



GENESTRA  
BRANDS®

# HMB Complex

## HMB plus L-glutamine, L-arginine and BCAAs

- Assists in the building of lean muscle when combined with regular training and a healthy balanced diet
- Provides essential branched chain amino acids (L-leucine, L-isoleucine, L-valine) involved in protein synthesis
- Convenient, once-daily formula that easily mixes into water or juice
- Improved formula
  - Improved taste profile – now featuring a natural citrus flavour, plus added dextrose and malic acid
  - Increased bottle size – now packaged in a 40 oz. bottle
  - Increased scoop size – each scoop now provides 16.7 grams of powder

HMB Complex combines beta-hydroxy beta-methylbutyrate (HMB) with the amino acids glutamine and arginine, branched chain amino acids (BCAAs) leucine, isoleucine and valine, and vitamin D. It was specifically designed to assist in the building of lean muscle when combined with regular training and a healthy balanced diet. Amino acids are well-recognized for their important role as the building blocks of proteins.<sup>1</sup> As protein degradation exceeds protein synthesis during aging and after exercise, BCAA supplementation, particularly when enriched with leucine, may provide important support for stimulating muscle protein synthesis in aging individuals as well as athletes.<sup>2-4</sup> Furthermore, leucine can be used to form HMB, a clinically studied metabolite that is widely used by bodybuilders and strength athletes.<sup>5</sup> Glutamine helps to support immune and digestive system health after periods of physical stress, while arginine helps support a modest improvement in exercise capacity in individuals with stable cardiovascular diseases (CVD). Vitamin D further contributes to maintaining good health by aiding in the absorption and use of calcium and phosphorus to support healthy bones and teeth.



### EACH SCOOP (16.8 g) CONTAINS:

CaHMB (calcium-beta-hydroxy-beta-methylbutyrate).....	0.75 g
L-Glutamine .....	3.5 g
L-Arginine (l-arginine hydrochloride) .....	3.5 g
Branched Chain Amino Acids .....	0.6 g
L-Leucine .....	300 mg
L-Isoleucine .....	150 mg
L-Valine .....	150 mg
Vitamin D (cholecalciferol) .....	6.25 mcg/250 IU

Non-Medicinal Ingredients: Dextrose, natural flavours (orange, lemonade), potassium citrate, citric acid, DL-malic acid, sodium chloride, thaumatin

### Recommended Dose

Adults: In a glass, add 250 mL of water or juice to 2 scoops of HMB Complex and mix. Take once daily with a meal or as recommended by your healthcare practitioner. Consult your healthcare practitioner for use beyond 6 weeks if you suffer from a cardiovascular disease. Consult your healthcare practitioner for use beyond 6 months.

### Product Size

475 g Powder

### Product Code

06479

NPN 80051759



Gluten Free



Dairy Free



Vegetarian

### REFERENCES

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# HMB Complex

## Scientific Rationale:

Skeletal muscle is constantly turning over, with new protein replacing older protein lost to degradation.<sup>1</sup> When the rate of muscle protein synthesis is greater than the rate of protein breakdown, there is a gain in muscle mass.<sup>1</sup> In contrast, a net breakdown of muscle protein occurs when protein degradation exceeds protein synthesis.<sup>2</sup> Decreased lean muscle mass occurs naturally during aging, with approximately 1% of total muscle mass lost each year over the age of 30.<sup>3</sup> In older adults, this decrease in muscle mass is associated with decreased muscle strength and function, as well as reduced quality of life.<sup>4</sup> Age-related loss of muscle mass occurs in as many as 45% of men and 26% of women.<sup>5</sup>

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.<sup>3</sup> An estimated 24% of women and 12% of men 70 years and older consume an inadequate amount of protein (less than 0.66 g protein per kg body weight each day).<sup>5</sup> Protein breakdown is also greater than protein synthesis after exercise, resulting in a negative balance of protein turnover.<sup>6</sup> As amino acids are required in adequate levels for the production of new protein, the goal of amino acid supplementation, particularly with branched chain amino acids (BCAAs), is to help maximize protein synthesis and muscle mass development.<sup>1</sup>

The BCAAs leucine, isoleucine and valine play an important role in protein metabolism.<sup>7</sup> Leucine in particular promotes protein synthesis by activating the mammalian target of rapamycin (mTOR) signaling pathway, which stimulates protein translation.<sup>8</sup> Supplementation with a leucine-enriched essential amino acid formula may help stimulate muscle protein synthesis in older adults, and may also provide important support for muscle protein synthesis after exercise.<sup>6,8</sup> Research has found that essential amino acid consumption following exercise can lead to a greater rate of muscle protein synthesis compared to consumption at rest or when resistance exercise is performed in the fasting state.<sup>8</sup> Recovery after exercise may specifically depend on dietary leucine supplementation to elevate intracellular leucine levels and stimulate protein synthesis.<sup>6</sup>

In addition to its role in protein synthesis, leucine can be used to form the metabolite beta-hydroxy beta-methylbutyrate (HMB) in a reaction that occurs naturally within the body.<sup>2</sup> As with all essential amino acids, leucine

cannot be synthesized by the body and must be obtained from the diet.<sup>9</sup> The primary sources of leucine are protein sources, such as meat.<sup>9</sup> In order to produce 3 g of HMB, individuals would have to obtain 60 g of leucine from 600 g of high-quality protein.<sup>9</sup> As it would be difficult to achieve this intake level as part of a balanced diet, supplementation can be used to help increase HMB levels.<sup>2</sup> HMB has been evaluated in numerous clinical trials and is widely used by bodybuilders and strength athletes.<sup>2</sup>

L-Arginine is a non-essential amino acid involved in protein synthesis. In addition to this role, research suggests that L-arginine may help support a modest improvement in exercise capacity in individuals with stable cardiovascular diseases (CVD). L-Arginine may work by supporting the production of nitric oxide (NO), a hormone released by endothelial cells in response to shear stress.<sup>10</sup> NO is an important component of endothelial function and helps to regulate blood flow to muscles.<sup>10</sup> As exercise capacity may be limited by endothelial function and NO levels in those with CVD, supplementation with L-arginine may support NO synthesis in this population to increase exercise capacity.<sup>11</sup> L-Arginine is also a precursor of L-citrulline, which can provide further support by regulating platelet aggregation, angiogenesis and monocyte adhesion.<sup>10</sup>

Glutamine is the body's most abundant free amino acid.<sup>12</sup> It is the primary source of energy for intestinal cells, supporting their growth and proliferation.<sup>12</sup> Glutamine further contributes to intestinal health by maintaining the barrier function of the gut.<sup>13</sup> It helps to form mucin and supports the integrity of the intestinal surface.<sup>13</sup> In addition, glutamine is a major energy substrate for immune cells.<sup>14</sup> Through its role in the synthesis of nucleotides, glutamine is required for the proliferation of lymphocytes.<sup>14</sup> Glutamine has also been found to support macrophage and natural killer cell activity, as well as antibody and cytokine production *in vitro*.<sup>14</sup> Similarly, animal research has demonstrated that glutamine supplementation can support immunity, regulating lymphocyte function and cytokine release from macrophages.<sup>14</sup> Clinical research has also found that glutamine supplementation during stress can support the digestive and immune systems by maintaining the intestinal barrier and healthy immune cell responses.<sup>13</sup>

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