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Effect of astaxanthin supplementation on muscle damage and oxidative stress markers in elite young soccer players.

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Source

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Abstract

AIM:

The purpose of the current study was to examine the effect of Astaxanthin (Asx) supplementation on muscle enzymes as indirect markers of muscle damage, oxidative stress markers and antioxidant response in elite young soccer players.

METHODS:

Thirty-two male elite soccer players were randomly assigned in a double-blind fashion to Asx and placebo (P) group. After the 90 days of supplementation, the athletes performed a 2 hour acute exercise bout. Blood samples were obtained before and after 90 days of supplementation and after the exercise at the end of observational period for analysis of thiobarbituric acid-reacting substances (TBARS), advanced oxidation protein products (AOPP), superoxide anion ($O_2^{\bullet-}$), total antioxidative status (TAS), sulphhydryl groups (SH), superoxide-dismutase (SOD), serum creatine kinase (CK) and aspartate aminotransferase (AST).

RESULTS:

TBARS and AOPP levels did not change throughout the study. Regular training significantly increased $O_2^{\bullet-}$ levels (main training effect, $P < 0.01$). $O_2^{\bullet-}$ concentrations increased after the soccer exercise (main exercise effect, $P < 0.01$), but these changes reached statistical significance only in the P group (exercise x supplementation effect, $P < 0.05$). TAS levels decreased significantly post-exercise only in P group ($P < 0.01$). Both Asx and P groups experienced increase in total SH groups content (by 21% and 9%, respectively) and supplementation effect was marginally significant ($P = 0.08$). Basal SOD activity significantly decreased both in P and in Asx group by the end of the study (main training effect, $P < 0.01$). All participants showed a significant decrease in basal CK and AST activities after 90 days (main training effect, $P < 0.01$ and $P < 0.001$, respectively). CK and AST activities in serum significantly increased as result of soccer exercise (main exercise effect, $P < 0.001$ and $P < 0.01$, respectively). Postexercise CK and AST levels were significantly lower in Asx group compared to P group ($P < 0.05$)

CONCLUSION:

The results of the present study suggest that soccer training and soccer exercise are associated with excessive production of free radicals and oxidative stress, which might diminish antioxidant system efficiency. Supplementation with Asx could prevent exercise induced free radical production and depletion of non-enzymatic antioxidant defense in young soccer players.