

中等度運動回復期における水分補給の効果

純水，糖，クエン酸，食酢の比較

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Effects of Fluid Replacement after Moderate Exercise – Comparison between Water, Glucose, Citric Acid and Vinegar –

by

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ABSTRACT

We examined the effect of fluid replacement after moderate exercise, for 30 min at 60 %HRmax. The investigation was carried out in five healthy university students, 24 ± 2 (mean \pm S.E.) years old. Subjects drank one of the following four test solutions twice, immediately after and 30 min after the exercise: 1) distilled water (group W), 2) 6% glucose solution (group G), 3) 0.5% citric acid solution containing 6% glucose solution (group C), and 4) vinegar diluted ten-fold with water (about 0.5% acetic acid) containing 6% glucose solution (group V). Each ingestion volume was 250 ml at a time. Six blood samples (before exercise and 0, 15, 30, 60 and 120 min after exercise) were drawn. The three physical sensations, fatigue, thirst and relaxation, were checked up at three times, immediately after the exercise, and after the first and the second drinking.

No significant increase in hematocrit and serum lactic acid concentration was observed in all groups immediately after exercise. Group G, C and V increased significantly in serum glucose,

serum insulin and serum lactic acid after the ingestion. However, the suppression in the increment rate was observed in two groups, C and V. Free fatty acids reduced immediately after the exercise, and during recovery period, group W only showed a significant increase to the contrary other three groups indicated decreasing tendency. Group G indicated the most effective improvement substantially the whole physical sensations. However, vinegar contributed to the equal or more speedy improvement, especially on the sensation of fatigue and relaxation.

During exercise recovery period, the ingestion of citric acid or vinegar with glucose indicated suppressing tendency on the variation of blood glucose as compared to the ingestion of glucose only. Moreover, addition of vinegar effected the improvement of a few physical sensations after exercise. These results suggests that vinegar ingested with glucose is more efficient solution for the individual who have a few abnormalities on blood glucose metabolism and/or physically fatigue person after exercise.

要 旨

本研究は、中等度運動回復期におけるグルコースおよびクエン酸、酢酸の補給効果について、血清成分の変動および疲労回復の観点より検討した。健康男子学生5名(24 ± 2歳)を対象とした。60% HRmaxで30分間、自転車エルゴメーター運動を行い、運動直後および30分後に、a) 純水(W), b) 6%グルコース(G群), c) 0.5%クエン酸(6%グルコースを添加: C群), d) 食酢(市販品10倍希釈: 酢酸0.5%含有, 6%グルコースを添加: V群)のいずれかを250mlずつ、合計500ml摂取させた。運動前、直後、15分、30分、60分、120分後に採血し、運動直後、1回目の飲水後、2回目の飲水後に主観評価(疲労感・口渇感・リラックス感)について調査した。

運動によりヘマトクリット、血清乳酸値は増大したが、有意差を示さなかった。飲水後、血清乳酸値・血糖値・インスリンはグルコース摂取により有意に増大したが、そのピーク値はクエン酸や酢酸を添加することにより抑制される傾向を示した。遊離脂肪酸(FFA)は運動により低下傾向を

呈し、回復期にはW群のみ有意に上昇したが、他3群は有意に低下した。主観評価は、G群が相対的によく改善されたが、とくに疲労感、リラックス感については、V群により速やかな回復が認められた。

運動回復期にグルコースとともにクエン酸や食酢を摂取することにより血糖上昇が抑制され、また、とくに食酢の摂取は主観評価(疲労感・リラックス感)回復の促進効果を示したことから、運動後の食酢摂取の有効性が示唆された。