

Influence of caffeine on performance, physiological responses, thermoregulation and hydration during a 1500m run in hot humid conditions.

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Introduction: Caffeine is ergogenic for endurance performance¹, however little research exists on middle-distance performance, particularly in hot/humid conditions. This study examined caffeine's effects on a 1500 m run in hot/humid conditions. Caffeine was expected to enhance performance and lower plasma potassium concentrations with no effect on hydration or thermoregulation, compared to placebo.

Methods: In a randomised, double-blind, crossover design, two testing sessions were completed under hot/ humid conditions by seventeen healthy individuals. Participants consumed a carbohydrate-controlled meal and placebo (caffeine-free cola) or caffeine (5 mg/kg in placebo) before the run. Measurements were taken at baseline, following 65 min rest, and in the climate chamber before, during and after the run. Urine specific gravity, blood lactate, sweat rate, core temperature [T_{core}], skin temperature, heart rate, thermal sensation, thermal comfort and plasma caffeine and potassium were assessed. Data were analysed by two-way ANOVA and Tukey tests ($p < 0.05$).

Results: Caffeine had no effect on any variables when compared to placebo except T_{core} , plasma potassium and perceived fatigue. Post-exercise T_{core} was significantly higher for caffeine. Plasma potassium concentrations were significantly elevated after exercise, and significantly lower with caffeine compared to placebo. Fewer participants reported fatigue with caffeine.

Conclusions: Caffeine had no negative effects on hydration but did not enhance middle distance performance in hot/humid conditions. Thermoregulation was unaffected by caffeine except for post-exercise T_{core} which was significantly higher with caffeine. The lack of performance effect may be attributed to the carbohydrate controlled pre-race meal. The lowered potassium levels with caffeine may have contributed to the lower levels of perceived fatigue.