Research article

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The efficacy of a β-hydroxy-β-methylbutyrate supplementation on physical capacity, body composition and biochemical markers in elite rowers: a randomised, double-blind, placebo-controlled crossover study

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Abstract

Background

β-hydroxy-β-methylbutyric acid (HMB) is an interesting supplement in sports. However, literature sources present a limited number of studies that verify the efficacy of HMB intake over a longer time period among endurance athletes. For this reason, the aim of this study was to assess the effect of HMB supplementation on physical capacity, body composition and levels of biochemical markers in rowers.

Methods

Sixteen elite male rowers were administered a 12-week HMB supplementation (3×1 g $_{HMB}$ $\cdot$day $^{-1}$) and placebo administration (PLA) following the model of a randomised, placebo controlled,

double-blind crossover study with a 10 days washout period. Over the course of the experiment, aerobic (maximal oxygen uptake, ventilatory threshold) and anaerobic (anaerobic power indices) capacity were determined, while analyses were conducted on body composition as well as levels of creatine kinase, lactate dehydrogenase, testosterone, cortisol and the T/C ratio. A normal distribution of variables was tested using the paired 2-tailed t-tests; the Mann–Whitney *U*-test or the Wilcoxon-signed rank test were applied for non-normally distributed variables.

Results

Following HMB supplementation, $\dot{V}O_2max$ increased ($+2.7\ mL \cdot min^{-1} \cdot kg^{-1}$) significantly ($p < 0.001$) in comparison to its reduction after PLA ($-1.0\ mL \cdot min^{-1} \cdot kg^{-1}$). In turn, at the ventilatory threshold, a longer time was required to reach this point ($+1.2\ min_{HMB}$ vs. $-0.2\ min_{PLA}$, $p = 0.012$), while threshold load ($+0.42\ W \cdot kg^{-1}{}_{HMB}$ vs. $-0.06\ W \cdot kg^{-1}{}_{PLA}$, $p = 0.002$) and threshold heart rate ($+9\ bpm_{HMB}$ vs. $+1\ bpm_{PLA}$, $p < 0.001$) increased. After HMB supplementation, fat mass decreased ($-0.9\ kg_{HMB}$ vs. $+0.8\ kg_{PLA}$, $p = 0.03$). In relation to the initial values after HMB supplementation, the refusal time to continue in the progressive test was extended ($p = 0.04$), maximum load ($p = 0.04$) and anaerobic peak power ($p = 0.02$) increased. However, in relation to the placebo, no differences were observed in anaerobic adaptation or blood marker levels.

Conclusions

The results indicate that HMB intake in endurance training has an advantageous effect on the increase in aerobic capacity and the reduction of fat mass. It may also stimulate an increase in peak anaerobic power, while it seems to have no effect on other indices of anaerobic adaptation and levels of investigated markers in the blood.

Keywords: β-hydroxy-β-methylbutyric acid; Sport supplements; Training support; Adaptation; Rowing