

Cardiovascular and Metabolic Health



Merging Science with Nature



Natural e³
DavosLife Tocotrienols



Effects of Modern Day Unhealthy Lifestyles – Metabolic Syndrome and Cardiovascular Disease

Blood lipids play a major role in cardiovascular and metabolic disease risk

Cholesterol

This waxy substance which is found in food and produced by the liver and other cells in the body is essential for the proper functioning of cell membranes and maintaining the body's metabolic processes.

Cholesterol is carried in the blood by low density lipoprotein (LDL), a type of transport protein. Elevated levels of LDL-cholesterol have been associated with higher risks of cardiovascular disease. LDL-cholesterol is also susceptible to attack from free radicals. It is its oxidized state that LDL-cholesterol becomes more reactive with the inner linings of blood vessel walls, causing fatty plaque formations (atherosclerosis) that increase the risk of heart attacks and stroke.

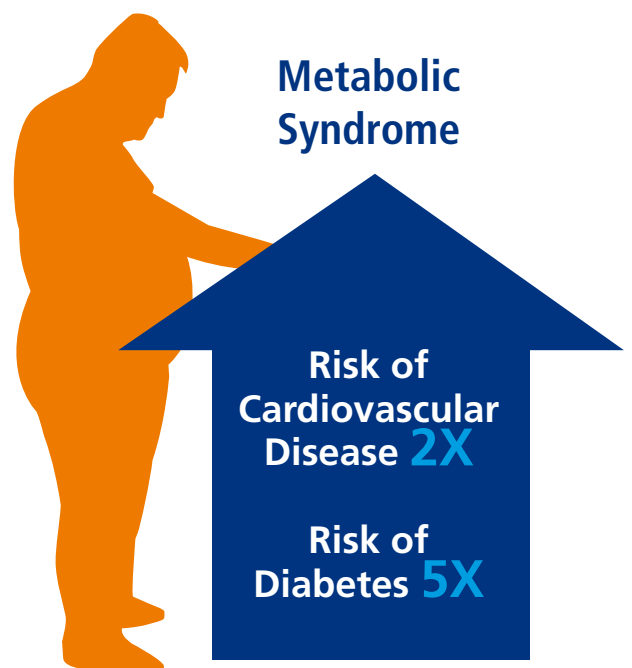
Triglycerides

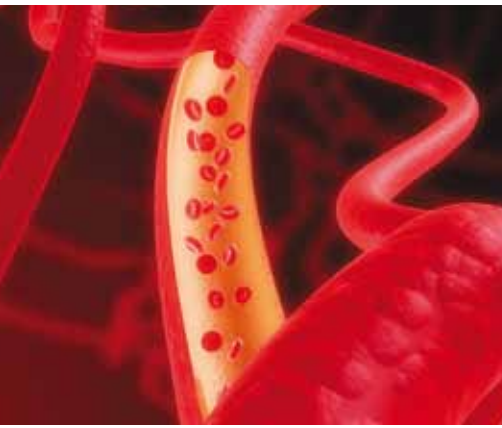
Similarly, elevated triglyceride levels can foreshadow heart disease and its complications. Triglycerides are mainly produced by the body and high levels are generated as a result of a high fat diet and excessive alcohol consumption. When left unchecked, high triglyceride levels are closely associated with the metabolic syndrome, a major risk factor in lifestyle related diseases such as heart disease, stroke and diabetes. ^[1]

Lack of lipid balance can lead to metabolic syndrome — a major risk factor in cardiovascular disease, type II diabetes and non-alcoholic fatty liver disease (NAFLD). ^[2, 3]

Overeating and insufficient exercise are negative attributes of modern day lifestyles that can lead to the development of metabolic syndrome. Metabolic syndrome is a group of conditions that includes the lack of lipid balance (dyslipidemia), excessive fat around the waist, elevated blood pressure and blood glucose levels. A person who has metabolic syndrome is twice as likely to develop cardiovascular disease and five times as likely to develop diabetes as someone who does not have this condition. ^[4]

Metabolic syndrome also contributes to the development of NAFLD, a common medical condition that can eventually lead to inflammation (hepatitis) and scarring (cirrhosis) of the liver. ^[5] A study showed that men and women with metabolic syndrome have 4 to 11 times higher risk of developing NAFLD compared to those without the condition. ^[6]





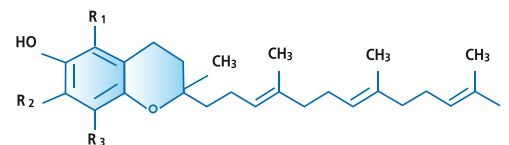
Achieve Lipid Balance Through Tocotrienols

Tocotrienols - A Gem in the Vitamin E Family

Tocotrienols are members of the Vitamin E family with up to 60 times more powerful antioxidation properties in lipid biological systems than alpha-tocopherol. [7] Cellular uptake of tocotrienols is up to 70 times higher, as its distinct chemical structure readily allows rapid incorporation for optimal antioxidation activity. [8] Tocotrienols as powerful antioxidants protect the body from attack by free radicals and DNA damage. [9] Besides its antioxidant properties, tocotrienols have been shown to reduce both cholesterol and triglyceride levels.

Tocotrienol isoforms

	R ₁	R ₂	R ₃
α:	CH ₃	CH ₃	CH ₃
β:	CH ₃	H	CH ₃
γ:	H	CH ₃	CH ₃
δ:	H	H	CH ₃

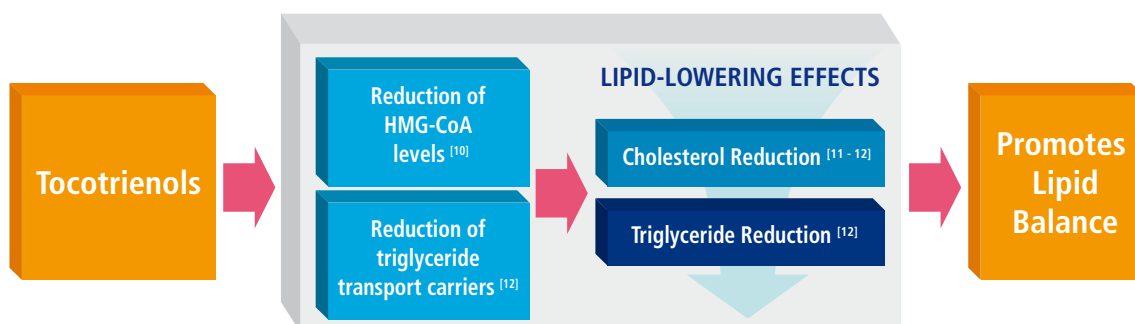


Scientific Evidence

Cholesterol-Lowering Effects

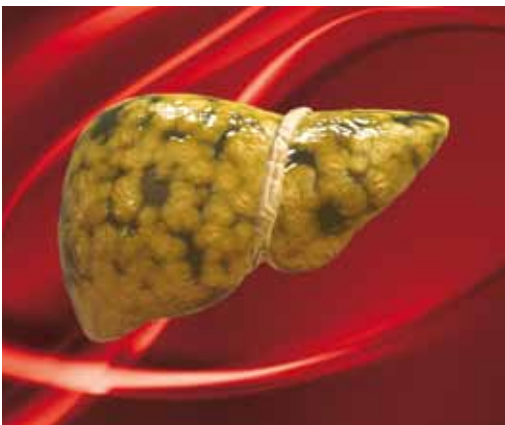
Tocotrienol lowers LDL 'bad' cholesterol and total cholesterol by reducing the levels of HMG-CoA reductase, a protein that plays a central role in cholesterol production in the liver. [10]

Mechanism of Action



In a study conducted in human subjects with elevated cholesterol levels, tocotrienol-rich formulation (100 mg/day) reduced LDL-cholesterol and total cholesterol levels by up to 20% and 25% respectively when administered with a controlled diet for 35 days. [11]

Further, tocotrienol-rich formulation when used in combination with lovastatin, a standard anti-cholesterol agent results to lower total cholesterol and LDL-cholesterol levels in hypercholesterolemic patients taking a controlled diet. [10]



Tocotrienols For Healthy Lipid Levels, Blood Vessels And Liver

Scientific Evidence

Triglyceride-Lowering Effects

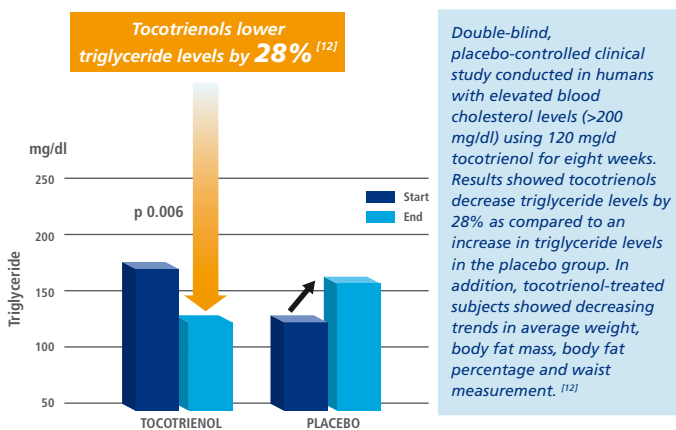


Fig. 1 Triglyceride levels in tocotrienol and placebo groups after eight weeks. ^[12]

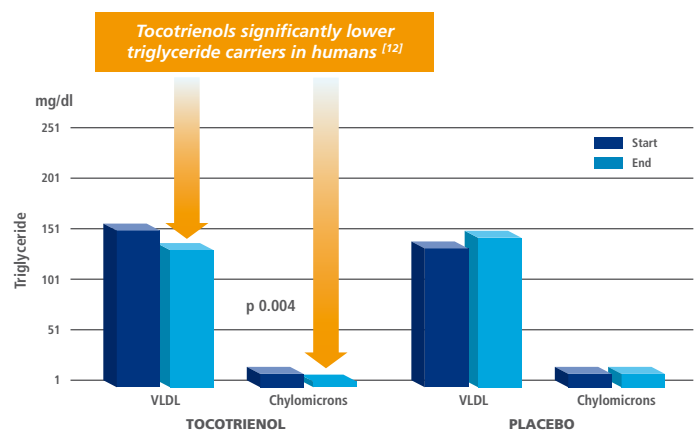
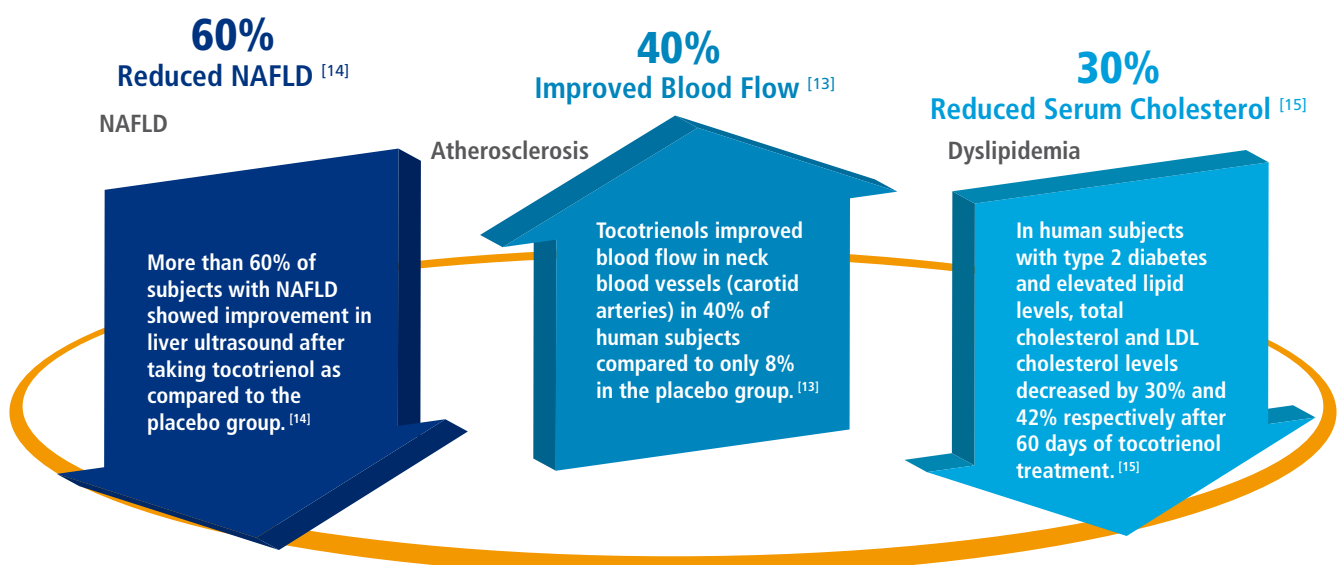


Fig. 2 VLDL and chylomicron levels in tocotrienol and placebo groups after eight weeks. ^[12]

Apart from its cholesterol- and triglyceride-lowering effects, results from clinical studies have shown that tocotrienol supplementation inhibited atherosclerosis or fatty plaque formation in main blood vessels suggesting their role in promoting cardiovascular health. ^[13] In addition, in a recent double-blind, placebo-controlled human study, supplementation with tocotrienols improved non-alcoholic fatty liver conditions in 60% of patients with NAFLD as compared to only 33% in the placebo group. ^[14]





Natural Way To Enhance Cardiovascular And Metabolic Health

Safety*

Natural e³ obtained US FDA generally recognized as safe (GRAS) status in 2010. Toxicology testing has shown Natural e³ to be safe for oral and topical applications. ^[16]



TOXICOLOGY TEST	RESULTS
Acute oral toxicity studies	LD50>2000mg/kg
Acute dermal toxicity study	Non-skin irritant
Primary eye irritation study	Non-eye irritant

Table 1. Results of toxicology testing for Natural e³ according to OECD guidelines

* Safety and toxicity profile available upon request



Dose

Recommended daily dose of 100 to 200 mg of tocotrienols in one or two servings per day.

Application

Suitable for incorporation in dietary supplement formulations and in functional food and beverages to promote lipid balance, healthy blood vessels and liver health.



Reference:

[1] Ballantyne CM, et al. *Int J Obes (Lond)*.2008;32(S2):S21-4. [2] Galassi A, et al. *Am J Med*. 2006;119(10):8129. [3] Bellentani S, et al. *Dig Dis*. 2010;28(1):155-61. [4] http://www.nhlbi.nih.gov/health/dci/Diseases/ms/ms_what.html [5] Vanni E, et al. *Dig Liver Dis*;42(5):320-30. [6] Hamaguchi M, et al. *Ann Intern Med*, 2005;143(10):722-8. [7] Serbinova E, et al. *Free Radic Biol Med*.1991;10(5):263-75. [8] Saito Y, et al. *Ann N Y Acad Sci*. 2004;1031:368-75. [9] Chin SF, et al. *Nutrition*. 2008; 24(1):1-10. [10] Qureshi AA, et al. *J Nutr Biochem*. 2001;12(6):318-329. [11] Qureshi AA, et al. *Atherosclerosis*, 2002;161(1):199-207. [12] Zaiden N, et al. *J Atheroscler Thromb*. 2010. [13] Kooyenga DK WT, et al. *Micronutrients and health*. K Nesaretnam and L Packer. Illinois.AOCS Press:366-375, 2001. [14] Magosso EA YM, et al. The 61st Annual Meeting of the American Association for the Study of Liver Disease (AASLD) The Liver Meeting®. 2010: Boston, USA. [15] Baliarsingh S, et al.*Atherosclerosis*. 2005;182(2):367-74. [16] Davos Life Science. Data on File.

**Derived from Nature
Driven by Science**



World Leader in High Quality, High Purity Palm Tocotrienols

**DavosLife - No.1 Supplier Of
High Purity Palm Tocotrienols**

Stable Supply

DavosLife produces a 100% natural tocotrienol-rich complex extracted using standards of the highest quality from GMO-free palm fruit fully traceable to the plantations of its parent Company, the Kuala Lumpur Kepong Berhad Group. Natural e³ contains a balanced blend of all tocotrienol isoforms (alpha, beta, delta, gamma) at high concentration levels for maximum health benefits.

Science Driven

DavosLife has established the world's largest tocotrienol R&D center to spearhead cutting-edge tocotrienol research and innovation in chronic diseases and skin care. It was awarded the 2010 Asia Pacific Excellence in Research Award in the Natural Vitamin E Market by Frost and Sullivan.

Unrivalled Technical Support

Our team of experienced in-house scientists is available to support your technical needs ensuring that you meet the demands of today's market.

Custom Formulations

We offer custom formulations for higher potencies to meet your needs.



Natural e³
DavosLife Tocotrienols

Available Products:

High Purity Palm Tocotrienol Oil
Up to 95% (total vitamin E)

Palm Tocotrienol Powder
Up to 30% (total vitamin E)

T3Boost™ - Water Soluble Tocotrienol
Up to 1.5% (total vitamin E)

Tocotrienol Isomers
up to 97% (alpha, beta, gamma, delta)

**Palm Tocotrienol Analytical Test
and Cell Culture Kits**



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