muscle damage [2]. It is suggested that an acute bout of exercise may cause more severe oxidative injury to muscle in human subjects [3]. These deleterious ROS pose a serious threat to the cellular antioxidant defense system, such as diminished reserves of antioxidant vitamins and glutathione [4]. A commonly approach to oxidative stress is the exogenous administration of compounds that are thought to have antioxidant properties. Each of these antioxidants plays a unique role in the cell and defense mechanism. Green tea is the rich source of catechins flavonoids which has an antioxidant property [5]. We studied the effect of different doses of green tea on oxidative parameters and muscle soreness in downhill treadmill running.

METHODS**Study design:**

Sixty male participants were included in the study which assigned to six groups of 10 people. They asked to run on a downhill treadmill (-10 degrees slope) for 35 minute of 10km/hr while the sixth group is the control (Placebo) group. All participants were aged between 20 and 30 yr, were non-smokers, and for at least 3 months before the study did not take any vitamins, minerals, or medication that would affect oxidative stress markers. Subjects were informed of the potential risks involved and gave written voluntary consent before participating in the study. All subjects were instructed to maintain a designed diet of consuming commercially produced green tea extract, (Group1:200mg Group2:600mg, Group3: 800, Group4:1000, G5:1200mg) for 3 months. The indicators of oxidative stress in these groups has been evaluated. The study was approved by the Human Research Ethics Committee of the University of Azad Khoramabad Iran.

Determination of MDA

MDA is measured using thiobarbituric acid (TBA) reaction. The absorbance of supernatant was measured spectrophotometrically (Pharmacia, Novaspec II, Biochrom, England), at 532 nm.

Estimation of Ck and catalase levels:

The level of Ck and catalase were calculated in serum samples with a specific Kit (Pars Azmoon Tehran, Iran), using an auto analyzer.

Determination of GSH

Total glutathione, which included both reduced glutathione and glutathione disulphide, content of the plasma was measured using the glutathione reductase-Ellman's reagent recirculating assay [6]. Due to the very low amount of glutathione present in the plasma, the above enzymatic cycling was used as it continuously reduces glutathione-Ellman's adduct using NADPH.

Protein estimation

The protein estimation was done according to the method of Lowry et al. [7] using bovine serum albumin (BSA) as standard

Statistical analysis

Results were expressed as the mean \pm SD and statistical comparison of means between groups was made by one way-ANOVA. The level of significance in all statistical analyses was set at $P \leq 0.05$. Data analysis was performed using SPSS software for windows (version 13, SPSS, Inc., Chicago, IL).

RESULTS**Determination of CK**

The level of Ck has been decreased with the doses of G4 and G5 significantly ($P < 0.05$) which is shown in fig 1.

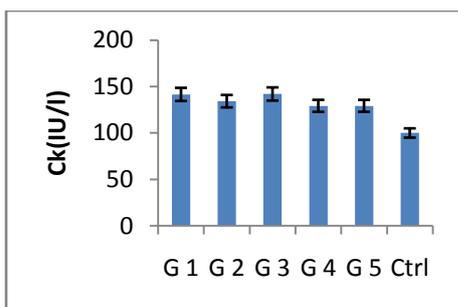


Fig.1.The level of Ck with different concentration of Green tea (G1:200mg G2:600mg, G3: 800, G4:1000, G5:1200mg/green tea, Ctrl: control group)

Determination of GSH

The level of GSH in G5 and G6 has been decreased significantly ($p < 0.05$) compare to other groups which is shown in fig 2.

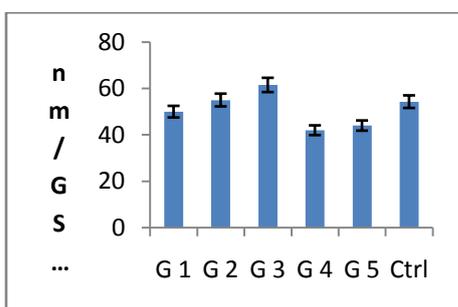


Fig 2. The level of GSH in different groups (G1:200mg G2:600mg, G3: 800, G4:1000, G5:1200mg/green tea, Ctrl: control group)

Determination of catalase

The level of catalase has been increased significantly ($p < 0.05$) in G5 group compare to other groups which is shown in fig 3.

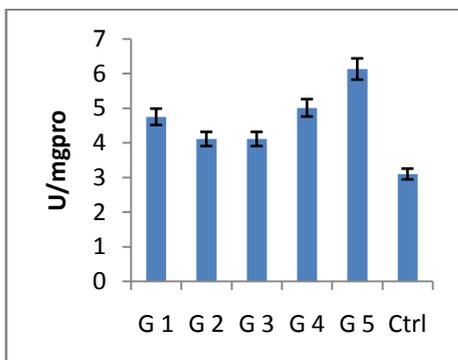


Fig.3. the level of catalase in different groups (G1:200mg G2:600mg, G3: 800, G4:1000, G5:1200mg/green tea, Ctrl: control group)

Determination of MDA

The level of MDA is reduced by G5 group significantly ($p < 0.05$) compare to other groups which is shown in fig 4.

DISCUSSION

During intense exercise, the level of oxidative stress has been increased. Studied who exercised on a treadmill had increased blood amounts of oxidized glutathione immediately after exercise, suggesting an increase in oxidative stress, but returned to rest after 1 h [8]. Gohil et al. reported an increase in oxidized glutathione after prolonged submaximal exercise with a concomitant decrease in reduced glutathione [9]. In our study, an increase in glutathione reductase activity was thought to suggest an increase of oxidative

stress induced by treadmill downhill. Supplementation with antioxidants, either through an increased consumption in the diet or from supplementation, has become extremely popular as a means to improve one's health or increase physical performance [10].

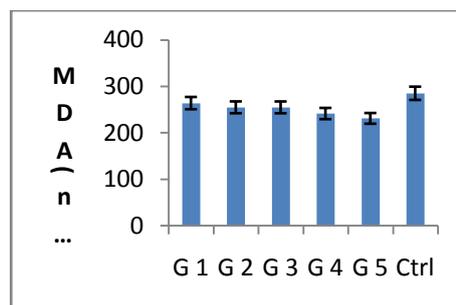


Fig.4. the level of MDA in different groups of (G1:200mg G2:600mg, G3: 800, G4:1000, G5:1200mg/green tea, Ctrl: control group) in downhill treadmill running.

CONCLUSION

Our results showed that the level of oxidative stress and muscle soreness have been reduced in treadmill downhill by consumption of high dose of Green Tea at 1200 mg compare to other doses.

CONFLICT OF INTEREST

There is no conflict of interest between the authors.

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