Thesis Title Effects of some Commercial Beverages on Intermittent Exercise Performance

Name Chatree Utailawon

Degree Master of Science (Physiology)

Thesis Supervisory Committee

Pipat Cherdrungsi, M.S.

Chalerm Chawatcharaporn, Ph.D.

Chaturaporn Na Nakorn, M.D.

Date of Graduation 24 May B.E. 2536 (1993.)

ABSTRACT

This study assessed the effect of two commercial rehydration beverages, gatorade (SG) and oral rehydration solution (ORS), compared with water placebo (WP) on physiologic function and performance during 2 h of intermittent submaximal cycling exercise. Seven male subjects (17 to 22 yr) completed three separate rides. Each consisted of intermittent steady-state cycling (at 75% HR_{max}) interspersed with four rest periods and a high intense performance ride (80% HR_{max}) until exhaustion. During each rest period, subjects consumed 2 $ml.kg^{-1}$ body weight of WP, SG, or ORS. Beverages were administered in double-blind, counter-balanced order. No differences were observed among subjects in response to beverage treatments for changes in plasma concentration of sodium, potassium, lactate, and total protein, as well as plasma pH, percent change in plasma volume (%ΔPV), heart rate (HR), rating of percevied exertion (RPE), rectal temperature (T_r), and mean skin temperature (T_{sk}). In all treatments, blood lactate concentration was significantly higher during and after exercise than resting ($p<0.05$) and the post-exercise plasma pH was

lower than the initial value ($p<0.05$). In WP treatment, plasma glucose concentration during exercise was lower than baseline ($p<0.05$) while heart rate and rating of perceived exertion were higher during exercise and reach peak at the high intense erformance ride. The time to exhaustion (PT) for the high intense performance ride for the WP, SG, and OR treatments were 342.7 ± 54, 380.9 ± 76, 352.7 ± 74 s respectively. No significant differences in the time to exhaustion among the three beverage treatments were observed. In the WP treatment, the time to exhaustion was found to be signficantly correlated with the high-intense exercise HR ($r = 0.793$, $P<0.05$) and the $\%\Delta PV$ ($r = 0.685$, $P<0.05$); whereas in the SG treatment,PT was found to be significantly correlated with the post-exercise blood lactate ($r = 0.887$, $P<0.01$) and the high-intense exercise HR ($r=0.857$, $P<0.01$). When the total treatments (WP+SG+ORS) were analyzed together, it was found that PT was significantly correlated with the blood lactate ($r = 0.419$, $P<0.05$), the $\%\Delta PV$ ($r = -0.439$, $P<0.05$), and VO_2max ($r = -0.450$, $P<0.05$). In addition, the time to exhaustion was also found to be signifiicantly correlated with the post-exercise blood lactate($r = 0.650$, $P<0.001$) and the post-exercise HR ($r = 0.675$, $P<0.001$). The results of the present study indicated that physiologic function in SG and ORS treatments were similarly maintained during prolonged submaximal intermiittent cycling as the WP treatment and the performance time to exhaustion was similar in all beverage treatments.