

POSTER PRESENTATION

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# Effects of pre-exercise ingestion of a carbohydrate-electrolyte gel on cycling performance

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## Background

Exercise performance can benefit from pre-exercise ingestion of carbohydrate-electrolyte drinks. Carbohydrate-electrolyte gels may provide a convenient and effective energy source for subsequent exercise bouts, but supportive evidence needs to be provided. We examined the effect of pre-exercise ingestion of a commercial carbohydrate-electrolyte gel on cycling performance.

## Methods

Following an overnight fast, healthy males ( $n = 12$ , age:  $24 \pm 7$  yr, height:  $181 \pm 6$  cm, body mass:  $78.1 \pm 9.4$  kg,  $VO_{2max}$ :  $47.6 \pm 7.1$  mL·kg<sup>-1</sup>·min<sup>-1</sup>,  $W_{max}$ :  $316 \pm 51$  W) cycled steady state (40 min, SS1,  $56 \pm 4\%W_{max}$ , SRM Ergometer) followed by a time trial (15 min, TT1, Wattbike cycle ergometer), a 2 hour passive recovery, and cycled steady state (20 min, SS2, power equal to SS1) followed by a time trial (15 min, TT2). Participants ingested either placebo (P, low-caloric gel, equal in flavour) or Maxifuel's Viper<sup>®</sup> Active Gel (V, 65 gram equal to one gel) (Maxinutrition Ltd, Hemel Hempstead, UK), 15 min pre-SS1 (+250 ml water), 0 hr post-TT1 (+750 ml water), 1 hr post-TT1 (+250 ml water), and 15 min pre-SS2 (+250 ml water). Maxifuel's Viper<sup>®</sup> Active Gel contains 22 g maltodextrin, 11.2 g sucrose, 1.5 g dextrose, 0.8 g fructose and 0.1g sodium per 100g). Experimental design was double-blind and randomized. Carbohydrate oxidation was calculated with stoichiometric equations from Jeukendrup & Wallis. Two-way ANOVA with post-hoc t-tests were used for analysis with significance accepted at  $p < 0.05$ .

## Results

During SS1, heart rate, oxygen uptake, respiratory exchange ratio, rating of perceived exertion, plasma lactate and carbohydrate oxidation were not different between conditions. There was a trend for blood glucose (mmol·L<sup>-1</sup>) with Viper during SS1 to be higher at 0 min (P:  $4.26 \pm 0.21$ , V:  $6.36 \pm 0.76$ ) and 10 min (P:  $3.89 \pm 0.37$ , V:  $4.98 \pm 0.70$ ), and lower at 20 min (P:  $3.89 \pm 0.47$ , V:  $3.12 \pm 0.69$ ) and 30 min (P:  $3.92 \pm 0.45$ , V:  $3.12 \pm 0.69$ ). During SS2, heart rate, oxygen uptake, rating of perceived exertion and plasma lactate were not different between conditions. Blood glucose (in mmol·L<sup>-1</sup>) with Viper during SS2 was higher at 0 min (P:  $3.80 \pm 0.40$ , V:  $5.33 \pm 0.77$ ) and 10 min (P:  $3.56 \pm 0.40$ , V:  $4.10 \pm 0.55$ ). Respiratory exchange ratio was higher during SS2 for Viper at 5 min (P:  $0.90 \pm 0.09$ , V:  $0.99 \pm 0.08$ ). Carbohydrate oxidation (g·min<sup>-1</sup>) during SS2 was higher with Viper at 5 min (P:  $2.11 \pm 0.84$ , V:  $2.97 \pm 0.71$ ). Cycling distance during TT1 and TT2 was 3.1% (P:  $9467 \pm 963$  m, V:  $9741 \pm 817$  m) and 3.4% (P:  $9375 \pm 943$  m, V:  $9667 \pm 746$  m) higher with the carbohydrate-electrolyte gel ingestion.

## Conclusion

It is concluded that pre-exercise ingestion of a 65 gram commercial carbohydrate-electrolyte gel with multiple carbohydrates benefits cycling performance. In addition, the ingestion of the carbohydrate-electrolyte gel during recovery enhanced subsequent cycling performance. The consumption of commercial carbohydrate-electrolyte gels with different carbohydrates may be beneficial for athletes with multiple daily training sessions.

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