D3K2 Capsules

Natural Vitamins D3 and K2

Biogenetix
Nutrition Uncompromised

PRODUCT BENEFITS*

- **Supports Bone Health by Promoting Carboxylation of Bone Proteins***
- **Supports Cardiovascular Health by Affecting Arterial Calcium Deposits***
- **Supports Healthy Blood Clotting***

Naturally occurring vitamin K is found as either K1 (phylloquinone), which is derived from food sources such as green leafy vegetables, or K2 (menaquinones). Menaquinones are designated as MK-n, where n denotes the length of the molecule's aliphatic side chain. Menaquinones are synthesized by bacteria and can be obtained from animal-based and fermented foods. Structural differences between K1 and K2 impact their bioavailability and bioactivity. Furthermore, among menaquinones, menaquinone-7 (MK-7), with its longer side chain, is very hydrophobic. Compared to K1, MK-7's physiochemical properties make it highly transportable by plasma lipoproteins, increase its extrahepatic (bones, arteries, etc.) availability, and produce its long half-life.[1-3]

Absorption of K1 from food can be limited due to its membrane-bound nature and the individual consumer's digestive and absorptive variability. Moreover, adequate consumption of foods high in K2 can be challenging. Therefore, dietary supplementation is an important option. In addition, research suggests that higher levels of menaquinones are needed than were previously thought. Supplementary vitamin K can be found in three forms: synthetic K1; MK-4, which is structurally similar to K1; and natural, long-chain MK-7. Biogenetix provides MK-7 as Vitamk7®, a naturally derived and solvent-free vitamin K2 that has been obtained through a patent-granted biofermentation process of Bacillus subtilis natto cultures.*

MK-7 Bioavailability Increases Extrahepatic Tissue Utilization

Schurgers et al conducted human studies to compare the in vivo properties of orally administered K1 and MK-7. The results supported better bioavailability and utilization of MK-7. Expressed as AUC , MK-7 demonstrated a six-fold better 96 half-life, a seven- to eight-fold higher dose-response level, and a three times higher carboxylated to uncarboxylated osteocalcin ratio (cOC:ucOC[t]). Furthermore, on a molar basis, MK-7 is a three-to-four times more potent antidote for oral anticoagulation than is K1. Researchers note that, aside from sensitive individuals, "MK-7 supplements containing more than 50 mcg/d may interfere with oral anticoagulant treatment, whereas doses of at least 50 mcg are not likely to affect the INR value in a relevant way."[2] Nonetheless, practitioners should closely monitor patients taking anticoagulants.*

While studies on the absorption and bioavailability of MK-4 at nutritional levels (i.e., doses of 500 mcg/d or lower) suggest less efficacy compared to longer-chain menaquinones at similar doses,[4] this remains subject to debate. It is possible that rapid uptake of MK-4 could account for its observed lack of detection in serum after oral administration,[5] but more studies are needed for clarification.*

KEY INGREDIENTS

Vitamin K2 is provided as menaquinone-7 (MK-7), a highly bioavailable and bioactive form of K2.

Vitamin D3 (cholecalciferol), the identical form in which vitamin D is derived in the body from cholesterol and synthesized by sunlight on the skin. Historical use and numerous studies have demonstrated the efficacy of vitamin K supplements for bone and cardiovascular health.*

SUPPLEMENT FACTS

Serving size: 1 Capsule Servings per container: 60	Amount Per Serving	% Daily Value
Vitamin D3 (cholecalciferol)	125 mcg (5000 IU)	625%
Vitamin K2 (as menaquinone-7)	90 mcg	**

** Daily Value Not Established

VEGETARIAN CAPS

Other Ingredients: Capsule (hypromellose and water), microcrystalline cellulose, ascorbyl palmitate, and silica.
DOES NOT CONTAIN: Wheat, gluten, yeast, soy protein, dairy products, fish, shellfish, peanuts, tree nuts, egg, ingredients derived from genetically modified organisms (GMOs), artificial colors, artificial sweeteners, and artificial preservatives.

Bone Benefits

Among the dietary factors critical to bone health, vitamin K has emerged as a key player. Vitamin K is believed to be necessary for bone mineralization. Through carboxylation, vitamin K activates osteocalcin, the protein needed to bind calcium to the mineral matrix in bone.[6] Several studies have demonstrated the efficacy of MK-7 (e.g., doses of 45-90 mcg/d) to increase osteocalcin carboxylation and to increase the cOC:ucOC ratio. A high cOC:ucOC ratio is associated with bone health.[1,2,4] A recent in vitro study also showed an osteogenic effect of MK-7 administration on human mesenchymal cell differentiation.[6] In addition, the vitamin may protect bone integrity by reducing the synthesis of prostaglandin E2 or interleukin-6 by osteoclasts.[7] Animal and human studies have demonstrated a significant beneficial effect of MK-7 supplementation on bone health.[8-10] Vitamin K and vitamin D share some similar characteristics and are believed to act synergistically.*[11]

*To be provided by health care professionals only. The dosage recommendations are only for your health care provider's consideration. Please consult your health care provider for your individual dosing instructions. This product is for nutritional purposes only. It is not designed to diagnose, treat, reverse, cure, or prevent any disease. This product is not intended to replace or delay the use of prescription medication. These statements have not been evaluated by the FDA. All rights reserved © Biogenetix, LLC

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Cardiovascular and Other Health Benefits

Vitamin K benefits cardiovascular health by participating in the carboxylation of matrix GLA protein (MGP), a protein regarded to be the most potent inhibitor of arterial calcification. Researchers have demonstrated that supplementation with vitamin K reduces arterial calcium deposits[1,3,12] and that long-term intake of long-chain menaquinones is inversely correlated with calcium accumulation in arteries.*[5]

Vitamin K has specific receptor binding sites that allow it to regulate gene activity.[13] Besides its gene-mediating effects upon critical proteins, the vitamin can also bind with the steroid and xenobiotic receptors and influence their expression.[14] In addition, vitamin K also demonstrates antioxidant activity[15]; reduces levels of certain markers, such as acute phase reactants (e.g., C-reactive protein)[16]; and participates in the induction of apoptosis.*[17]

Vitamin D (as D3)

Although vitamin D3 (cholecalciferol) is made in the skin when 7-dehydrocholesterol reacts with sunlight, many things affect the degree to which this biosynthesis occurs, including time of day, seasons, location, smog/ pollution, clothing, shade of skin (darker skin requires more sun), and sunscreen use. Low-cholesterol diets and certain cholesterol therapies can also affect vitamin D formation. By some estimates, one billion people worldwide have vitamin D deficiency or insufficiency.[18] The body needs vitamin D to absorb calcium, and the importance of vitamin D in skeletal health and bone density is well-established. Without adequate absorption, the body must take calcium from its stores in the skeleton, which weakens existing bone and prevents the formation of strong, new bone. Researchers suggest that vitamin D supplementation may decrease bone turnover and increase bone mineral density.[19] A pooled analysis evaluating 11 randomized, double-blind, placebo-controlled trials supported this analysis. It concluded that vitamin D supplementation (> 800 IU daily) was favorable in maintaining hip and nonvertebral bone integrity in individuals aged 65 and older.*[20]

Although D2 and D3 are similar biochemically, one study demonstrated D3 to be approximately 87% more potent in raising and maintaining serum calcidiol (the body's storage form) concentrations and in producing two- to threefold greater storage of vitamin D than did equimolar D2.*[21]

†The cOC:ucOC ratio can be used as a determinant of vitamin K status.

DIRECTIONS FOR USE

Swallow one capsule daily with water, preferably at mealtime, or as directed by your healthcare professional.

Consult your healthcare professional prior to use. Individuals taking medication should discuss potential interactions with their healthcare professional. Consider total vitamin K intake (food + supplements) if you are taking blood-thinning medication. Do not use if tamper seal is damaged.

STORAGE

Keep closed in a cool, dry place out of reach of children.

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