

D3 10,000 + K~K2D3



Therapeutic Solutions

Clinical Applications

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

*K2 Supreme, K2 Vitamin D3, and K2 Vitamin D3 5000 provide vitamin K2 as menaquinone-7 (MK-7), a highly bioavailable and bioactive form of K2. Historical use and numerous studies have demonstrated the efficacy of vitamin K supplements for bone and cardiovascular health.**

All Optimum Therapeutic Solutions Formulas Meet or Exceed cGMP Quality Standards

Discussion

Naturally occurring vitamin K is found as either K1 (phyloquinone), 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. Optimum Therapeutic Solutions 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_{0-6h}, MK-7 demonstrated a six-fold better half-life, a seven- to eight-fold higher dose-response level, and a three times higher carboxylated to uncarboxylated osteocalcin ratio (cOC:ucOC[†]). 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.*

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]

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]

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

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K2 Vitamin D3

Supplement Facts

Serving Size: 1 Capsule
Servings Per Container: 60

	Amount Per Serving	%Daily Value
Vitamin D3 (cholecalciferol)	10,000 IU	2500%
Vitamin K2 (as menaquinone-7)	45 mcg	56%

Other Ingredients: Microcrystalline cellulose, HPMC (capsule), vegetable stearic acid, vegetable magnesium stearate, and silica.

Directions

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

Consult your healthcare practitioner prior to use. Individuals taking other medication should discuss potential interactions with their healthcare practitioner. Consider total vitamin K intake (food and supplements) if you are taking blood-thinning medication. Present studies show that 45 mcg of MK-7 from Vitamk7™ daily is not likely to interfere with blood-thinning medicines. Do not use if tamper seal is damaged.

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, or artificial preservatives.

References

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Optimum Therapeutic Solutions
6420 N. MacArthur Blvd, Suite 100
Irving, TX 75039

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Therapeutic Solutions

Opti-Omega 820

For Professional Use Only



Clinical Applications

- Supports Cardiovascular Health and Blood Sugar Metabolism
- Supports Cognitive Function and Development
- Supports Healthy Skin, Joints and Connective Tissues
- Increases Visual and Ocular Health
- Helps Maintain a Healthy Inflammatory Response and Strengthen Immune Function

Cardiovascular Health

This product is a high-concentration fish oil sourced from waters off the Chilean coast. As the world's least industrialized coastline, these cold, fresh waters provide the cleanest, most sustainable source of fish in the world. This product provides 820 mg of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) per soft gel as natural triglycerides, the preferred form with superior absorption. Vitamin E (as mixed tocopherols) and rosemary extract are used to ensure maximum purity and freshness. This exclusive fish oil is purified, vacuum-distilled and independently tested to ensure heavy metals, pesticides and polychlorinated biphenyls (PCBs) are removed to undetectable levels. Extensive research has shown that EPA and DHA from fish oil enhance cardiovascular health, promote better brain function, and support healthy skin, joints and connective tissues. With over 10,000 published studies in the last three decades, EPA and DHA from fish oil are among the most researched natural ingredients available and have a long history of safety and efficacy.

Overview

Omega-3 fatty acids are essential cornerstones of human nutrition. They are deemed "essential" because we need them for proper health, but cannot produce them on our own. We must therefore consume these fats through diet or supplementation. Omega-3 fatty acids are required for a number of body functions, from proper blood flow to brain development. These long-chain fatty acids are integral components of tissues and organ systems throughout the body, including the heart, skin, joints, eyes and immune system. In nature, omega 3s occur as alpha linolenic acid (ALA), found mostly in plants, and as long-chain EPA and DHA, which primarily originate from cold-water fish. The body is able to

slowly convert the shorter chain ALA to the more active long-chain, EPA and DHA. However, many people lack the enzymes delta-5 and delta-6 desaturase necessary to make the conversion, making a higher dietary intake of EPA and DHA necessary. In addition, major changes in modern diet over the last century have led to a decrease in the general consumption of omega-3 fatty acids. Since omega-3 fatty acids are known to benefit cardiovascular health, support healthy brain function and cognition, and have also been proven to maintain a healthy inflammatory response, achieving the proper balance of omega-3s has become an important health strategy, requiring supplementation for most people.¹ The American Heart Association recommends that those concerned about blood lipids take up to 4 g of omega-3 fatty acids per day.²

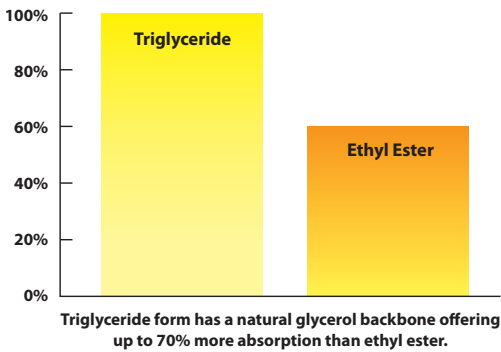
Fish Oil Delivery – Triglycerides vs. Ethyl Esters[†]

While the amount of EPA and DHA provided in a fish oil product is important for efficacy, the type of fish oil delivered is another significant factor in defining fish oil effectiveness. The human body is accustomed to digesting and absorbing EPA and DHA in the natural triglyceride form. Even though natural triglyceride-based fish oils are the preferred form for superior fish oil absorption, the vast majority of fish oil products available on the market are in the semi-natural ethyl ester form. While ethyl esters allow for higher concentrations of EPA and DHA to be achieved, their unusual structure is resistant to the digestive enzymes (lipases) that enable fat breakdown. In a study comparing EPA and DHA digestion in both the natural triglyceride and ethyl ester form, five common digestive lipase enzymes were shown to more readily digest fish oil in the natural triglyceride as compared to the ethyl ester substrate.³ A recent study, conducted by fish oil research pioneer Dr. Jorn

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Dyerberg, demonstrated that omega-3s in the triglyceride form are more efficiently digested and therefore 70% more absorbable than omega-3s in the ethyl ester form.⁴

Relative % Bioavailability of Triglyceride Compared to Regular Ethyl Ester



Omega-3 Depletion[†]

An accumulating body of research shows that the typical Westernized diet does not provide a sufficient amount of omega-3s for optimal health. Additionally, insufficient conversion of ALA to the active EPA and DHA may reduce the amount available for use in organs and tissues. Symptoms of omega-3 deficiency are common and often overlooked. These may include dry, itchy or flaky skin, poor sleep quality, poor circulation, eye discomfort, and mood imbalance.⁵

Cardiovascular and Blood Sugar Health[†]

Omega-3 fatty acids have long been known to benefit cardiovascular health. The well-known GISSI-Prevezione trial found that just 1 g a day of omega-3 fatty acids had a significant impact on cardiovascular health after three to four months of consumption.⁶ EPA and DHA have been shown to modulate levels of fat in the blood,⁷ and a meta-analysis of 31 placebo-controlled trials found that for each gram of omega-3s consumed, there was improved support for healthy blood pressure levels.⁸ Population studies have also reported that EPA and DHA support better blood sugar balance in populations consuming large amounts of the n-3 long-chain PUFAs.⁹

Additional Benefits of Omega-3 Fatty Acids[†]

In addition to their well-known cardiovascular benefits, omega-3 fatty acids play a central role in brain development, mood enhancement, improved cognition, joint comfort and visual acuity.

Mood Enhancement[†]

A double-blind study, which randomly assigned participants with low mood to either placebo, 1 g/day or 2 g/day of EPA, found significant improvement with EPA compared with placebo in balancing mood.¹⁰

Increased Mental Focus[†]

In a recent British study, omega-3 blood levels were shown to be directly related to improved measures of cognition, performance and behavior among healthy children with below-average reading ability.¹¹

Joint Comfort[†]

A dose of 1,200 mg per day of omega-3 essential fatty acids were found to improve back and joint discomfort among 125 people, with 88% choosing to continue supplementation after the study's end.¹² Fish oil has also been shown to improve tender joints and morning stiffness after three months of consumption.

Visual Acuity[†]

A study evaluating the long-term effects of EPA and DHA on visual development in 136 school-age Inuit children exposed to high levels of n-3 PUFAs during gestation, found beneficial effects of DHA intake on visual acuity.¹³ Eating oily fish at least once per week compared with less than once per week was also found to enhance visual clarity and reduce commonly occurring visual deterioration in adults.¹⁴

Directions

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

Does Not Contain

Wheat, gluten, dairy, peanuts, tree nuts, egg, artificial colors, sweeteners or preservatives.

Cautions

If you are pregnant or nursing, consult your physician before taking this product.

Supplement Facts ^{v3}		
Serving Size 1 Soft Gel Capsule		
Servings Per Container 60, 120 & 180		
1 soft gel capsule contains	Amount Per Serving	% Daily Value
Calories	15	
Calories from fat	15	
Total fat	1.5 g	2%*
Cholesterol	<5 mg	<2%
Total Omega-3s (as Triglycerides)	950 mg	**
EPA (Eicosapentaenoic Acid)	430 mg	**
DHA (Docosahexaenoic Acid)	390 mg	**
Omega-3s (additional)	130 mg	**

* Percent Daily Values are based on a 2,000 calorie diet.
** Daily Value not established

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