

Oxidative stress biomarker monitoring in elite women volleyball athletes during a 6-week training period.

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Source

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Abstract

The objectives of this study were to determine (a) if reactive oxygen metabolites (ROMs) are a reliable parameter for monitoring oxidative stress in athletes alone or in association with other parameters of oxidative stress and depending on whether antioxidant supplements are taken or not; (b) the level of oxidative stress in athletes before the competition season; and (c) if oxidative status could be improved in volleyball athletes. Sixteen women athletes (supplemented group) received an antioxidant cocktail containing vitamin E, vitamin C, zinc gluconate, and selenium as a dietary supplement during a 6-week training period, whereas 12 of them (control group) received no dietary supplement. Blood samples were taken before and after the training period. The following parameters were measured: ROMs, superoxide anion ($O_2^{\cdot-}$), malondialdehyde (MDA), advanced oxidation protein products (AOPP), lipid hydroperoxide (LOOH), biological antioxidative potential (BAP), paraoxonase activity toward paraoxon (POase) and diazoxon (DZOase), superoxide dismutase (SOD), total sulfhydryl group concentration (SH groups), and lipid status. Reactive oxygen metabolites were taken as the dependent variable and MDA, $O_2^{\cdot-}$, AOPP, and LOOH as independent variables. In the group of athletes who have received supplementation, linear regression analysis revealed that the implemented model had a lower influence on dROMs (70.4 vs. 27.9%) after the training period. The general linear model showed significant differences between parameters before and after training/supplementation (Wilks' lambda = 0.074, F = 11.76, $p < 0.01$). At the partial level, significant increases in ROM levels ($p < 0.05$, 95% confidence interval [CI]: 286-337), SOD activity (CI: 113-144), and BAP (CI: 2,388-2,580) ($p < 0.01$) were observed. The association between ROMs and other parameters of oxidative stress was reduced in athletes who received supplements. During the precompetition training period, treatment with dietary supplements prevented the depletion of antioxidative defense in volleyball athletes.

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