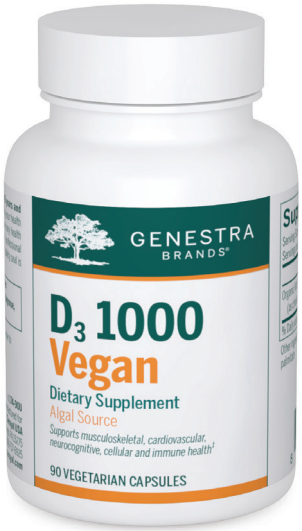
GENESTRA BRANDS®

D_3 1000 Vegan



Vegan-friendly vitamin D_3 (cholecalciferol)

- Produced from a sustainable, non-GMO algal source
- Offers 25 mcg (1,000 IU) of vitamin D_3 per capsule
- Supports the musculoskeletal and cardiovascular systems‡
- Promotes neurocognitive, cellular and immune health‡

D_3 1000 Vegan provides 25 mcg (1,000 IU) of vitamin D_3 (cholecalciferol) per capsule. Numerous studies have concluded that vitamin D_3 is more effective than vitamin D_2 at improving vitamin D status. Where most plant sources provide vitamin D_2, D_3 1000 Vegan provides the preferred form of vitamin D (D_3) produced from a sustainable, non-GMO algal source. The vitamin D receptor is present in nearly all human cells, demonstrating the important role of vitamin D in supporting overall well-being. While it is best recognized for its ability to support bone health, vitamin D also maintains muscle function, healthy heart and blood vessels, immune function (especially in the upper respiratory tract), cognitive health, and mood balance. Despite its importance to many physiological functions, many Americans have inadequate levels of vitamin D. This may result from insufficient sun exposure, indoor living, wearing covering clothes, limited consumption of vitamin D-containing foods, dark skin color, older age, and low intake of vitamin D supplements. With just one convenient capsule daily, this formula supports optimal bone and immune health.‡

SUPPLEMENT FACTS
Serving Size 1 Capsule
Servings per Container 90

	AMOUNT PER SERVING	% DV
Organic Vitamin D_3 (as cholecalciferol from algae)	25 mcg (1,000 IU)	125%

* Daily value (DV)

Other ingredients: Cellulose, hypromellose, ascorbyl palmitate

Recommended Dose
Adults, Adolescents and Children (6 years and older): Take 1 capsule daily with a meal or as recommended by your health professional.

Size
90 Vegetarian Capsules

Product Code
01174-90U

Non GMO · Gluten Free · Dairy Free · Vegan

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‡ These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

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Scientific Rationale:

Vitamin D is a fat-soluble vitamin that is essential for overall well-being.[1] Primarily recognized for its beneficial effects on bone health, vitamin D mediates important biological pathways in more than 50 tissues.[2] It plays a critical role in gene transcription, as its binding to the vitamin D receptor (VDR) – which is present in nearly all human cells – directly or indirectly regulates the activity of approximately 2,000 genes.[3] Many cells, such as those in the colon, prostate and breast, can also locally produce vitamin D, which may help regulate genes related to cell growth and differentiation.[3‡]

As one of the major nutrients involved in bone health, vitamin D plays an essential role in building strong bones.[3] It helps absorb calcium, a primary structural component of the skeleton, and regulates the differentiation of cells present in bone.[1,3] Vitamin D also helps to achieve peak bone mass, which occurs between the ages of 18 and 23 and has a major impact on bone health in later life.[4] Furthermore, vitamin D supports bone health in the elderly, a life stage associated with a greater level of bone resorption than bone formation.[5,6] In a randomized, double-blind trial involving elderly women, daily supplementation with 400 IU of vitamin D for two years significantly increased bone mineral density at the femoral neck.[5] Maintaining bone health in elderly women is especially important, as the rate of bone loss increases at a greater level after menopause, resulting from decreased estrogen production.[3,6] Similarly, a meta-analysis concluded that supplementation with 700-800 IU of vitamin D (alone or with calcium) supported bone strength in older adults.[7‡]

Likewise, clinical studies have reported that vitamin D intake in the elderly supports muscle strength and balance.[9] Preclinical research suggests that vitamin D may contribute to muscle health by indirectly mediating calcium transport in muscle cells, affecting contractility.[9] Vitamin D may also directly influence muscle through the VDR by promoting the production of proteins related to muscle cell growth and differentiation.[9‡]

The heart and blood vessels also express the VDR and 1α-hydroxylase (the enzyme responsible for converting vitamin D into its bioactive form), demonstrating an important connection between the vitamin and the cardiovascular system.[10] Observational studies have reported that adequate vitamin D status is associated with the maintenance of cardiovascular health.[10] Vitamin D may act by regulating parathyroid hormone (PTH) and renin activity, endothelial function, cytokine balance, and calcium movement through the heart.[10‡]

Additionally, most immune cells express the VDR, and vitamin D levels vary depending on the season in a pattern that resembles the seasonal variation in immune system health.[11,12] Preclinical research suggests that vitamin D benefits both the innate and adaptive immune systems by regulating phagocytic activity of macrophages, the production of peptides that help maintain microbial balance, T cell activation, B cell function, cytokine balance and dendritic cell activity.[13-14] In a recent trial involving children, daily supplementation with 1,000 IU of vitamin D for three months significantly increased plasma vitamin D levels and promoted healthy cytokine balance.[15] Specifically, adequate vitamin D status has been associated with proper upper respiratory immune function.[16,17] Two meta-analyses concluded that vitamin D helped maintain respiratory tract immune health, with one analysis reporting greater benefits in participants who consumed vitamin D daily or weekly, rather than large doses at once.[14,18‡]

Both the VDR and 1α-hydroxylase are also expressed in the brain, including in regions responsible for cognition.[2,3] Preclinical research suggests a neuroprotective role of vitamin D in the brain, as it is may contribute to remyelination, calcium homeostasis, and the production of neurotransmitters and neurotrophins (proteins that promote neuron health).[2,3,19] Observational studies have reported that seasonal variations in vitamin D levels may be associated with seasonal mood patterns, and that vitamin D levels may be associated with both mood and cognitive function.[3,20] Likewise, clinical studies have reported that daily supplementation with vitamin D significantly promotes positive mood.[21,22‡]

Despite the importance of vitamin D in the human body, inadequate intakes are common worldwide.[23] Analysis of the 2005-2006 National Health and Nutrition Examination Survey (NHANES) data revealed that nearly 42% of Americans had insufficient levels of vitamin D.[24] Individuals may be vitamin D insufficient due to inadequate sun exposure (related to latitude, sunscreen use or covered clothing), limited consumption of vitamin D-containing foods, low intake of vitamin D supplements, dark skin color, or old age.[23‡]

Vitamin D exists in two different forms: ergocalciferol (vitamin D_2), which occurs in plants, mainly in mushrooms; and cholecalciferol (vitamin D_3), which occurs in animals and certain strains of algae, and is produced in human skin.[27] Although vitamins D_2 and D_3 differ only in their side chains, vitamin D_3 has significantly higher bioavailability and potency then vitamin D_2.[25-27] In fact, vitamin D_3 has been found to be approximately 87% more potent in raising and maintaining serum 25(OH)D concentrations and produces 2- to 3-fold greater storage of vitamin D than does vitamin D_2.[28‡]

D_3 1000 Vegan provides 25 mcg (1,000 IU) of algal-sourced vitamin D_3 (cholecalciferol) per capsule to support adequate vitamin intake for optimal health. It is ideal for those following a vegan lifestyle or anyone 6 years and older who would like the benefit of vitamin D_3 in a plant-sourced supplement.‡

REFERENCES
1. Holick, MF. Curr Drug Targets. 2011; 12(1): 4-18.
2. Dickens, AP, Lang, IA, Langa, KM, Kos, K, Llewellyn, DJ. CNS Drugs. 2011; 25(8): 629-39.
3. Hossein-nezhad, A, Holick, MF. Mayo Clin Proc. 2013; 88(7): 720-55.
4. Saggese, G, Vierucci, F, Boot, AM, Czech-Kowalska, J, Weber, G, et al. Eur J Pediatr. 2015; 174(5): 565-76.
5. Ooms, ME, Roos, JC, Bezemer, PD, van der Vijgh, WJ, Bouter, LM, Lips, P. J Clin Endocrinol Metab 1995; 80(4): 1052-8.
6. Demontiero, O, Vidal, C, Duque, G. Ther Adv Musculoskelet Dis. 2012; 4(2): 61-76.
7. Bischoff-Ferrari, HA, Willett, WC, Wong, JB, Giovannucci, E, Dietrich, T, Dawson-Hughes, B. JAMA. 2005; 293(18): 2257-64.
8. Bischoff-Ferrari, HA. Rev Endocr Metab Disord. 2012; 13(1): 71-7.
9. Ceglia, L. Curr Opin Clin Nutr Metab Care. 2009; 12(6): 628-33.
10. Pilz, S, Tomaschitz, A, März, W, Drechsler, C, Ritz, E, et al. Clin Endocrinol (Oxf). 2011; 75(5): 575-84.
11. Aranow, C. J Investig Med. 2011; 59(6): 881–886.
12. Prietl, B, Treiber, G, Pieber, TR, Amrein, K. Nutrients. 2013; 5: 2502-2521.
13. Kamen, DL, Tangpricha, V. J Mol Med(Berl). 2010 May; j88(5): 441-450.
14. Charan, J, Goyal, JP, Saxena, D, Yadav, P.J Pharmacol Pharmacother. 2012; 3(4): 300-303.
15. Di Filippo P, Scaparrotta A, Rapino D, Cingolani A, Attanasi M, Petrosino MI et al. Int Arch Allergy Immunol. 2015; 166: 91-96.
16. Bryson KJ, Nash AA, and Norval M. Epidemiol. Infect. 2014; 2(9): 1789-1801.
17. Sabetta J, DePetrillo P, Cipriani R, Smardin J, Burns A, and Landry M. PLoS One. 2010; 5(6): e11088.
18. Martineau, AR, Joliffe, DA, Hooper, RL, Greenberg, L, Aloia, JF, et al. BMJ. 2017; 356: i6583.
19. Etgen, T, Sander, D, Bickel, H, Sander, K, Förstl, H. Dement Geriatr Cogn Disord. 2012; 35(5): 297-305.
20. Wilkins, CH, Sheline, Y, Roe, CM, Birge, SJ, Morris, JC. Am J Geriatr Psychiatry. 2006; 14(12): 1032-40.
21. Vieth, R, Kimball, S, Hu, A, Walfish, PG. Nutr J. 2004; 3-8.
22. Lansdowne, AT, Provost, SC. Psychopharmacology (Berl). 1998; 135(4): 319-23.
23. van Schoor, NM, Lips P. Best Pract Res Clin Endocrinol Metab. 2011; 25(4): 671-80.
24. Parva, NR, Tadepalli, S, Singh, P, Qian, A, Joshi, R, et al. Cureus. 2018; 10(6): e2741.
25. Lehmann, U, Hirche, F, Stangle, GI, Hinz, K, Westphal, S et al. J Clin Endocrinol Metab. 2013, 98: 4339-4345.
26. Tripkovic, L, Wilson, LR, Hart, K, Johnsen, S, de Lusignam, S, et al. Am J Clin Nutr 2017; 106:481–90.
27. Tripkovic, L, Lambert, H, Hart, K, Smith, CP, Bucca, G, et al. Am J Clin Nutr 2012; 95:1357–64.
28. Heaney, RP, Recker, RR, Grote, J, Horst, RL, and Armas AG et al. J Clin Endocrinol Metab. 2011 96: E447–E452.

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