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 (Metroxylon sago) on cycling in a hot (30°C) and humid (78% RH) environment. Eight male, non-heat acclimated, well-trained club cyclists (VO2max 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% VO2max) followed by a 15 minute time-trial (~75% VO2max). 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 ± 0.5°C (Con), 38.9 ± 0.4°C (Pre) and 39.1 ± 0.4°C (Dur) for rectal and 32.7 ± 1.2°C (Con), 32.8 ± 1.4°C (Pre) and 32.8 ± 1.8°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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