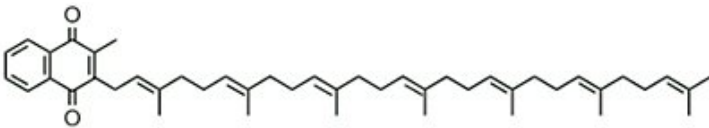


## MK-7 Vitamin K<sub>2</sub>

### TECHNICAL SUMMARY

Vitamin K is well known for its role in blood clotting, but it has also been found to play an important role in normal bone formation and the preservation of bone strength.\* Vitamin K<sub>2</sub> is more specifically a significant regulator of tissue calcification and is critical for the maintenance of arterial elasticity and cardiovascular health.\* Vitamin K<sub>2</sub> includes two of the most studied subtypes, MK-7 (Menaquinone-7) and MK-4 (Menatetrenone). MK-7, the most readily absorbed and bioactive form of K<sub>2</sub>, has no common dietary sources.\* Unlike vitamin K<sub>1</sub>, which is stored in the liver, MK-7 is transported directly to tissues and has a longer half-life than either K<sub>1</sub> or MK-4.\*

#### Structure Formula:



**Chemical Name:** 2-methyl-3-farnesylgeranylgeranyl-1,4-naphthoquinone (menaquinone-7; MK-7)

**Allergen and Additive Disclosure:** Not manufactured with wheat, gluten, soy, milk, egg, fish, shellfish, or tree nut ingredients. Produced in a GMP facility that processes other ingredients containing these allergens.

**Delivery Form:** Tablet

### ROLE AS NUTRIENT/FUNCTION

Vitamin K<sub>2</sub> is a generic term for a group of molecules of different sizes. This product has menaquinone-7, a purified form of vitamin K<sub>2</sub> with unique biological properties. Vitamin K is essential for the proper function (gamma-carboxylation of glutamyl amino acid residues) of GLA proteins in the body, including proteins involved in extracellular matrix mineralization such as osteocalcin in bones, and other matrix GLA proteins (MGP) found in cartilage and artery walls.\* Clinical data suggest, for example, that MK-7 supplementation is able to induce prolonged carboxylation of osteocalcin and MGP in the blood.\*

### NATUROKINETICS®

**Liberation:** Disintegration of the tablet is measured in water using a USP testing method with disintegration between zero to 60 minutes.

**Absorption:** Vitamin K<sub>2</sub> is a fat soluble vitamin. Following oral ingestion, MK-7 is rapidly and well absorbed in the intestine and enters blood circulation via the lymphatic system as part of the chylomicron fraction of plasma. Vitamin K<sub>2</sub> is most efficiently absorbed when consumed with foods containing fat. (Figure 1)

**Distribution:** MK-7 has a very long half-life. After oral ingestion it can be detected in the plasma for more than 48 hours and up to 92 hours. MK-7's distribution in tissues has not been yet fully elucidated; however, it is known to be present in the liver, pancreas, heart, and bone lipids.

## Supplement Facts

Serving Size 1 Tablet

### Amount Per Serving

Vitamin K <sub>2</sub> (as Menaquinone-7) (MK-7) (MenaQ7®) (from chickpea)	160 mcg**
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\*\* Daily Value not established.

Other ingredients: Microcrystalline Cellulose, Stearic Acid (vegetable source) and Silicon Dioxide.

- Supports Bone Health\*
- Supports Vascular Elasticity\*

SUGGESTED USAGE: Take 1 tablet 1 to 2 times daily.

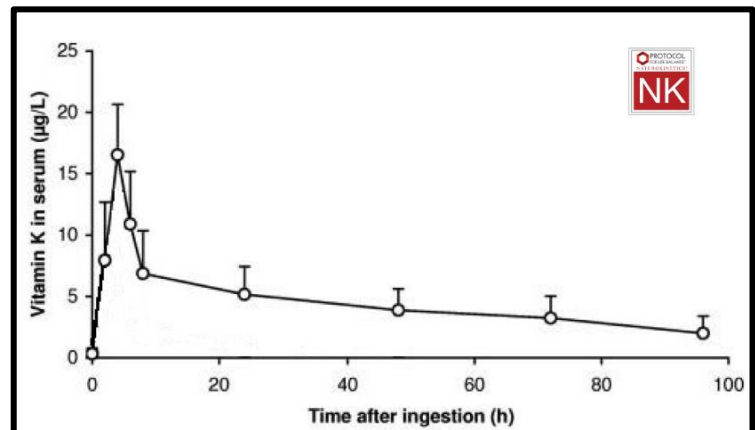


Figure 1: Circulating vitamin K concentrations following a single oral dose of 1 mg MK-7. Baseline level <0.05 mcg/L was subtracted from all values.

**Metabolism:** In the bloodstream, chylomicrons carrying vitamin K are metabolized into chylomicron remnants which are cleared by the liver. MK-7 metabolism in the liver is only partially known, it is most likely degraded through omega- and beta-oxidation and the obtained metabolites are then conjugated with glucuronic acid.

**Elimination:** The products of MK-7 metabolism are excreted in the bile and urine.

### CLINICAL VALIDATION

- **Bone health support.\*** In a prospective double-blind placebo-controlled clinical trial with 244 healthy postmenopausal women, MK-7 supplementation (180 mcg/d or placebo for 3 years) resulted in a significantly improved vitamin K status and it decreased the age-related decline bone mass density (BMD) and bone mineral content (BMC).\* (figure 2)

\*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.

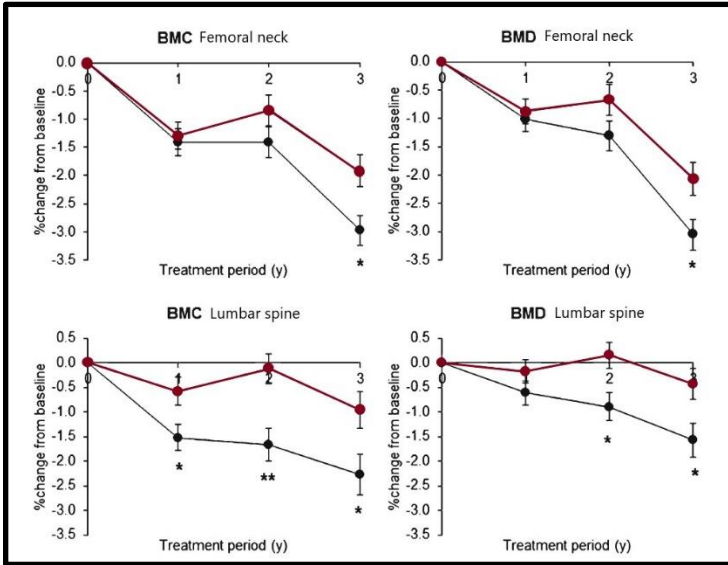


Figure 2: Effect of MK-7 (red line) on BMC and BMD of the femoral neck and lumbar spine over 3 years of supplementation in healthy postmenopausal women.

- Cardiovascular support.\*** In a prospective double-blind placebo-controlled clinical trial with 244 healthy postmenopausal women, MK-7 supplementation (180 mcg/d or placebo for 3 years) resulted in a significant improvement in a marker of arterial stiffness.\* (figure 3)

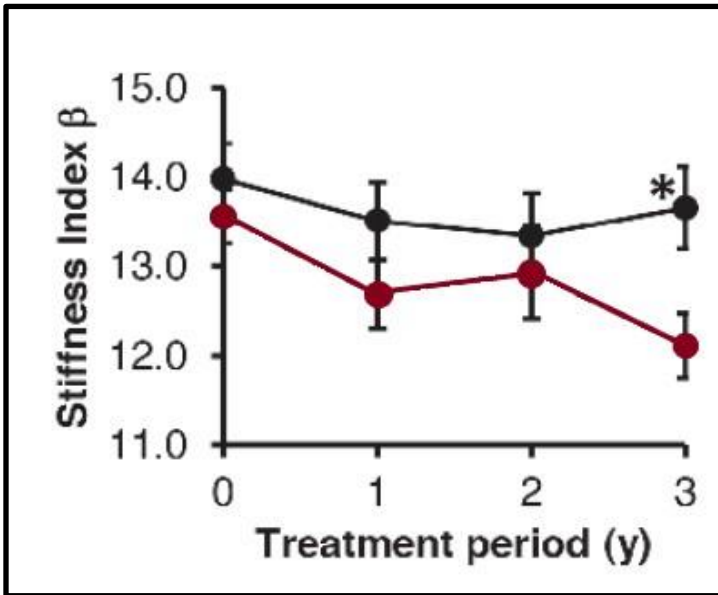


Figure 3: Effect of Mk-7 (red line) of artery stiffness index over 3 years of supplementation in healthy postmenopausal women.

### SAFETY INFORMATION

**Tolerability:** MK-7 is well tolerated when used as directed. Occasional gastrointestinal complaints may occur.

**Contraindications:** Individuals receiving vitamin K antagonists (VKA).

### INTERACTIONS

**Drug Interactions:** Possible interactions with cardiac glycosides, atorvastatin, thiazide diuretics, and anti-coagulant medication.

**Supplement Interactions:** CoQ<sub>10</sub> and vitamin K<sub>2</sub> have similar chemical structures, concomitant use may theoretically have an additive effect.

**Interaction with Lab Tests:** Osteocalcin blood levels can be increased by vitamin K<sub>2</sub> supplementation.

### STORAGE

Store in a cool, dry place in original sealed container.