

MQ-7



Natural Source of Highly Bioavailable Vitamin K2 | VA-045

Key Features:

- MK-7 is a natural, highly bioavailable and bioactive vegetable source of vitamin K2
- Effective dosage of only 45 mcg per day for osteoporosis prevention
- Higher Bioavailability, due to the Longer Serum Half Life (72-96 hours) compared to that of MK-4 (6-8 hours).
- Use of vitamin K2, not K1, shown to provide cardiovascular benefits
- Less risk of negative interaction with blood-thinning medication

Indication:

- Aids in the maintenance of bone health and prevention of osteoporosis.
- Supports cardiovascular health by reducing arterial calcification.
- Helps to prevent and treat late-onset hemorrhagic disease of the newborn.

Description:

Vitamin K denotes a group of fat-soluble vitamins that are essential for the post-translational modification of certain proteins, mostly required for blood coagulation. For the past few years however, a growing body of new research has been uncovering the underlying importance of vitamin K in bone and cardiovascular health.

Types of K Vitamins

There are 3 types of K vitamins: K₁ (phylloquinone), K₂ (menaquinone), and K₃ (menadione). K₁ is the major dietary form of vitamin K that is mostly obtained from plants. K₂ (menaquinone) is either synthetic or bi-product of bacteria in dairy or other fermented products.

K₃ is generally not used as a nutritional supplement. K₃ supplements have been banned by the FDA due to its high toxicity that can cause adverse outcomes including hemolytic anemia due to G6PD deficiency, neonatal brain or liver damage, or neonatal death in some cases.

Vitamin K Absorption

Although most K vitamins obtained from diet are in the form of K₁ (85-90%), only 10% of K₁ is absorbed by the body, and approximately 50% of the K vitamins in the body are present as K₁.

Quantity: 84 Vegetarian Capsules

Ingredients (per capsule):

Vitamin K2 (menaquinone-7).....120 mcg
Vitamin E (from d-a-tocopheryl acetate) (2.7 mg ATE).....2 IU

Non-medicinal Ingredients: Microcrystalline cellulose, silicon dioxide, L-Leucine, pullulan/ hypromellose (capsule)

Suggested Use:

Adults - take 1 capsule daily or as directed by a health care practitioner.

On the other hand, K₂ vitamins comprise merely 10-15% in our total dietary K intake, but they account for the other 50% of the total vitamin K absorbed by the body due to its higher bioavailability and bioactivity.⁶

Different Pharmacokinetic Behaviours of K Vitamins

Studies have shown that K₁ is mainly taken up by liver, whereas K₂ has a more widespread distribution pattern and preferentially taken up by extra-hepatic tissues including kidney, pancreas, and bones.⁶ This difference suggests that K₂ is transported more efficiently than K₁ to the bone and other targeted tissues.

MK-4 vs MK-7

K2 can be sub-divided into short chain group, commonly in the form of menatetrenones (MK-4), and long chain group such as menaquinones (MK-7). MK-7 is largely present in fermented products, such as cheese and natto, while MK-4 is mostly synthetic.

The current Dietary Recommended Intake (DRI) of vitamin K is 30-120 mcg/day due to the fact that larger doses of K vitamins are known to influence blood coagulating and interact negatively with persons on blood-thinning medications like warfarin.² Yet there are numerous clinical trials utilizing 15-45 mg/day of MK-4 to post-menopausal patients for prevention of bone fracture.³

Since MK-7 has a longer serum



half life (72-96 hours) while MK-4 is either quickly excreted by the body or transported to various tissues (less than 8 hours),⁴ doses of 45-100 mcg/d of MK-7 have been shown efficacious in the maintenance of bone health for children and adults.⁵ In short, MK-7 is about 300-450 times more effective than MK-4 in terms of therapeutic dosages.

MK-7, with its long serum half life, is able to accumulate in bone to meet DRI levels that may only be reached with much higher doses of either K₁ or MK-4. Such difference suggests that MK-7 may be the most bioavailable form of K vitamin supplements and that MK-7 has a much lower risk of interacting with blood coagulation and anticoagulation.

Bone Health

Vitamin K works by aiding in the formation of osteocalcin, a calcified tissue protein containing γ2-carboxyglutamic acids, and calcium-binding **Matrix-Gla-Protein (MGP)**, which is important in calcium transportation and utilization to prevent bone loss and increase bone mineral density (BMD).⁴ Activation at Gla-residues of these proteins via carboxylation depends on the bioavailability of vitamin K.

Cardiovascular Health

Our body fluids and tissues contain calcium and phosphate in concentrations far above saturation. The vitamin K dependent, calcium-binding proteins have been shown to inhibit vascular calcification. The prevention of calcification is an active and continuing process in which several different proteins, such as Matrix-Gla-Protein (MGP), are involved.

MGP is the strongest and the most abundant inhibitor of soft tissue calcification in the tissues; it is a vitamin K-dependent protein containing five Gla-residues, implying that uncarboxylated MGP is associated with arterial calcification. Vitamin K-insufficiency of the vessel wall is a severe and independent risk factor for cardiovascular disease.

A study has shown that no uncarboxylated MGP was detected in the healthy arteries; whereas, in areas around calcium salt precipitates, MGP expression was strongly promoted and the majority of MGP were uncarboxylated.⁶

Among different types of vitamin K's, menaquinone (MK-7) of vitamin K₂, according to studies, is the most associated with the reduced risk of arterial calcification and coronary heart disease while vitamin K₁ intake does not show similar

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significant relation to the same outcome.⁷

Such results may be due to the fact that vitamin K₁ upon being absorbed is quickly transported to the hepatic tissues. It is postulated that large amount of K₁ is converted to K2 (mainly in the form of menatetrenones) in the liver.⁸ On the other hand, MK-7 (natural source of vitamin K₂) will stay in the bloodstream or other extra-hepatic tissues. MK-7 has been shown to have a serum half-life as long as 72-96 hours, and for this reason, the decalcification process on the vessel wall can be more active and consistent with MK-7 supplementation.⁶

Reference:

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Caution: Consult a health care practitioner prior to use if you are taking blood thinners.