

H/H

Supplement FactsServing Size 1 Capsule
Servings Per Container 60

1 capsule contains	Amount Per Serving	% Daily Value
Vitamin D3 (as Cholecalciferol)	125 mcg (5,000 IU)	625%
Vitamin K2 (as Menaquinone-7 (MK-7))	180 mcg	150%

Other Ingredients: Natural Vegetable Capsules, Microcrystalline Cellulose, Magnesium Stearate, Silicon Dioxide, Stearic Acid, and Turmeric Root Extract. MenaQ7[®] is a registered trademark of NattoPharma, Norway.

WARNING: All forms of Vitamin K may interact with blood thinning medications. If you are taking such medicines please consult with your physician before taking this product.

† This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

SUGGESTED USE: 1 capsule per day or as recommended by your health care professional. Formulated to be free of allergens derived from: Gluten, yeast, artificial colors, and flavors. Do not consume this product if you are pregnant or nursing. Consult your physician for further information. As with all dietary supplements, some individuals may not tolerate or may be allergic to the ingredients used. Please read the ingredient panel carefully prior to ingestion. Cease taking this product and consult your physician if you have negative reactions upon ingestion. KEEP CONTAINER TIGHTLY CLOSED. STORE AT ROOM TEMPERATURE. KEEP OUT OF REACH OF CHILDREN. This product was sealed for your protection. Do not use if outer logoed neck seal or inner-seal is missing or damaged. 135.003E

Label ID L-HAU240-135060-B
Product #135060



Distributed by:
Hauser Health
4802 Old National Pike
Frederick, MD 21702

H

enforced

Boost immunity while supporting cardiovascular
and bone health with vitamins D3 and K2.†

DIETARY SUPPLEMENT
60 CAPSULES



Supports Healthy Blood Circulation

**Promotes Optimal Bone Health and Proper Calcium Storage*

Supports Cardiovascular Health and Arterial Elasticity

**Boosts Immune Function*

ESSENTIAL VITAMINS

Emerging research highlights the importance of optimal intake of vitamin K and its critical role in maintaining bone and cardiovascular health. Composed of a group of naturally occurring and structurally similar, fat-soluble vitamins, vitamin K is required for the proper utilization of calcium and helps to bind newly absorbed calcium to the bone matrix. Vitamin K helps maintain bone mineral density by decreasing the activity of osteoclasts, cells which break down bone.¹ It also provides critical cardiovascular protection by activating matrix Gla protein (MGP), a potent inhibitor of circulatory calcification.^{2,3} Along with vitamin D, another key nutrient required for overall wellness, these two nutrients act in synergy to support and maintain bone and cardiovascular health. Current research has found high concentration supplementation, at 180 µg/day, results in improved clinical results compared to lower-dose supplementation.⁴ enforcedD provides 180 mcg of soy-free vitamin K2 delivered in the MK-7 form, along with 5,000 IU of vitamin D3 for optimal support of bone and cardiovascular health.

Overview

Calcium and vitamin D are important mediators in bone growth, but vitamin K plays an equally important role. The synthesis of bone growth is dependent on vitamin K, through its carboxylation of osteocalcin, a protein secreted by osteoblasts.⁵ Osteocalcin guides calcium into bones and prevents its absorption into organs, joint spaces and arteries. Vitamin K occurs in three main forms: K1 (phylloquinone), found primarily in the liver, naturally occurs in green leafy vegetables and is considered to be the main dietary source;⁶ K2 (menaquinone), which is a group name for a family of related compounds differentiated by their side chains;⁷ and K3

(menadione), which does not have vitamin K activity.⁸ MK-4 and MK-7 are the two subclasses of K2 most widely studied for their role in bone and cardiovascular health. MK-4 is primarily a metabolic byproduct of K1 while MK-7 is found in small quantities in liver mitochondria and other tissues.⁷ The MK-7 form is substantially more active, has a longer half-life and accumulates to higher concentrations in serum than vitamin K1.^{4,9} The different degrees of bioavailability between K1 and K2 are due to differences in structure. The long side-chain of vitamin K2 (specifically MK-7) allows it to bind with fat particles in circulation. This process then allows easier facilitation to soft tissue, bones and arteries. More recently, research has shown that doses of 180 mcg of MK-7 provide greater results when supporting both bone and cardiovascular health.⁴

Vitamin K Depletion†

Although most people consume adequate dietary levels/ amounts of vitamin K to maintain sufficient blood clotting, most do not consume enough MK-7 to meet cardiovascular and bone health needs. Compromised intestinal absorption can also lead to insufficient K2 levels leaving calcium available to be exported out of bone and into other tissues. Other medications such as antibiotics, cholesterol-lowering medications and laxatives have also been found to contribute to a deficiency of vitamin K.^{10,11}

Bone Health†

Supplementation of K2 has repeatedly been shown to help maintain bone density and strength among women.¹² Research from Japanese populations has found superior bone health among women who more frequently consumed MK-7-rich nattō than those who did not.¹³ The positive effect of K2

† 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.

on bone health is also evident among healthy children, among whom modest supplementation with MK-7 has been shown to increase osteocalcin carboxylation.⁹ In a randomized, placebo-controlled trial, 180 mcg of MK-7 or placebo were given to 244 healthy post-menopausal women over the course of three years. After at least two years, statistically significant benefits were seen in vertebrae, hip and femoral neck.¹⁴ Another ground-breaking randomized, placebo-controlled trial gave 244 women, aged 55-65, 180 mcg of vitamin K2 or placebo. The study found that those given the K2 were significantly better able to maintain their osteoclast to osteoblast ratio. Furthermore, levels of circulating osteocalcin, a marker related to tissue calcification in the body, were reduced by 50% among women taking K2 versus a 4% increase among the placebo group after two and three years.⁴

Cardiovascular Health and Blood Sugar Balance[†]

Vitamin K also plays a key role in supporting the cardiovascular system and healthy blood sugar balance. In a large population study, those who consumed high amounts of K2 had significantly improved cardiovascular markers compared to those given vitamin K1.¹⁵ A cohort of over 16,000 women also linked higher intake of K2 with better maintenance of cardiovascular health.¹⁶ Studies have also shown vitamin K to support healthy blood sugar metabolism.^{17,18} Doses of 180 mcg of K2 have been shown to have a positive effect on arterial and vascular elasticity. Additionally, 180 mcg of K2 given over two to three years has been shown to help maintain soft tissue health and vascular elasticity in healthy adult subjects.¹⁹ The same amount of MK-7 was also found to impart substantial benefits in arterial plasticity and blood vessel elasticity in healthy women, which had previously been only with “pharmacological doses” of synthetic vitamin K of up to 4,500 mcg daily.¹⁴

Triage Theory

The Triage Theory states that in the face of nutrient inadequacies, nature ensures short term survival of a cell is protected at the expense of long term consequences.^{20,21} Vitamin K is an excellent example of this theory. Hypothetically, a short term deficiency in vitamin K would lead to a reduction in blood clotting. This direct threat to survival does not happen, as the body uses its metabolic reserve of vitamin K to ensure immediate needs are met. If continued, this dip into reserve leads to a long-term deficiency in vitamin K. Though not directly threatening immediate survival, long-term deficiencies are linked to bone fragility, arterial calcification and genomic instability. These issues are related to a loss of vitamin K-dependent proteins not required for short-term survival, nevertheless presenting long-term health challenges.²⁰

Directions

1 capsule per day or as recommended by your health care professional.

Does Not Contain

Gluten, yeast, soy, artificial colors and flavors

Cautions

Do not consume this product if you are pregnant or nursing. All forms of vitamin K may interact with blood thinning medications. If you are taking such medicines please consult your physician before taking this product.

Supplement Facts ^{v1}		
Serving Size 1 Capsule		
Servings Per Container 60		
1 capsule contains	Amount Per Serving	% Daily Value
Vitamin D3 (as Cholecalciferol)	5,000 IU	1,250%
Vitamin K2 (as Menaquinone-7 (MK7))	180 mcg	225%

[†] 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.

References

1. Weber P. Management of osteoporosis: is there a role for vitamin K? *Int J Vitam Nutr Res* 1997;67(5):350-6.
2. Geleijnse JM, et al. Dietary intake of menaquinone is associated with a reduced risk of coronary heart disease: the Rotterdam Study. *J Nutr* 2004;134(11):3100-5.
3. Beulens JW, High dietary menaquinone intake is associated with reduced coronary calcification. *Atherosclerosis* 2009;203(2):489-93. Epub 2008 Jul 19.
4. Kidd PM. Vitamins D and K as pleiotropic nutrients: clinical importance to the skeletal and cardiovascular systems and preliminary evidence for synergy. *Altern Med Rev* 2010;15(3):199-222.
5. Plaza SM, Lamson DW. Vitamin K2 in bone metabolism and osteoporosis. *Altern Med Rev* 2005;10(1):24-35.
6. Schurgers LJ, Teunissen KJ, Hamulyák K, Knapen MH, Vik H, Vermeer C. Vitamin K-containing dietary supplements: comparison of synthetic vitamin K1 and natto-derived menaquinone. *Blood* 2007;109(8):3279-83. Epub 2006 Dec 7. -7.
7. Shearer MJ. Vitamin K metabolism and nutriture. *Blood Rev* 1992;6(2):92-104.
8. Unpublished clinical studies, NattoPharma. On file.
9. <http://umm.edu/health/medical/altmed/supplementdepletion-links/drugs-that-deplete-vitamin-k>
10. Knapen MH, Schurgers LJ, Vermeer C. Vitamin K2 supplementation improves hip bone geometry and bone strength indices in postmenopausal women. *Osteoporos Int*. 2007 Jul;18(7):963-72. Epub 2007 Feb 8.
11. Kaneki M, Hodges SJ, Hosoi T, Fujiwara S, Lyons A, Crean SJ, Ishida N, Nakagawa M, Takechi M, Sano Y, Mizuno Y, Hoshino S, Miyao M, Inoue S, Horiki K, Shiraki M, Ouchi Y, Orimo H. Japanese fermented soybean food as the major determinant of the large geographic difference in circulating levels of vitamin K2: possible implications for hip-fracture risk. *Nutrition* 2001; 17(4):315-21.
12. Van Summeren MJ, Braam LA, Lilien MR, Schurgers LJ, Kuis W, Vermeer C. The effect of menaquinone-7 (vitamin K2) supplementation on osteocalcin carboxylation in healthy prepubertal children. *Br J Nutr*. 2009 Oct;102(8):1171-8. Epub 2009 May 19.
13. Ushiroyama T, Ikeda A, Ueki M. Effect of continuous combined therapy with vitamin K(2) and vitamin D(3) on bone mineral density and coagulofibrinolysis function in postmenopausal women. *Maturitas* 2002; 41(3):211-21.
14. Knapen MH, Drummen NE, Smit E, Vermeer C, Theuwissen E. Three-year low-dose menaquinone-7 supplementation helps decrease bone loss in healthy postmenopausal women. *Osteoporos Int*. 2013 Sep;24(9):2499-507.
15. Geleijnse JM, Vermeer C, Grobbee DE, Schurgers LJ, Knapen MH, van der Meer IM, Hofman A, Witteman JC. Dietary intake of menaquinone is associated with a reduced risk of coronary heart disease: the Rotterdam Study. *J Nutr* 2004; 134(11):3100-5.
16. Gast GC, de Roos NM, Sluijs I, Bots ML, Beulens JW, Geleijnse JM, Witteman JC, Grobbee DE, Peeters PH, van der Schouw YT. A high menaquinone intake reduces the incidence of coronary heart disease. *Nutr Metab Cardiovasc Dis*. 2009 Sep;19(7):504-10. Epub 2009 Jan 28.
17. Beulens JW, van der A DL, Grobbee DE, Sluijs I, Spijkerman AM, van der Schouw YT. Dietary phyloquinone and menaquinones intakes and risk of type 2 diabetes. *Diabetes Care* 2010; 33(8):1699-705.
18. Choi HJ, Yu J, Choi H, An JH, Kim SW, Park KS, Jang HC, Kim SY, Shin CS. Vitamin K2 supplementation improves insulin sensitivity via osteocalcin metabolism: a placebo-controlled trial. *Diabetes Care* 2011; 34(9):e147.
19. Theuwissen E, Smit E, Vermeer C. The role of vitamin K in soft-tissue calcification. *Adv Nutr*. 2012 Mar 1;3(2):166-73.
20. Shea MK, Booth SL, Massaro JM, Jacques PF, D'Agostino RB Sr, Dawson-Hughes B, Ordovas JM, O'Donnell CJ, Kathiresan S, Keaney JF Jr, Vasan RS, Benjamin EJ. Vitamin K and vitamin D status: associations with inflammatory markers in the Framingham Offspring Study. *Am J Epidemiol* 2008; 167(3):313-20.
21. Iijima H, Shinzaki S, Takehara T. The importance of vitamins D and K for the bone health and immune function in inflammatory bowel disease. *Curr Opin Clin Nutr Metab Care* 2012; 15(6):635-40.