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Aronia-citrus juice (polyphenol-rich juice) intake and elite triathlon training: a lipidomic approach using representative oxylipins in urine.

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Abstract

In the present study, we examined whether particular urinary oxylipins (isoprostanes (IsoPs), leukotrienes (LTs), prostaglandins (PGs), and thromboxanes (TXs)) in 16 elite triathletes could alter during 145 days of training. Within this time span, 45 days were dedicated to examining the effects of the intake of a beverage rich in polyphenols (one serving: 200 mL per day) supplemented in their diet. The beverage was a mixture of citrus juice (95%) and Aronia melanocarpa juice (5%) (ACJ). Fifty-two oxylipins were analyzed in the urine. The quantification was carried out using solid-phase extraction, liquid chromatography coupled with triple quadrupole mass spectrometry. The physical activity decreased the excretion of some PG, IsoP, TX, and LT metabolites from arachidonic acid, γ-dihomo-linolenic acid, and eicosapentaenoic acid. The ACJ also reduced the excretion of 2,3-dinor-11β-$PGF_{2\alpha}$ and 11-dehydro-TXB_2, although the levels of other metabolites increased after juice supplementation (PGE_2, 15-keto-15-F_{2t}-IsoP, 20-OH-PGE_2, LTE_4, and 15-epi-15-E_{2t}-IsoP), compared to the placebo. The metabolites that increased in abundance have been related to vascular homeostasis and smooth muscle function, suggesting a positive effect on the cardiovascular system. In conclusion, exercise influences mainly the decrease in oxidative stress and the inflammation status in elite triathletes, while ACJ supplementation has a potential benefit regarding the cardiovascular system that is connected in a synergistic manner with elite physical activity.

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