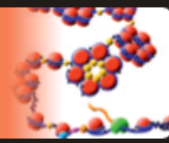




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The effects of theaflavin-enriched black tea extract on muscle soreness, oxidative stress, inflammation, and endocrine responses to acute anaerobic interval training: a randomized, double-blind, crossover study

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Abstract

Background

Muscle soreness and decreased performance often follow a bout of high-intensity exercise. By reducing these effects, an athlete can train more frequently and increase long-term performance. The purpose of this study is to examine whether a high-potency, black tea extract (BTE) alters the delayed onset muscle soreness (DOMS), oxidative stress, inflammation, and cortisol (CORT) responses to high-intensity anaerobic exercise.

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Methods

College-age males ($N = 18$) with 1+ yrs of weight training experience completed a double-blind, placebo-controlled, crossover study. Subjects consumed the BTE ($1,760 \text{ mg BTE} \cdot \text{d}^{-1}$) or placebo (PLA) for 9 days. Each subject completed two testing sessions (T1 & T2), which occurred on day 7 of the intervention. T1 & T2 consisted of a 30 s Wingate Test plus eight 10 s intervals. Blood samples were obtained before, 0, 30 & 60 min following the interval sessions and were used to analyze the total to oxidized glutathione ratio (GSH:GSSG), 8-isoprostane (8-iso), CORT, and interleukin 6 (IL-6) secretion. DOMS was recorded at 24 & 48 h post-test using a visual analog scale while BTE or PLA continued to be administered. Significance was set at $P < 0.05$.

Results

Compared to PLA, BTE produced significantly higher average peak power ($P = 0.013$) and higher average mean power ($P = 0.067$) across nine WAnT intervals. BTE produced significantly lower DOMS compared to PLA at 24 h post test ($P < 0.001$) and 48 h post test ($P < 0.001$). Compared to PLA, BTE had a slightly higher GSH:GSSG ratio at baseline which became significantly higher at 30 and 60 min post test ($P < 0.002$). AUC analysis revealed BTE to elicit significantly lower GSSG secretion ($P = 0.009$), significantly higher GSH:GSSG ratio ($P = 0.001$), and lower CORT secretion ($P = 0.078$) than PLA. AUC analysis did not reveal a significant difference in total IL-6 response ($P = 0.145$) between conditions.

Conclusions

Consumption of theaflavin-enriched black tea extract led to improved recovery and a reduction in oxidative stress and DOMS responses to acute anaerobic intervals. An improved rate of recovery can benefit all individuals engaging in high intensity, anaerobic exercise as it facilitates increased frequency of exercise.

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