

Bio-ADEK-Mulsion™

Bio-ADEK-Mulsion™ supplies vitamins A, D3, E, and K (as K1 and K2) in a true oil and water emulsion, resulting in enhanced bioavailability and utilization via the lymphatic system without the use of "tweens" and surfactants that may damage cell membranes and result in gut permeability. Structurally, all of these fat soluble vitamins are nonpolar lipids with extremely low solubility in aqueous media.¹ Consequently, fat soluble vitamins require emulsification by bile to be properly absorbed. Many individual's gallbladders function at suboptimal efficiency, adding to the difficulty of fat soluble vitamin absorption and assimilation. Although each fat soluble vitamin has specific nutritional roles, each one is vital for optimal health. For example, both vitamin A and D are important for immune function, while Vitamin K is important in both bone and cardiovascular health, and vitamin E plays an important role in the formation of red blood cells.

Vitamin A is involved in regulating the growth and differentiation of virtually all cells in the human body. In animals, vitamin A exists as preformed vitamin A (retinol), while in fruit and vegetables it exists as pro-vitamin A carotenoids.² Functionally, vitamin A also plays an essential role in cellular reproduction and cellular differentiation, and is essential for good vision. Vitamin A is also needed for the proper development of the embryo and fetus, and is necessary for healthy thyroid function and skin integrity. Vitamin A deficiency is associated with a number of undesirable health challenges, including increased susceptibility to infections. Also, the prevalence of vitamin A deficiency and night blindness is especially high during the third trimester of pregnancy due to accelerated fetal growth, and preterm infants born with inadequate body stores of vitamin A are at risk of respiratory and gastrointestinal tract challenges.³

Vitamin D is produced endogenously when ultraviolet rays from sunlight strike the skin and trigger the synthesis of vitamin D. However, due to many different factors, vitamin D status is low in the majority of the population. In fact, according to a Scientific American article, the "magnitude of the decline in a relatively short time period was surprising,"⁴ referring to surveys of vitamin D status conducted in 1994 and 2004. According to one conclusion, low levels of 25(OH)D are associated with impaired myocardial health in a graded manner, even after allowing for factors known to be associated with coronary artery function.⁵

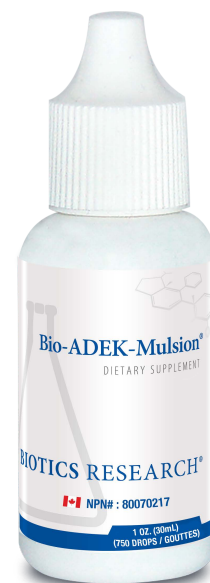
Vitamin D has many important functions in the body, including its role in calcium and phosphorous balance, immunity, cellular differentiation, insulin secretion, blood pressure regulation and cardiovascular health.

Vitamin E functions as an antioxidant to protect cell membranes and tissues from oxidative damage. It also aids in the formation of red blood cells, and the use of vitamin K by the body. Additionally, it supports the healthy function of the circulatory system.⁶

Bio-ADEK-Mulsion™ supplies natural vitamin E as d-alpha tocopheryl acetate combined with mixed tocopherols. Vitamin E functions as a chain-breaking antioxidant, preventing the propagation of free radicals in membranes and plasma lipoproteins. Vitamin E is also likely involved in strengthening certain aspects of cell-mediated immunity.⁷ It also functions to decrease the release of reactive oxygen species by monocytes.⁸

In addition to vitamin E, "vitamins A and D both make independent contributions to immune function by binding to their respective receptors, and thereby directing cellular processes in favor of beneficial immune responses."⁹ Studies in isolated cells suggest that vitamin D may only be able to activate its receptor with the cooperation of vitamin A.^{10,11} It is now known that vitamins A and D also collectively cooperate to regulate the production of certain vitamin K-dependent proteins. Once these proteins are activated by vitamin K, they help mineralize bones and teeth, support adequate growth, and protect arteries and other soft tissues from abnormal calcification, as well as protect against cell death.¹²

Vitamin K1 or Phytonadione [2-methyl-3-phytyl-1,4-naphthaquinone (II)] is the most important member of the vitamin K family, and serves as the major source of dietary vitamin K in humans. Nutritive sources of Vitamin K1 include alfalfa, green leafy vegetables, meats, dairy products and some plant oils. Vitamin K1 absorption, like most nutrients, is absorbed prior to reaching the colon. However, unlike many nutrients, the colon can absorb vitamin K very well, thus promoting the



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uptake of vitamin K synthesized in the lower intestinal tract by the gut microflora. Vitamin K, specifically K1, functions in two main processes, both involving normal bone formation. The first constitutes its importance as a component of the calcium-binding bone protein, matrix GLA-protein (MGP). The second is its importance in the carboxylation of osteocalcin, a protein synthesized by osteoblasts (bone forming cells) during bone matrix formation. The γ -carboxylation of osteocalcin is a vitamin K dependent reaction. In individuals with fat malabsorption disorders, including bowel maladies and cystic fibrosis, there may be an increased risk of vitamin K deficiency^{13,14,15} thus making the case for emulsification.

Vitamin K2 is an important dietary component in cardiovascular health, due to the fact that vitamin K-dependent proteins are also present in vascular tissues.^{16,17,18,19,20,21} In fact, matrix GLA-protein (MGP) has been identified in human atherosclerotic plaque, where it is speculated to prevent calcium precipitation, in a similar fashion as it does in bone. This action has been clearly demonstrated in MGP-knockout mice, resulting in death due to massive aortic and coronary calcification, occurring shortly after birth.²²

Each fat-soluble vitamin plays important roles in the body, and intake, particularly that of vitamins D and E is often insufficient to meet nutritional needs.

Bio-ADEK-Mulsion™ supplies 375 mcg RAE (1,250 IU) of vitamin A, 25 mcg (1,000 IU) of vitamin D3, 20 mg (30 IU) of vitamin E, and 100 mcg of vitamin K (as K2 and K1 in a 1:1 ratio). **Bio-ADEK-Mulsion™** is emulsified for increased uptake and utilization without the use of tweens or other surfactants.

Bio-ADEK-Mulsion™, another example of Biotics Research Corporation bringing you "The Best of Science and Nature".

References

1. Thompson GR. Absorption of fat-soluble vitamins and sterols. J. Clin. Pathol. (R Coll Pathol). 1971 5:85-89.
2. <http://lpi.oregonstate.edu/mic/vitamins/vitamin-A>.
3. <http://lpi.oregonstate.edu/mic/vitamins/vitamin-A#deficiency>.
4. Lite J. Vitamin D deficiency soars in the U.S., study says. Scientific American. 2009 March 23.
5. Giovannucci E, Liu Y, Hollis BW, Rimm EB. 25-Hydroxyvitamin D and Risk of Myocardial Infarction in Men: A Prospective Study. Arch Intern Med. 2008 168(11):1174-1180. doi:10.1001/archinte.168.11.1174.
6. <https://www.nlm.nih.gov/medlineplus/ency/imagepages/18113.htm>.
7. <http://lpi.oregonstate.edu/mic/vitamins/vitamin-E>.
8. Jialal J, Devaraj S, Kaul N. The effect of α -tocopherol on monocyte proatherogenic activity. J. Nutr 2001 131:389S-394S. [PubMed: 11160567].
9. <http://www.westonaprice.org/health-topics/abcs-of-nutrition/nutritional-adjuvants-to-the-fat-soluble-vitamins/#sthash.fHX5GNYE.dpuf>.
10. Sanchez-Martinez R, Castillo A, Steinmeyer A, Aranda A. The retinoid X receptor ligand restores defective signaling by the vitamin D receptor. EMBO Rep. 2006 7(10):1030-4.

11. Sánchez-Martínez R, Zambrano A, Castillo AI, Aranda A. Vitamin D-dependent recruitment of corepressors to vitamin D/retinoid X receptor heterodimers. Mol Cell Biol. 2008 28(11):3817-29.
12. Masterjohn C. On the Trail of the Elusive X Factor: A Sixty-Two-Year-Old Mystery Finally Solved. Wise Traditions. 2007 8(1).
13. Jagannath VA, Fedorowicz Z, Thaker V, Chang AB. Vitamin K supplementation for cystic fibrosis. Cochrane Database Syst Rev. 2013 4:CD008482.
14. Nakajima S, Iijima H, Egawa S, et al. Association of vitamin K deficiency with bone metabolism and clinical disease activity in inflammatory bowel disease. Nutrition. 2011 27(10):1023-1028.
15. Nowak JK, Grzybowska-Chlebowczyk U, Landowski P, et al. Prevalence and correlates of vitamin K deficiency in children with inflammatory bowel disease. Sci Rep. 2014 4:4768.
16. Suttie JW. Vitamin K and human nutrition. J. Am. Diet. Assoc. 1992 92: 585-590.
17. Vermeer C., Braam L. Role of K vitamins in the regulation of tissue calcification. J. Bone Miner. Metab. 2001 19: 201-206.
18. Spronk HM, Soute BA, Schurgers LJ, Cleutjens JP, Thijssen HH, de Mey JG, Vermeer C. Matrix Gla protein accumulates at the border of regions of calcification and normal tissue in the media of the arterial vessel wall. Biochem. Biophys. Res. Commun. 2001 289: 485-490.
19. Shanahan CM, Cary NR, Metcalfe JC, Weissberg PL. High expression of genes for calcification-regulating proteins in human atherosclerotic plaques. J. Clin. Invest. 1994 93: 2393-2402.
20. Vermeer C, Jie KS, Knapen MH. Role of vitamin K in bone metabolism. Annu. Rev. Nutr. 1995 15: 1-22.
21. Shearer MJ, Bach A, Kohlmeier M. Chemistry, nutritional sources, tissue distribution and metabolism of vitamin K with special reference to bone health. J. Nutr. 1996 126 (Suppl. 4): 1181S-1186S.
22. Geleijnse JM, Vermeer C, Grobbee DE, Schurgers LJ, Knapen MHJ, van der Meer IM, Hofman A, Witteman JCM. Dietary Intake of Menaquinone Is Associated with a Reduced Risk of Coronary Heart Disease: The Rotterdam Study. Am Society for Nutritional Sciences. 2004 August 25.

Supplement Facts

Serving Size: 5 Drops (0.2 mL)
Servings Per Container: 150

	Amount Per Serving	% Daily Value
Vitamin A (as palmitate)	375 mcg RAE	42%
Vitamin D3 (as cholecalciferol)	25 mcg	125%
Vitamin E (as d-alpha tocopheryl acetate and mixed tocopherols)	20 mg	133%
Vitamin K (as K2 menadiol and K1 phytonadione 1:1 ratio)	100 mcg	83%

Other ingredients: Emulsifier base (water and arabic gum), sesame oil and olive oil.

This product is gluten and dairy free.

RECOMMENDATION: Five (5) drops each day as a dietary supplement or as otherwise directed by a healthcare professional.

CAUTION: Keep out of reach of children. Use only as recommended unless otherwise directed by a healthcare professional. Excessive consumption of vitamin A has been shown to cause serious health problems.

KEEP OUT OF REACH OF CHILDREN

Store in a cool, dry area.
Sealed with an imprinted safety seal for your protection.

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To place your order for **Bio-ADEK-Mulsion™** or for additional information please contact us below.



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