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KEY WORD : FRUCTOSE/ GLUCOSE/ BREATH HYDROGEN TEST/
ALANINE/ ABSORPTION/ PHYSICAL PERFORMANCE

JEERANUN SUWANWAREE: EFFECT OF EXERCISE ON FRUCTOSE ABSORPTION FACILITATED BY ALANINE AND PHYSICAL PERFORMANCE. THESIS ADVISORS: KRAISID TONTISIRIN, Ph.D., KALLAYA KIJBOONCHOO, Ph.D., AND CHAIVAT TOSKULKAO, Ph.D. 152P. ISBN 974-664-566-8

Ingestion of water and/or beverage both before and during competition or training is important for athletes and their performance. Fructose is a carbohydrate that creates less insulin responses than glucose but is less absorbed in the intestine than glucose. The facilitating effect of alanine on fructose absorption in healthy children is shown in resting condition but there is no report about fructose absorption with facilitating effect of alanine in exercise conditions. Therefore, this study aimed to investigate the effect of exercise on fructose absorption facilitated by alanine and physical performance using a double blind randomized design. Eight physically active college students (VO_2 max = 51.78 ± 2.04 ml/kg/min), were engaged in the experiment in four trials i.e., 6% glucose (G), 6% fructose (F), 6% fructose and half-equimolar alanine (Fa), or 6% fructose and equimolar alanine (FA). Five hundred milliliters of beverage was given at 45 min before exercise and 350 ml immediately prior to exercise. Total fructose/glucose intake was 51 g in each trial. Osmolality of the beverages were 413 ± 6.56 , 438 ± 3.85 , 594 ± 14.93 , and 788 ± 12.47 mmol/L in G, F, Fa, and FA trials, respectively. The intensity of exercise employed was 70% VO_2 max for the first 60 min of exercise on treadmill, followed by an increased of workload 10% every 5 min until exhaustion.

There were no significant differences in heart rate, and ratings of perceived exertion (RPE), blood lactate, plasma free fatty acids, percentage changes in plasma volume, serum osmolality, and body weight loss. Plasma glucose and serum insulin were more significantly increased in G than in F, Fa and FA trials at 15 min after first ingestion ($p < 0.05$). Breath hydrogen excretion was more significantly increased in F than in G, Fa and FA trials ($p < 0.05$). Gastrointestinal disturbances were reported in F and FA trials in which 4 of subjects could not run until exhaustion due to diarrhea in F trials and severe abdominal distention in the FA trial. However, exhaustion time in the other 4 subjects was not significantly different among trials (74.00 ± 5.05 , 73.75 ± 5.30 , 72.25 ± 3.68 , and 74.75 ± 3.35 min in G, F, Fa, and FA trials, respectively). These results showed that ingestion of either fructose 51 g or high osmolality of 788 ± 12.47 mmol/L before exercise could create gastrointestinal disturbances which apparently limits performance. Alanine has an enhanced effect on fructose absorption in exercise as shown by lowering breath hydrogen excretion. Despite the GI disturbances, physical performance is similar among all trials.