

METABOLIC AND PERFORMANCE EFFECTS OF HIGH FAT AND HIGH CARBOHYDRATE (LOW GI) MEALS PRIOR TO SPECIFIC FOOTBALL EXERCISE

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Introduction

Pre-exercise meals high in carbohydrate (CHO) but with a low glycaemic index (GI) are generally recommended to athletes. However, there is evidence to suggest that a high fat meal prior to exercise increases utilisation of fats and may consequently spare limited glycogen stores. This study investigated the efficacy of a high CHO (low-GI) and a high fat meal consumed prior to a simulated football match on metabolism and performance.

Methods

Ten male recreational football players completed a 90 minute football specific protocol [1], followed by a self paced 1-km time trial completed on a motorised treadmill, 3 ½ h after ingesting one of 2 test meals, high fat meal (HFM), containing 22% CHO and 64% fat, or high carbohydrate meal (HCM), containing 61% CHO and 22% fat. Test meals were isoenergetic (HFM: 995.6 kcal, HCM: 983.7 kcal) and were administered in a counter balance design. Plasma glucose, non-esterified fatty acids (NEFA), glycerol, β -hydroxybutyrate, lactate and insulin were assessed prior to the meal, pre-exercise, at half time, and post exercise, whilst rates of CHO and fat oxidation were determined at four time points during the protocol as well as heart rate (HR), rating of perceived exertion (RPE) and ratings of hunger and fullness.

Results

No difference was found in post match 1-km time trial performance (HFM: 228.6 \pm 14.4 s; HCM: 229.4 \pm 26.5 s), or in heart rate or RPE. Post meal blood glucose was significantly higher for HCM (6.67mmol.L⁻¹) compared to HFM (5.39mmol.L⁻¹). Significant increases were observed throughout exercise for NEFA (HFM: 1.03mmol.L⁻¹; HCM: 0.82mmol.L⁻¹), glycerol (HFM: 187.80mmol.L⁻¹; HCM: 150.00mmol.L⁻¹) and β -hydroxybutyrate (HFM: 0.092mmol/L⁻¹; HCM: 0.070mmol/L⁻¹) following HFM compared to HCM. Similarly fat oxidation (HFM: 0.72g/min⁻¹; HCM: 0.52g/min⁻¹) and hunger (HFM: 60%; HCM: 39%) were greater throughout the exercise following HFM, whereas sensation of fullness (HFM: 35%; HCM: 57%) and CHO oxidation (HFM: 1.48g/min⁻¹; HCM: 2.47g/min⁻¹) were significantly elevated following HCM throughout exercise (P<0.05).

Conclusion

These findings suggest that the type of meal ingested pre-match has an impact on metabolism, although not on the subsequent performance or perceptions of effort.

References

1. Drust, B., Reilly, T. and Cable N.T. (2000). *Journal of Sports Science*, 18, 885-892.