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Oxidative Stress Response to Aerobic Exercise: Comparison of Antioxidant Supplements

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Abstract

Purpose: To compare the effects of two antioxidant formulas on biomarkers of oxidative stress before and after aerobic exercise.

Methods: Aerobically trained men ($N = 25$) and women ($N = 23$) were assigned to one of three treatments: 400 IU of vitamin E + 1 g of vitamin C (V; $N = 15$), a fruit and vegetable juice powder concentrate (FV; $N = 16$), or a placebo (P; $N = 17$). Subjects ran for 30 min at 80% V_{2max} before, after 2 wk of supplementation, and after a 1-wk washout period. Blood samples were taken before and immediately after exercise and analyzed for protein carbonyls (PC), malondialdehyde (MDA), 8-hydroxydeoxyguanosine (8-OHdG), and vitamins C and E.

Results: The V treatment increased plasma vitamin C and E after 2 wk ($P \leq 0.05$), with no change in the FV or P. Postexercise PC values were elevated for all treatments after all exercise bouts ($P < 0.0001$). Both V and FV attenuated the exercise-induced increase in PC after 2 wk of supplementation (V = 21%, FV = 17%), and after the 1-wk washout (V = 13%, FV = 6%) compared with P ($P < 0.05$), with no differences between V and FV. MDA was unaffected by exercise and treatment. A treatment main effect for 8-OHdG was noted, with values for V lower than for FV and P (4.5 ± 2.5 , 5.5 ± 2.7 , and 6.0 ± 2.5 ng·mL⁻¹, respectively; $P = 0.0002$). No exercise session or time main effect was noted for 8-OHdG, suggesting that the lower mean value for the V treatment group was not a result of the supplementation.

Conclusion: These data suggest that V and FV supplementation for 2 wk can attenuate the rise in PC after 30 min of aerobic exercise, even after a 1-wk washout, without an impact on plasma MDA or 8-OHdG.