# CARBOHYDRATE FEEDING TWO HOURS BEFORE EXERCISE: EFFECT OF GLYCAEMIC INDEX

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In previous studies we showed that slowly digested carbohydrate foods eaten one hour before exercise produce higher plasma glucose levels towards the end of exercise (Thomas et al. 1991) and are associated with longer endurance (Thomas et al. 1989). However, these findings were thought to have limited application because food is not commonly consumed so soon before a race. The aim of the present study therefore was to compare a high and low glycaemic index food consumed two hours before exercise.

Six male cyclists performed two trials one week apart in which the test foods were consumed in random order 120 min before cycling at 65-70% $VO_{2max}$ for 90 min. This was followed by 30 min rest and then a 10 min performance trial, where the goal was to accomplish as much work as possible (km) in the given time. The low GI food (LGI) comprised a lentil-based flaked food and the high GI food (HGI) was a potato-based flaked food (Nestec, Switzerland), reconstituted with water and consumed as 1 g carbohydrate/kg body weight after an overnight fast.

Plasma glucose levels fell at the onset of exercise in both trials and then steadily increased. By the end of the 90 min exercise period (3.5 h after consumption), plasma glucose levels relative to fasting were significantly higher after LGI ($0.07 \pm 0.24$ mmol/L) compared with HGI ($-0.87 \pm 0.25$, $P < 0.05$). Plasma free fatty acids were also higher in the LGI trial than the HGI. During the rest period plasma insulin levels were higher after LGI than after HGI, suggesting that carbohydrate was still being absorbed from the gut. Carbohydrate oxidation was lower during the 90 min exercise period after LGI than HGI ($14 \pm 8$ vs $16 \pm 1$ g.min.L-1 respectively, $P < 0.05$). Despite the differences in biochemical parameters, there was no difference between the foods during the 10 min performance test ($5.3 \pm 2.2$ vs $5.4 \pm 2.2$ km respectively, $P > 0.05$). Carbohydrate oxidation during the performance test was high for both trials, suggesting that muscle glycogen stores were not limiting.

These results show that the GI of the pre-exercise food influences plasma fuel substrates during subsequent exercise even when the meal is consumed 2 h previously. Although there was no difference in the distance covered during the 10 min performance test, the plasma glucose and FFA levels suggest that endurance may have been prolonged by LGI had exercise continued.

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