

The Effect of Sago Supplementation on Physiology and Performance in a Hot and Humid Environment

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Abstract : This study was designed to investigate the physiological and performance effects of a local Malaysian native starch (Metroxylum sago) on cycling in a hot (30°C) and humid (78% RH) environment. Eight male, non-heat acclimated, well-trained club cyclists (VO_{2max} 65 ± 10 ml kg^{-1} min^{-1} , peak aerobic power 397 ± 71 W) completed one familiarization and three experimental trials in our laboratory simulating cycling in environmental conditions of heat and humidity. Each trial consisted of 45 minutes at a fixed workload (55% VO_{2max}) followed by a 15 minute time-trial (~75% VO_{2max}). Sago in porridge form was consumed 1h before exercise (Pre), in gel form during exercise (Dur) and compared to a control trial (Con), using a random, cross-over design. Plasma glucose concentration did not differ between trials ($P = 0.06$) with an increase from 4.1 ± 0.6 to 6.1 ± 1.6 mmol $^{-1}$ (Con), 4.8 ± 1.7 to 5.7 ± 0.4 mmol $^{-1}$ (Pre) and 4.7 ± 0.8 to 6.9 ± 1.4 mmol $^{-1}$ (Dur) from start to end of exercise. Plasma lactate increased ($P = 0.02$) from 1.6 ± 0.3 to 7.6 ± 2.2 mmol $^{-1}$ (Con), 1.7 ± 0.5 to 7.3 ± 2.9 mmol $^{-1}$ (Pre) and 1.6 ± 0.2 to 7.3 ± 1.8 mmol $^{-1}$ (Dur) with no effect of trial ($P = 0.74$). No differences were found between trials for RER ($P = 0.328$) with values of 0.93 ± 0.05 (Con), 0.94 ± 0.04 (Pre) and 0.92 ± 0.04 (Dur). There were no differences between trials in rectal ($P = 0.64$) and skin ($P = 0.56$) temperatures; values reaching $39.1 \pm 0.5^{\circ}C$ (Con), $38.9 \pm 0.4^{\circ}C$ (Pre) and $39.1 \pm 0.4^{\circ}C$ (Dur) for rectal and $32.7 \pm 1.2^{\circ}C$ (Con), $32.8 \pm 1.4^{\circ}C$ (Pre) and $32.8 \pm 1.8^{\circ}C$ (Dur) for skin temperature, respectively. Heart rate ($P = 0.07$) also did not differ between trials but reached maximal values by the end of time-trial for all trials. Performance was unaffected by trial ($P = 0.98$) with the average work completed in 15 minutes being 221 ± 33 kJ (Con), 222 ± 31 kJ (Pre) and 219 ± 32 kJ (Dur), respectively. Therefore, the results of this investigation do not support consumption of sago, either before or during exercise, in altering the thermoregulatory, metabolic or performance responses in a hot and humid environment.

Keywords : hot and humid, physiology, time trial performance, thermoregulatory

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