

# Heart Smart *Nutrition*



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## Vitamin K Interactions with Warfarin Anticoagulation Therapy

By Maureen Elhatton, RD

One of the most commonly used anticoagulation therapies, warfarin and its derivatives, need to be closely regulated to avoid serious bleeding complications. The goal of anticoagulation therapy is to prescribe the minimum effective dose of anticoagulant to prevent clot development or enlargement. Foods containing large amounts of Vitamin K have the opposite effect and may seriously dilute the anticoagulation properties of the medication.<sup>1</sup>

While Vitamin K has a role in the creation of several proteins involved in blood coagulation, warfarin and other anticoagulants act to inhibit its synthesis. Dietary Vitamin K is metabolized through an alternative warfarin-insensitive pathway and has the ability to overcome the anticoagulant effect of the medication.<sup>2</sup> Knowledge of the food-drug interactions, particularly with anticoagulation medication, can play an important role in stabilizing and maximizing the effectiveness of the medication.

One study found 94% of medical residents were aware of Vitamin K decreasing the effectiveness of warfarin therapy, but only 43% knew broccoli contained high levels of Vitamin K.<sup>3</sup>



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Table 1

Recommended Dietary Intake of Vitamin K	
	Vitamin K (mcg/day)
<b>Female</b>	
19 years and older	90
<b>Male</b>	
19 years and older	120

Adapted from Institute of Medicine: Dietary Reference Intakes for Vitamin A, Vitamin K, arsenic, boron, chromium, copper. (2002)

Dietary Reference Intakes for Vitamin A, Vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc. Washington, DC: National Academy Press, (2002). <http://www.nap.edu>

Vitamin K is an essential nutrient for bone health and the dietary reference intake (DRI) for adults is between 90 and 120 micrograms (mcg) per day for men and women (Table 1). A reduced intake over a long period of time may compromise bone mineral density. At this point, intakes of Vitamin K below the DRI are not advised in an effort to improve coagulation stability.<sup>4</sup> A recent literature review found most adults consume 60-200 mcg per day of Vitamin K. However, some individuals have reported intakes > 600 mcg/day, mostly attributed to green vegetable intakes. Of all the fat-soluble vitamins, Vitamin K has been reported as having the highest individual daily variation.<sup>2</sup> Recommendations to consume a consistent intake of this vitamin present challenges for the health-care provider and the patient.

Patients should be aware of the major sources of the vitamin and be advised to maintain a consistent intake of these food items rather than a feast and famine approach. While patients are being stabilized on their anticoagulant, it is important to have their Vitamin K intake remain close to their normal dietary intake. Once stabilized, variations from the dietary pattern should be minimized.<sup>4</sup> For example, one-half cup of cooked broccoli (270 mcg) daily for four days is preferable to two cups of cooked broccoli (1,080 mcg) in one day.<sup>6</sup> Concerns are also raised over the Vitamin K content of canola and soybean oils, particularly if the patient is using these in the form of margarine and cooking oils. These oils contain small, but significant amounts of Vitamin K particularly if used in large amounts or if used in combination with foods naturally high in the vitamin. For example, coleslaw made with green cabbage and a salad dressing of canola oil can contain 119 mcg Vitamin K per cup.<sup>7</sup>

Seasonal variation of food intake can also provide fluctuation in Vitamin K intake. For example, an abundant garden supply of swiss chard may lead to overconsumption of this nutritious vegetable for individuals on anticoagulation medica-

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tion. At 830 mcg of Vitamin K per 100 g raw product, which steams down to a small amount, this vegetable is an extremely potent source.<sup>6</sup>

Food items green in color are prized for their high nutrient content and may be added to other food items or sold as nutritious food supplements. These all-natural grasses/algae/seaweed products contain large amounts of Vitamin K. For the consumer on anticoagulation therapy, these products can pose a problem for coagulation stability. Juicing products at home has also become very popular with consumers. Leafy greens, such as parsley, are often added to these mixtures to boost their nutrient content. The unaware consumer who is taking anticoagulation medication will then consume an extremely high Vitamin K beverage.

One of the keys in identifying foods with high Vitamin K content is the vitamin's association with the green part of the plant. For this reason, green tea and other herbal teas, if taken in large amounts, are not advised. As a general rule, root vegetables and animal products are poor sources of Vitamin K. However,

the addition of oils or leafy greens to these products will increase the content.<sup>6</sup> Listings of Vitamin K content in foods is found in Table 2, however more detailed charts are available from Weihrauch and Chatra<sup>6</sup> and Booth and Centurelli.<sup>7</sup>

The entire area of Vitamin K determination has inconsistencies in analysis methods for content and studies often consist of anecdotal reports. Nevertheless,

Table 2


## Vitamin K Content of Selected Foods

Food Item	Vitamin K (mcg/100 g)
Lettuce leaf, raw	210
Parsley, raw	540
Spinach leaf, raw	400
Broccoli, cooked	270
Brussel sprouts, raw	177
Seaweed, laver, purple	1,385
Swiss chard leaf, raw	830
Soybean oil	193
Canola oil	141
Coleslaw with dressing homemade, 1 cup	119
Beef chow mein from Chinese takeout, 1 cup	78
Fish sandwich on a bun, fast food	26

Adapted from Weihrauch, JL, Chatra AS: United States Department of Agriculture, Provisional Table on the Vitamin K Content of Foods. (1994) Booth, SL, Centurelli, MA: Vitamin K: A Practical Guide to the Dietary Management of Patients on Warfarin. Nutrition Reviews 57(9):288-296.

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many professionals are aware of the food-drug interactions with this medication, an improved knowledge of how they fit into a person's overall diet is important. 

individuals on these medications still require some dietary guidelines as to food interactions. As a general rule one-half cup of cooked or one cup of uncooked green vegetable per day will allow the patient to have some dietary variation without compromising coagulation stability.<sup>4</sup>

Human anticoagulation therapy has been available since the 1940s. However, the knowledge of food interactions, which can minimize the effectiveness of the drug, continues to be a challenge. While



#### References

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