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**Abstract**

# The effect of HMB supplementation in regular training and Fight Gone Bad workout-enhanced stimuli on body composition and lower-limb isometric strength in trained males

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Beta-hydroxy-beta-methylbutyrate (HMB) supplementation may support muscle protein synthesis and/or the inhibition of proteolysis (Durkalec-Michalski et al., 2017; Durkalec-Michalski & Jeszka, 2016). This could explain the HMB-induced reduction in body fat and an increase in fat-free mass (FFM) or anaerobic/aerobic capacity observed, especially during homeostasis disturbances and body overload (Durkalec-Michalski et al., 2017; Durkalec-Michalski & Jeszka, 2016). However, the results of up-to-date studies on HMB

are inconclusive. Therefore, the aim of this study was to evaluate the effect of the 3-week supplementation with free liquid form of HMB (90 $mg_{HMB} \cdot kg^{-1}{}_{FFM}$) on body composition (BC) and lower-limb isometric strength, depending on the training specificity (custom workouts and regular training enhanced by the additional high-intensity functional exercises). This randomised double-blind placebo-controlled parallel study was performed with 17 trained male athletes aged 26±9 years (body mass (BM) 85.5±10.5 kg, height 1.83±0.06 m). Participants were randomly allocated into HMB (*n*=9) or placebo (PLA; *n*=8) group based on FFM. Study protocol consisted of two 3-week periods, of which *1)* the first one was supplementation period (*SUP*) – participants were ingesting either HMB or PLA and were performing their usual training cycle, and *2)* during the second period as an adjunct to HMB/PLA, the additional (in addition to their usual training schedule) exercise stimuli in the form of 2 *Fight Gone Bad* (FGB) training units per week was introduced (*SUP+FGB*). Testing visits were performed at baseline (*BAS*), and after completion of *SUP* and *SUP+FGB* periods. During each visit, the following procedures were performed one by one: BC (FFM and fat mass (FM) [BodPod®; Cosmed]), *vastus lateralis* (*VL*) ultrasonography, blood drawn (BD), *VL* microbiopsy (*VL*-MB), incremental cycling test (ICT), BD, *VL*-MB and eventually maximal voluntary isometric contraction (MVIC) knee extension (Isokinetic Dynamometer HUMAC NORM; Humac). MVIC was evaluated based on peak (PT), average (AT) torque and PT slope (PTS) measured in triplicate (1, 2, 3; maximal [MAX] and MEAN results were also established). There were no differences in BM, FFM, FM, PT, AT and PTS at *BAS* between groups. No changes in BM, FFM and FM occurred during the whole study protocol, regardless of the study group. In PLA, no changes in PT, AT, and PTS were observed. Surprisingly, in HMB $PT_1$, $PT_{MEAN}$, $AT_2$, $AT_{MEAN}$ were significantly higher at *BAS* compared to *SUP* and *SUP+FGB*; while $PT_2$, $PT_{MAX}$, $AT_1$, $AT_{MAX}$ and $PTS_1$ at *BAS* compared to *SUP+FGB*. In conclusion, current results indicate the need for further research, which must take into consideration the impact of HMB supplementation combined with athletic training related to body composition and isometric strength outcomes.

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