THE EFFECTS OF SWILLING A L(-)-MENTHOL SOLUTION DURING EXERCISE IN THE HEAT

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Background - We have previously demonstrated that provision of a cold (4°C) fluid during exercise in the heat increases fluid intake and improves exercise capacity when compared to a control (19°C) fluid (Mündel et al. 2006). The present study investigated whether these positive effects could simply be replicated with chemical, as opposed to physical cooling. Procedure - Nine healthy, non-acclimatised males (25 ± 7 years; O2max: 54 ± 5 ml•kg⁻¹•min⁻¹) cycled to exhaustion at 65% of their peak aerobic power at 34°C, swilling 25 ml of either a L(-)-Menthol (0.01%, MEN) or orange-flavoured placebo (PLA) solution every 10 minutes whilst water was available ad libitum; all fluids were kept at 19°C. Results - Eight out of nine subjects cycled for longer whilst swilling with MEN and this resulted in a 9 ± 12 % improvement in endurance capacity (p = 0.04). Rectal temperatures rose by over 1.7ºC during exercise (p < 0.001) with the same time-course in both conditions (p = 0.81), whilst skin temperature remained largely unchanged (p = 0.19). Swilling with MEN resulted in hyperventilation by 8 ± 10 L•min⁻¹ (p = 0.05) and reduced central (cardio-pulmonary) ratings of perceived exertion by 15 ± 14 % (p = 0.01). No differences between trials were observed for heart rate (p = 0.72), substrate oxidation (p = 0.25), blood concentrations of glucose (p = 0.54) or lactate (p = 0.82), sweat rate (p = 0.29) and volume ingested (p = 0.12). Conclusions – Oral swilling of a menthol solution during exercise in the heat significantly improves endurance capacity, increases ventilation and reduces the perceived exertion of breathing.

References