GENESTRA BRANDS®

Metabolic Protein Chocolate

Delicious chocolate-flavoured pea protein, nutrient and berry extract formulation

- Combines pea protein, alpha-lipoic acid, chromium, vitamins and berry extracts
- Promotes healthy nutrient and glucose metabolism
- Provides 15 g of pea protein and 20 mg of berry polyphenols per dose

Metabolic Protein Chocolate helps maintain healthy metabolism with a blend of pea protein, alpha-lipoic acid, chromium, vitamins and polyphenol-rich berry extracts. This plant-based protein formula helps build and repair body tissues, and assists in the building of lean muscle mass when combined with regular resistance training and a healthy balanced diet. Chromium is included as an essential mineral that helps maintain normal blood glucose levels. Vitamin B_{12} plays important roles in red blood cell formation and energy metabolism, while vitamin D is well-recognized for its ability to support immune function and help build strong bones and teeth. This formula also combines alpha-lipoic acid with standardized blueberry and strawberry extracts for their valuable effects on antioxidant defence. Metabolic Protein Chocolate is ideal for individuals looking to increase their intake of vegetarian protein, vitamins, antioxidants and complementary ingredients in a delicious, chocolate-flavoured formula.

EACH SCOOP (15.1 g) CONTAINS:

Pea Protein (from *Pisum sativum* seed)	7.5 g
DL-Alpha-Lipoic Acid	150 mg
Vitamin D (cholecalciferol)	5 mcg/200 IU
Vitamin B_{12} (methylcobalamin)	220 mcg
Chromium (chromium nicotinate glycinate)	100 mcg
Curcumin (from *Curcuma longa* rhizome)	12.5 mg
Lecithin (from *Helianthus annuus* seed)	300 mg
Strawberry (*Fragaria x ananassa*) Fruit Extract (25:1) (6.25 g Fresh Equivalent)	250 mg
Blueberry (*Vaccinium angustifolium*) Fruit Std. Extract (30:1) (4% Polyphenols/7.5 g Fresh Equivalent)	250 mg

Non-Medicinal Ingredients: Cocoa powder, guar gum, natural chocolate, vanilla cream and vanilla flavours, rebaudioside A (stevia leaf extract), thaumatin

Recommended Dose
Adults: In a glass, add 250 mL of water to 2 scoops of Metabolic Protein Chocolate and mix. Take once daily or as recommended by your healthcare practitioner.

Product Size
423 g Powder

Product Code
06454

NPN 80045724

Non GMO | Gluten Free | Dairy Free | Vegetarian

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Scientific Rationale:

Skeletal muscle is constantly turning over, with new protein replacing older protein lost to degradation.[1] When the rate of muscle protein synthesis is greater than the rate of protein breakdown, there is a gain in muscle mass.[1] In contrast, a net breakdown of muscle protein occurs when protein degradation exceeds protein synthesis.[2] Protein breakdown is greater than protein synthesis after exercise, resulting in a negative balance of protein turnover.[3] Decreased lean muscle mass also occurs naturally during aging, with approximately 1% of total muscle mass lost each year over the age of 30.[4] In older adults, this decrease in muscle mass is associated with decreased muscle strength and function, as well as reduced quality of life.[5]

Pea protein helps build and repair body tissues and provides amino acids that play a role in muscle protein synthesis. Furthermore, when combined with regular resistance training and a healthy, balanced diet, pea protein can help build lean muscle mass. In one pilot study, supplementation with pea protein for eight weeks led to improvements in muscle thickness similar to those produced by the same dose of whey protein.[6] As pea protein is not obtained from common allergenic foods, such as milk, soy, wheat or fish, it is ideal for individuals consuming a restricted diet.[7]

Vitamin D is one of the major nutrients involved in bone health.[8] It plays an essential role in building strong bones and teeth, as it helps in the absorption of calcium, a primary structural component of the skeleton.[8] Vitamin D also helps to stimulate bone mineralization and maturation, while regulating the differentiation of cells present in bone.[8] Furthermore, vitamin D receptors are present on most immune cells, demonstrating its importance in maintaining immune function.[9] Individuals at a particular risk of vitamin D inadequacy include those with little sunlight exposure, the elderly, and dark skinned-individuals (due to reduced ability to synthesize vitamin D from sunlight).[10]

B vitamins play an important role in energy metabolism as cofactors for numerous biochemical reactions in the body.[11] **Vitamin B_{12}** is particularly critical in the metabolism of the amino acid metabolite homocysteine, and has additional roles supporting immune system function and red blood cell formation.[9] As vitamin B_{12} is primarily found in animal and dairy products, individuals consuming plant-based diets may benefit from daily supplementation.[9] Furthermore, adults over 50 may be at an increased risk of low vitamin B_{12} levels due to a decreased ability to digest food-bound B_{12} with age.[10]

Chromium helps the body metabolize glucose by supporting the actions of insulin, which include regulating glucose uptake in cells and promoting its storage as glycogen.[12,13] Chromium can directly bind to insulin, which may help stabilize the hormone and support insulin-mediated cell signalling pathways.[12] It can also bind to insulin via its binding protein, chromodulin, which is produced in the liver and is stored in insulin-sensitive tissues.[14] Upon binding to insulin, chromium helps to increase the number of GLUT4 transporters on cell membranes for glucose transport into cells.[12]

Free radicals may be generated by environmental sources (such as heavy metals, drugs or ultraviolet rays) or formed during normal metabolic reactions, playing important roles in cell signalling and differentiation.[15,16] Under normal cellular conditions, antioxidant protection balances free radical production; however, increases in free radical formation or reduced antioxidant activity can result in oxidative stress.[15] In turn, this can damage lipids, protein and DNA, impairing the integrity of the cell membrane as well as normal cell function.[15] Although the body naturally defends against oxidative stress, these processes can become overwhelmed.[17] In addition, the body's ability to protect against and repair damage due to oxidative stress decreases over time.[18] As such, older individuals may experience particular benefits from increasing their antioxidant intake.[17,18]

Alpha-lipoic acid is an antioxidant compound produced endogenously by mitochondria.[19] It plays an important antioxidant role by directly scavenging reactive oxygen species, chelating metals and regenerating other antioxidants, such as glutathione and vitamins C and E.[20] As it is both water- and lipid-soluble, alpha-lipoic acid can provide unique antioxidant support in areas of the cell not normally accessed by other antioxidants.[20]

Strawberries are known to contain a range of phenolic compounds including flavonols, anthocyanins and ellagitannins.[21] Preclinical research suggests that strawberries help reduce oxidative stress, while promoting the activity of antioxidant enzymes.[22] **Blueberries** are also well-recognized for their antioxidant effects, resulting primarily from their high anthocyanin content.[16,17] Animal research has reported that a diet rich in blueberries provided antioxidant support to the liver by promoting hepatic antioxidant enzyme activity and alleviating chemically induced DNA damage.[23] As they can cross the blood-brain barrier, blueberry anthocyanins may also provide specific support to the brain, an organ especially susceptible to oxidative stress due to its high rate of oxygen consumption.[17,18]

REFERENCES

1. Wolfe, RR. J Int Soc Sports Nutr. 2017; 14: 30.
2. Wilson, JM, Fitschen, PJ, Campbell, B, Wilson, G, Zanchi, N, et al. J Int Soc Sports Nutr. 2013; 10(1): 6.
3. Norton, LE, Layman, DK. J Nutr. 2006; 136(2): 533S-537S.
4. Morley, J, Argiles, J, Evans, W, Bhasin, S, Cella, D, Deutz, N, et al. J Am Med Dir Assoc. 2010; 11: 391-396.
5. Kim, JS, Wilson, J, Lee, SR. J Nutr Biochem. 2010; 21: 1-13.
6. Banaszek, A, Townsend, JR, Bender, D, Vantrease, WC, Marshall, AC, Johnson, KD. Sports (Basel). 2019; 7(1). pii: E12.
7. Krefting, J. J Ren Nutr. 2017; 27 (5): e31-e33.
8. Weichselbaum, E, Buttriss, JL. Nutr Bull. 2014; 39, 9-73.
9. Combs, GF. (2012). The Vitamins (4th ed.). USA: Elsevier.
10. American Dietetic Association. J Am Diet Assoc. 2009; 109: 2073-2085.
11. Panel on Micronutrients, Subcommittees on Upper Reference Levels of Nutrients and of Interpretation and Use of Dietary Reference Intakes and the SC on the SE of DRI. (2001). Washington, DC: National Academies Press.
12. Hua, Y, Clark, S, Ren, J, Sreejayan, N. J Nutr Biochem. 2012; 23(4): 313-319.
13. Newsholme, P, Cruzat, V, Arfuso, F, Keane, K. The Journal of Endocrinology, 221(3): R105-R120.
14. Vincent, JB, Bennett, R. (2007). In JB. Vincent (Ed.), The Nutritional Biochemistry of Chromium (III) (pp. 139-160). Amsterdam, The Netherlands: Elsevier B.V.
15. Zoidis, E, Seremelis, I, Kontopoulos, N, Danezis, GP. Antioxidants (Basel). 2018; 7(5). pii: E66.
16. Peng, C, Wang, X, Chen, J, Jiao, R, Wang, L, et al. Biomed Res Int. 2014; 2014: 831841.
17. Kelly, E, Vyas, P, Weber, JT. Molecules. 2017; 23(1). pii: E26.
18. Shukitt-Hale, B. Gerontology. 2012; 58(6): 518-23.
19. Kouzi SA, Yang S, Nuzum DS, Dirks-Naylor AJ. Frontiers in Bioscience (Elite Ed). 2015; 7: 107-121.
20. Skibska, B, Goraca, A2. Oxid Med Cell Longev. 2015; 2015: 313021.
21. Skrovankova, S, Sumczynski, D, Mlcek, J, Jurikova, T, Sochor, J. Int J Mol Sci. 2015; 16(10): 24673-706.
22. Oviedo-Solís, CI, Cornejo-Manzo, S, Murillo-Ortiz, BO, Guzmán-Barrón, MM, Ramírez-Emiliano, J. Gac Med Mex. 2018; 154(1): 80-86.
23. Ma, L, Sun, Z, Zeng, Y, Luo, M, Yang, J. Int J Mol Sci. 2018; 19(9). pii: E2785.

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