



HMB Complex

AMINO ACID FORMULA



HMB Complex: HMB + L-glutamine, L-arginine, and BCAA

- Helps maintain lean muscle mass when combined with regular exercise and a balanced diet^{14,20,21†}
- Helps maintain muscle strength and muscle protein synthesis^{12,14,20†}
- Helps improve recovery following physical exercise^{17†}
- Provides essential branched chain amino acids (L-leucine, L-isoleucine, L-valine) involved in protein synthesis[†]
- Helps to support immune system and digestive system health after periods of physical stress[†]

Easy-to-use

- HMB Complex powder dissolves readily into water, juice, and other drinks

Natural orange flavor

- Great taste increases patient compliance

GENESTRA BRANDS HMB Complex combines β -hydroxy- β -methylbutyrate (HMB) with two amino acids (L-glutamine and L-arginine) involved in protein synthesis, and three essential branched chain amino acids (BCAA); L-leucine, L-isoleucine, and L-valine. HMB Complex is dairy and gluten free, suitable for vegetarians, and has a delicious naturally-flavored orange powder formula.

Supplement Facts

Serving Size 2 Scoops (22 g)/ Servings per Container about 14

Each Serving Contains	% DV
Calories	20
Sodium	50 mg 2%
Total Carbohydrate	3 g 1%♦
Sugars	2 g *
Calcium	225 mg 23%
Vitamin D (cholecalciferol)	500 IU 5%
CaHMB (calcium beta-hydroxy-beta-methylbutyrate)	1.5 g *
L-Glutamine	7 g *
L-Arginine (L-arginine hydrochloride)	7 g *
Branched Chain Amino Acids	1.2 g *
L-Leucine	600 mg *
L-Isoleucine	300 mg *
L-Valine	300 mg *

♦ Percent Daily Values (DV) are based on a 2000 calorie diet
* Daily Value not established

Other Ingredients: Natural flavors, potassium citrate, citric acid, sodium chloride, thaumatin

Recommended Adult Dose: In a glass, add 250 ml of water or juice to two scoops of HMB Complex and mix. Take once daily with a meal or as recommended by your healthcare practitioner.

Product Size: Net Weight 10.9 oz (310 g) **Product Code:** 06479

GLUTEN FREE*

VEGETARIAN

DAIRY FREE*

Scientific Rationale:

Decreased lean muscle mass occurs naturally during aging, with approximately 1% of total muscle mass lost each year over the age of 30.¹ In older adults, this decrease in muscle mass is associated with decreased muscle strength and function, as well as reduced quality of life.² Age-related loss of muscle mass occurs in as many as 45% of men and 26% of women.³ Some of the contributing factors to reduced lean muscle mass and function in older adults include; inadequate protein intake, poor vitamin D status, and decreased physical activity.¹ An estimated 24% of women and 12% of men 70 years[†] consume an inadequate amount of protein (less than 0.66 g protein per kg body weight each day).³

In elderly adults, β -hydroxy- β -methylbutyrate (HMB) supplementation has beneficial effects on muscle composition with or without the addition of resistance training. HMB is a metabolite of the essential branched chain amino acid leucine that is naturally formed within the body.⁴ A 70 kg person produces an estimated 0.2-0.4 g of HMB per day. HMB upregulates protein synthesis in muscle cells, stabilizes the muscle cell membrane, and decreases skeletal muscle protein degradation.⁴⁻⁹ HMB inhibits activation of the enzyme capase-8, which prevents protein synthesis downregulation, and inhibits protein degradation caused by NF- κ B.^{6,7,10} It also directly increases protein synthesis by activating

Continued on reverse

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the mTOR (mammalian target of rapamycin) signaling pathway, which controls protein synthesis.^{9,11} HMB supplementation enhances lean body mass and muscle strength in both trained and untrained individuals, and may help to increase fat mass reduction when combined with a structured exercise program.¹²

In a randomized, placebo-controlled, clinical trial of 43 elderly (65 years or older) healthy men and women, daily HMB supplementation for 24 weeks was found to significantly increase muscle strength and quality. Participants were randomized to receive either a calcium powder (400 mg calcium + 8 g carbohydrate) placebo treatment or HMB powder (3.0 g calcium-HMB + 8 g carbohydrate) treatment, with ad libitum diet. Strength and body composition testing was performed before and after the 24 weeks of supplementation, and included: body composition (dual-energy X-ray absorptiometry), muscle strength (handgrip, isokinetic leg strength, bench press, leg press, leg extension strength, and get-up-and-go testing), muscle quality (muscle strength relative to muscle mass). Total lean body mass, leg lean body mass, and arm lean body mass significantly increased in the HMB treatment group in comparison with the placebo treatment group. Muscle quality was significantly improved in the HMB treatment group as well.¹³

In a double-blind, randomized, placebo-controlled clinical trial of 37 healthy untrained men aged 18-29, supplementation with approximately 3 g of HMB per day for 8 weeks resulted in a significant increase in lean body mass and strength following regular resistance exercise training. Participants were randomized to one of three treatment groups: placebo powder, ~3 g of HMB powder per day, or ~6 g of HMB powder per day. The resistance training regimen was performed 3 days per week and included: bench presses, latissimus pull-downs, military presses, arm curls, arm extensions, abdominal crunches, hip sled, leg curls, leg extensions, and calf raises. All exercises were performed at 80% of each participant's predetermined concentric 1 repetition maximum (1RM) for that exercise. The 1RM values were re-determined every two weeks for each exercise, and exercise performance was adjusted according. Participant body composition was determined before and after supplementation using a seven-site skin-fold evaluation with Lange calipers. Strength was assessed using a series of evaluations, including changes in 1RM for whole body exercise, training volume ([mass lifted x number of repetitions] / number of sets), isometric and isokinetic strength testing (force-velocity curves), and fatigue testing. Compared with the placebo treatment group, the ~3 g of HMB treatment group had a significant increase in lean body mass and peak isometric strength.¹⁴

Vitamin D status tends to decline with aging, and restoring vitamin D levels is associated with improved muscle strength and function.¹ In a cross-sectional study of 127 elderly citizens, higher serum vitamin D levels were associated with

improved physical performance.¹⁵ HMB's effects on muscle strength in elderly participants may also be influenced by vitamin D status. In a year-long, double-blind, placebo-controlled clinical study of 39 older adults (mean age of 76 years), daily supplementation with an HMB/arginine/glycine mixture significantly increased fat free mass. However muscle strength only improved in participants that had sufficient vitamin D levels. Participants received either a powder mixture containing 2.0 g calcium-HMB, 5.0 g arginine, and 1.5 g lysine, or a control powder containing an isonitrogenous or isocaloric mixture of nonessential amino acids (alanine 5.6 g, glutamic acid 0.9 g, glycine 3.1 g, and serine 2.2 g). Participants weighing more than 68 kg received 150% of the standard dosage for the powders. Lower leg strength was assessed using an isokinetic system for knee extension. Vitamin D status was determined using an average of fasting serum vitamin D₃ levels that were obtained prior to supplementation, and then again at months 3, 6, 9, and 12 of supplementation. Compared with the placebo group, participants that received the HMB/arginine/glycine mixture had significantly increased fat free mass. A significant increase in muscle strength only occurred in participants receiving the HMB/arginine/glycine mixture that had a serum vitamin D₃ level of ≥ 30 ng/mL.¹⁶

Branched chain amino acids (BCAA) may help to minimize acute muscle soreness and recovery following resistance exercise. In a placebo-controlled, double-blind, crossover clinical trial of 12 healthy young female untrained participants, a single 5.5 g dose of BCAA supplement containing isoleucine, leucine and valine reduced muscle soreness and biomarker levels for muscle damage following exercise, while improving exercise recovery. Participants consumed either the BCAA supplement or dextrin powder placebo and then performed 7 sets of 20 squats. Blood samples were collected prior to exercise, immediately following exercise, 1 and 2 hours after exercise, and in the morning on the two days that followed the exercise session. The samples were analyzed for biomarkers of muscle damage, including creatine kinase, myoglobin, and elastase. Muscle soreness was rated using a 10-cm muscle soreness visual analogue scale (VAS) that was completed while performing a single squat, and was assessed on the 4 days that followed the exercise session. Exercise recovery rates were determined at 2 days after exercise by measuring the leg muscle force generated during maximal voluntary isometric contractions. After an 11-week washout period, participants crossed over to the other treatment and repeated the trial. Compared with placebo, BCAA consumption resulted in significant reductions in both myoglobin and elastase levels, greater leg muscle force generated after 2 days of exercise recovery, and reduced VAS muscle soreness scores.¹⁷

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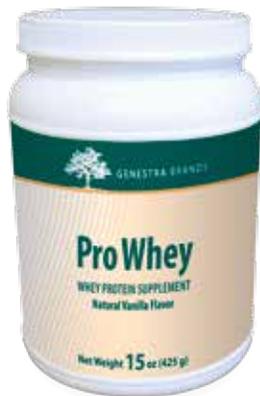
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HMB Complex

Companion Products

HMB Complex assists in the building of lean muscle mass when combined with regular resistance training and a healthy balanced diet. These companion products provide nutritional support for regular exercise plans, in order to improve patient outcomes.



Pro Whey

- Supports exercise nutrition by providing essential amino acids (including branched chain amino acids) for healthy muscle function and exercise recovery*
- Whey protein isolate is an excellent source of protein for the maintenance of healthy muscle function, exercise recovery, and overall daily wellness*



Magnesium Glycinate

- Helps to maintain normal muscle function*
- Magnesium glycinate is a gentle form of magnesium that is less likely to cause loose stools*



Omega 800

- Helps maintain cardiovascular health*

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