

Effects of carbohydrate and green tea co-ingestion on performance, metabolism and hormone during cycling exercise

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ABSTRACT

It has been known that carbohydrate intake during exercise can improve athletic performance, and caffeine can extend exercise endurance. Green tea containing caffeine and various polyphenols has been suggested beneficial to athletes due to anti-oxidative and anti-inflammatory effects. Therefore, this study investigated the influence of carbohydrate and green tea co-ingestion on the performance, metabolism and hormone during high-intensity road cycling exercise.

Nine well-trained male cyclists, aged 17.8 ± 1.0 yr, participated this acute-treatment, double-blind, crossover study that included 6.4-km cycling time trial. Participants ingested carbohydrate (240 mg/kg body mass fructose and 120 mg/kg body mass glucose) without (CHO group) and with green tea (TEA group) (22 mg/kg body mass catechins and 6 mg/kg body mass caffeine) during cycling exercise. Three blood samples were collected before exercise, immediately after exercise and at 15 h after exercise. It was found that the improved performance caused by co-ingestion of carbohydrate and green tea was meaningful to the athletes during competition. The percentage of neutrophil in blood was much higher in CHO group than TEA group. The blood sugar level after exercise was significantly lower by 20% than pre-exercise in TEA group, whereas no significant change was found in CHO group. The lactate level was significantly increased to 2.55 and 3.05 mM after exercise in CHO and TEA group, respectively. In addition, significant increase of creatine kinase activity was found in CHO group, but not in TEA group. The blood testosterone level was significantly decreased by 50% in CHO group, but only 11% decrease in TEA group.

These major results suggest that dual-supplementation of carbohydrate and green tea not only elevated exogenous glucose oxidation but also compromised inflammation by decreasing the level of muscle damage during intensive exercise. Moreover, the slightly decreased testosterone level represents a positive adaptation to high exercise loading. This information would provide coaches and athletes to choose nutritional supplements.

