

Effects of Palm Vitamin E Supplementation on Exercise-Induced Oxidative Stress and Endurance Performance in the Heat

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ABSTRACT

This study investigates the effects of tocotrienol-rich palm vitamin E supplementation on exercise-induced lipid peroxidation and endurance performance in the heat. In a double blind, cross-over study, eighteen healthy, male recreational athletes completed two endurance running trials, until exhaustion, on a motorized treadmill at 70% VO_2 max on two separate occasions following a 6-week supplementation regimen of either tocotrienol-rich palm vitamin E (E) or placebo (P). Both trials were conducted in the heat (31°C, 70% relative humidity). During the trials, rectal temperature (T_{rec}), ratings of perceived exertion (RPE) and oxygen uptake (VO_2) were recorded. Blood samples were collected for the determination of plasma volume changes (PVC), malondialdehyde (MDA), creatine kinase (CK), total antioxidant status (TAS) and vitamin E. After the supplementation regimen, serum alpha-tocopherol increased ~33% but serum concentrations of tocotrienols were negligible. No significant differences were evident in mean T_{rec} , RPE, VO_2 or in the time to exhaustion between the E-supplemented and the placebo-supplemented groups. Similarly, mean PVC, CK and TAS were also not different between the two groups. Resting plasma mean MDA concentration in the E-supplemented group was significantly lower than that in the placebo-supplemented group. At exhaustion, plasma mean MDA was higher than the resting values in both groups. Although tocotrienol-rich palm vitamin E supplementation decreased lipid peroxidation at rest and, to some extent, during exercise in the heat, as evident from the lower MDA levels, it however did not enhance endurance running performance or prevent exercise-induced

muscle damage or influenced body core temperature or plasma volume changes during exercise in the heat.

Key words: Oxidative stress, endurance, heat, malondialdehyde, palm vitamin E

Key Points

- reduced lipid peroxidation at rest.
- did not enhance endurance running performance in the heat.
- did not prevent exercise-induced muscle damage as indicated by CK activity.

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