

Tocotrienol Supercharged Vitamin E Contains Natural Mixed Tocopherols

Tocotrienols Reduce Three Major Risk Factors of Atherosclerosis

Atherosclerosis and its complications...heart attack and stroke...are the major causes of death in the United States and have reached epidemic proportions throughout the western world. This degenerative condition of the arteries is characterized by accumulation of lipids (mainly cholesterol) within the artery. Although any artery may be affected, the aorta, coronary and cerebral vascular system are most frequently involved.⁽²⁾

A number of dietary and lifestyle factors have been associated with increased risk for atherosclerosis. Three commonly sited risk factors may be modified with supplements of tocotrienols, a recently researched form of vitamin E.⁽¹⁾

- Elevated Cholesterol
- Oxidized LDL Cholesterol
- Abnormal Platelet Aggregation

Double-Blind Trial Shows Cholesterol Reduction in 75% of Patients Given Tocotrienol Supplements

Numerous studies have indicated that lowering LDL and total cholesterol levels decreases the risk of death from heart disease. Elevated cholesterol, specifically LDL (low density lipoprotein), is a clearly defined risk factor for the development of atherosclerosis. More specifically, oxidized LDL cholesterol is clearly implicated as the primary culprit. While vitamin E in the tocopherol form has been associated with reduced risk of heart attack, it has shown no significant effect on cholesterol levels.

In contrast, the tocotrienols have demonstrated significant cholesterol-lowering effects in both animals and humans. In clinical trials, approximately 75% of patients with high cholesterol levels respond to the cholesterol-lowering effects of tocotrienols. Researchers believe that, in those who do not respond, elevated cholesterol levels are likely to be due to errors in cholesterol transport or degradation.^(1,4)

The most dramatic cholesterol reduction is seen when tocotrienol supplements are combined with dietary changes (high fiber, low fat diet). In a 12-week, double-blind trial, those who responded to tocotrienol treatment, saw reductions of approximately 23% in total cholesterol and 32% in LDL using dietary modification plus tocotrienol supplements. Tocotrienols alone yielded a 16%

E-TOCO 400™
*Natural Vitamin E with
Mixed Tocopherols and Tocotrienols*

Product No. 798 Fill Size: 60 Capsules

Each softgel capsule contains:	% Daily Value
Vitamin E (mixed tocopherols) - - - - -	400 I.U. 1333%
Sesame Seed Oil - - - - -	200 mg. *
Mixed Tocotrienols (from Tocomin®) - -	15 mg. *

Other ingredients: gelatin.
* Daily Value not established.
®Tocomin is a registered trademark of Carotech, Inc.

Recommended Use: Two capsules daily will supply 800 I.U. of vitamin E with mixed tocopherols and 30 mg. of tocotrienols.

Vitamin E should not be taken with an inorganic iron supplement, as the effectiveness of both supplements will be impaired. They should be taken 8-12 hours apart.

decrease in total cholesterol and a 21% decrease in LDL.^(1,4)

In an 18-month study of 50 patients with cerebrovascular disease, the authors reported apparent regression of the disease in 7 patients in the tocotrienol group as demonstrated by ultrasonography. The disease progressed in only 2 of the 25 tocotrienol patients. None of the placebo group showed regression and 10 showed progression.^(1,5)

Dietary changes alone can reduce both cholesterol and the incidence of atherosclerosis; however, the degree of reduction is proportional to the degree of dietary change. Due to the difficulty of changing eating habits, dietary changes alone are inadequate for most people.

Tocotrienols vs. Cholesterol Drugs

HMG-CoA reductase is the rate-limiting enzyme involved in cholesterol production. It exerts its action at the corresponding receptor site. Tocotrienols appear to increase the natural rate of HMG-CoA reductase degradation, which in turn decreases cholesterol production. A 50% decrease in reductase can be seen within two hours. No adverse side effects have been associated with tocotrienols.^(1,4)

The "statin" drugs and over-the-counter yeast extracts decrease cholesterol production by competi-

tive blocking of the receptor sites. When receptor sites are blocked, the body responds by producing more of the enzyme. This adaptive response trig-

gers a 200-fold increase in reductase levels within a few hours. Significant adverse side effects may be associated with these medications.⁽¹⁾

Tocotrienols' Unsaturated Side Chain Provides Higher Antioxidant Activity than Tocopherols

Vitamin E as d-alpha-tocopherol, the form commonly found in supplements, protects LDL from oxidation. In a study of more than 1,000 people, vitamin E reduced the risk of nonfatal heart attack by 77%. This protective effect is attributed primarily to its antioxidant properties.⁽⁶⁾ Non-esterified vitamin E has higher antioxidant activity than esterified forms (tocopheryl acetate, succinate, etc.)

There are eight different forms of vitamin E. The four tocopherols (alpha-, beta-, gamma- and delta-tocopherol) share a saturated phytyl side chain. The four analogous tocotrienols have a triple-unsaturated side chain.

The unsaturated bonds on the side chain give the tocotrienols greater antioxidant activity and a different biologic action. When those bonds become saturated, the molecule becomes a tocopherol. Reports from laboratory studies indicate a 40-60 times higher antioxidant activity against lipid peroxidation in rat liver microsomal membranes with d-alpha-tocotrienol than with d-alpha-tocopherol and 6.5 times more protection of cytochrome P-450 against oxidative damage.⁽¹⁾ Cytochrome P-450 is present in most tissues and serves as an oxygenating catalyst in a variety of reactions.

Alpha-tocopherol is most often used in supplements and is the standard for measurement of vitamin E. Tocopherols are the dominant form of vitamin E in corn (86%) and wheat germ (72%). Rice bran, on the other hand, contains 66% of its vitamin E as tocotrienols.⁽¹⁾

Natural Anti-Thrombin Properties

Abnormal coagulation of platelets is also an important factor in the development of atherosclerosis. When platelets aggregate they release compounds that cause migration and proliferation of smooth muscle cells into the innermost layer of the artery.⁽²⁾ Aspirin has been recommended to atherosclerosis patients because of its ability to inhibit production of thromboxane A₂, a potent factor in coagulation and clot formation. However, aspirin is associated with a number of negative side effects including gastrointestinal bleeding and it has not been shown to positively influence any of the other risk factors for atherosclerosis.

Both tocopherols and tocotrienols, as well as other natural substances such as sesame seed oil, inhibit

platelet aggregation without the negative side effects associated with aspirin. Vitamin E provides antioxidant protection and tocotrienols may lower cholesterol as well.

As anti-thrombic agents tocotrienols have been shown to decrease platelet aggregation by 15% to 30%. Thromboxane A₂ is difficult to measure because of its extremely short half-life. Its metabolite, thromboxane B₂, is generally accepted as an indicator of thromboxane A₂ production. Tocotrienols are reported to cause a 31% decrease in thromboxane B₂.^(1,4)

Multiple studies report a significant relationship between tocotrienols and cancer. In laboratory studies, tocotrienols significantly inhibited the growth of cancer in cultures. Although it has not been shown to cure or kill cancer cells, it may halt or slow the progression of cancer.^(1,3)

Symptoms of Atherosclerosis

Atherosclerosis is usually associated with high blood pressure, weak pulse and wide pulse pressure. Symptoms, depending upon the arteries involved and degree of obstruction, may include angina, leg cramps, gradual mental deterioration, weakness or dizziness...or there may be no symptoms.⁽²⁾ For many a heart attack or stroke is the first symptom...or at least the first symptom they notice. Symptoms may appear so gradually that they go unnoticed or they may be attributed to the normal aging process.

WARNING: This information is provided for health care professionals only. **This publication and the product contained herein have not been approved or evaluated by the Food and Drug Administration. This publication, and the product contained herein are not intended to diagnose, treat, cure or prevent any disease.** The product relates to nutritional support only.

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