

The Effects of Ice Slurry Ingestion on Exercise In The Heat While Wearing Firefighting Clothing

Zachary T. Kerns, Shala Davis FACSM, Donald Cummings, Chad Witmer

East Stroudsburg University, East Stroudsburg, PA

Previous research has suggested that the consumption of an ice slurry beverage can improve performance during prolonged exercise in a heated environment. **PURPOSE:** The current study hypothesized that the consumption of an ice slurry beverage could improve physiological responses through a reduction in core temperature to combat the deleterious effects of exercise in heated environments. **METHODS:** Eight recreationally active healthy males participated in the study. The firefighting protective clothing was worn during testing and consisted of a bunker jacket, bunker pants, helmet, hood, gloves (10-15 kg), and a backpack to simulate the self-contained breathing apparatus (11.6 kg). Subjects completed two experimental trials which consisted of two 20 minute bouts of treadmill walking at 5 km/h and 7.5% grade separated by a 15 minute recovery period during which the subjects removed all gear but the bunker pants and sat in a chair. During the recovery the subjects received either an ice slurry ($-0.93 \pm 0.5^{\circ}\text{C}$) or a cold water beverage ($3.2 \pm 1.17^{\circ}\text{C}$) in $1.36 \text{ g}\cdot\text{kg}^{-1}$ servings every 3 minutes, totaling $6.8 \text{ g}\cdot\text{kg}^{-1}$.

RESULTS: Statistical analysis ($p < 0.05$) found no significant difference in mean rectal temperature (baseline: $F= 0.299$, $p= 0.593$; bout 1: $F= 0.299$, $p= 0.593$; recovery: $F= 0.706$, 0.415 ; bout 2 – 5 min: $F= 2.2$, $p= 0.160$; bout 2 – 10 min: $F= 1.831$, $p=0.197$, bout 2 – 15 min: $F= 1.474$, $p= 0.245$; bout 2 – 20 min: $F= 1.115$, $p= 0.309$), HR (baseline: $F=0.193$, $p= 0.667$; bout 1: $F= 0.149$, $p= 0.705$, recovery: $F= 0.061$, $p= 0.808$, bout 2 – 5 min: $F= 0.292$, $p= 0.598$, bout 2 – 10 min: $F= 0.292$; $p= 0.598$; bout 2 – 15 min: $F= 0.201$; $p= 0.660$; bout 2 – 20 min: $F= 0.033$, $p= 0.859$), tympanic temperature, RPE, RER, VO_2 , and thermal sensation. The only significant difference was RER baseline, the ice slurry trial was significantly lower (0.79 ± 0.03 ; $F= 5.031$; $p= 0.042$), compared to the cold water trial (0.84 ± 0.05).

CONCLUSION: In conclusion, the present study showed that there was no significant difference in physiological responses and rectal temperature with the consumption of an ice slurry beverage compared with a cold water beverage. The researchers believe that the lack of significance was due to the small difference in drink temperatures, the small sample size, the low serving size, and short consumption time were factors for the lack of effect.