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Short-term sodium phosphate supplementation improve VO_{2max} under hypoxia without calcium-phosphate imbalance in athletes

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AIM: Several previous studies revealed that sodium phosphate (SP) supplementation may enhance functional capacity of the aerobic energy system in normoxia. The aim of this study was to evaluate the effect of short-term intake of SP on aerobic capacity under hypoxia in endurance athletes. Additionally, we investigated the effect of SP supplementation on the phosphate-calcium balance. METHODS: Ten trained cyclists and triathletes (age, 33 ± 2.5 years; VO2max, 60.2 ± 4.7 ml·kg-1·min-1; body height, 1.81 ± 0.06 m; body mass, 70.5 ± 5.9 kg; fat free mass (FFM), 61.2 ± 6.2 kg; fat content, 13.3 ± 2.2%) received tri-sodium phosphate (50 mg·kg-1 of FFM/d) or placebo for 6 days in a randomized, cross-over study, with a three-week washout period between supplementation. Before and after each supplementation phase, the subjects performed an incremental exercise test to exhaustion under normobaric hypoxia (FiO2=16%, ~2500 m) to determine VO2max. Furthermore, in fasting conditions, venous blood samples were drawn to determine phosphates and calcium serum concentration. RESULTS: The results indicated a significant ($p<0.01$) increase in relative and absolute VO2max values (by 3.6%) due to SP supplementation. Serum phosphates levels increased from 3.03 to 3.24 mg/dl, however, these changes were not statistically significant. The calcium levels did not change significantly after phosphate salts intake (9.49 vs. 9.43 mg/dl). CONCLUSION: Short-term sodium phosphate supplementation improve aerobic capacity under hypoxic conditions without calcium-phosphate imbalance. Sodium phosphate may be considered as an ergogenic aid for endurance athletes.

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Keywords: Sodium Phosphate, Hypoxia,Ooxygen uptake, Aerobic Capacity, Athletes

Biography:

Kamila Płoszczyca is a (since 2020) - principal investigator in research project: “Effect of sodium phosphate supplementation on aerobic capacity under normobaric hypoxia in cyclists”; grant No. 2019/33/N/NZ7/00376 from the National Science Centre of Poland, since 2018 - employed in the Department of Kinesiology at the Institute of Sport - National Research Institute in Warsaw, Since 2016 – PhD student, the Jerzy Kukuczka Academy of Physical Education in Katowice. Department of Sports Training. Scientific field: Sport sciences; Dissertation title: “The effect of high intensity interval training in normobaric hypoxia on levels of selected hormones and lipid profile in swimmers”.

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