

Effect of Nighttime Pre-Sleep Ingestion of a Low Glycemic Modified Starch on Next Morning Running Performance in Endurance Athletes

Emilie Bode '19, Monique Dudar '20, Karly Fishkin '19

Advisor: Stephen J. Ives, PhD

Abstract

The human body cannot perform at its optimal level without proper nutrient intake. Research suggests that one of the most beneficial exercise interventions is the consumption of carbohydrates (CHO) prior to athletic performance. Growing evidence suggests that nighttime eating may positively affect physiological mechanisms. To date, no study has investigated the effects of next morning endurance running performance, substrate utilization, and gastrointestinal distress (GID) after ingestion of a low glycemic index (LGI) carbohydrate (CHO) supplement before sleep. **METHODS:** Using a double-blind crossover design, six endurance athletes (age, 28.5 ± 9.5 yrs; VO_{2peak} , 53.4 ± 7.6 ml·kg⁻¹·min⁻¹) randomly consumed either a high glycemic index (HGI), a LGI, or placebo (PLA) beverage ~30 min prior to sleep and 7-9hrs before a morning exercise trial. Resting energy expenditure (REE) was assessed prior to exercise. The exercise trial included a warm-up, three 3-min incremental workloads (IET) at 55%, 65%, and 75% peak oxygen consumption, a 3-min recovery, and then a 5km treadmill time trial (TT). Physiological responses were assessed prior, during, and post-exercise. **RESULTS:** No significant differences were found in blood glucose (BG) between PLA, HGI, or LGI at any time. Although there was a trend for significance with LGI CHOs promoting higher fat utilization than HGI CHOs at rest ($p=0.076$), condition had no significant effect on IET CHO utilization (PLA, 64.43 ± 20.18 ; HGI, 54.52 ± 18.10 ; LGI, $52.30 \pm 26.24\%$) or fat utilization (PLA, 46.02 ± 20.02 ; HGI, 36.13 ± 17.95 ; LGI, $49.10 \pm 24.65\%$). There was no effect of condition on GID at any point ($p > 0.05$). There was no effect of condition on 5km TT within subjects (PLA, 23.1 ± 3.7 ; HGI, 23.1 ± 4.1 ; LGI, 22.6 ± 3.2 minutes). **CONCLUSION:** The results showed that condition did not have any effect on substrate utilization, BG, or GID, and there was no difference in 5km TT performance among conditions. There was a trend towards higher fat utilization with the LGI group at rest, suggesting preserved overnight glycogen stores. LGI CHOs pre-sleep did not provide any benefits over HGI CHOs or the PLA in improving endurance exercise performance the next morning.