Get to the Heart of the Matter: The Impact of Tocotrienol Supplementation on Cardiovascular Health

Having high cholesterol, high blood pressure, high triglycerides and diabetes lead to increased risk of cardiovascular disease. Clinical and pre-clinical studies have shown that tocotrienol supplementation is able to reduce the risk factors involved in cardiovascular disease.

High Cholesterol

20% ↓ Total Cholesterol

25% ↓ LDL

Supplementation with tocotrienol-rich fraction reduces total cholesterol and low-density lipoprotein (LDL) in humans (Qureshi *et al*., 2002).

High Triglycerides

28% ↓ Serum Triglycerides

Tocotrienol supplementation reduces serum triglycerides in humans (Zaiden *et al*., 2010).

High Blood Pressure

19% ↓ Systolic Pressure

30% ↓ Diastolic Pressure

Tocotrienol supplementation gradually lowers systolic and diastolic blood pressure (Cheng *et al*., 2017).

Diabetes

25% ↑ Glucose Tolerance

50% ↑ Insulin Tolerance

Tocotrienol supplementation improves glucose and insulin tolerance (Wong *et al*., 2015).

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References:

1. Serbinova, E., Kagan, V., Han, D., and Packer, L. (1991). Free radical recycling and intramembrane mobility in the antioxidant properties of alpha-tocopherol and alpha-tocotrienol. Free Radical Biology and Medicine, 10: 263 – 275.
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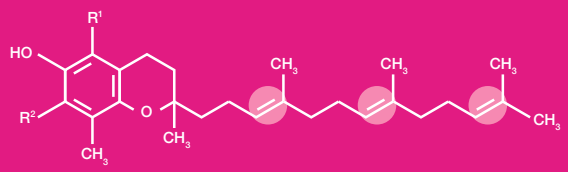
3. Zaiden, N., Yap, W.N., Ong, S., Xu, C.H., Teo, V.H., Chang, C.P., Zhang, X.W., Nesaretnam, K., Shiba, S. and Yap, Y.L. (2010). Gamma Delta tocotrienols reduce hepatic triglyceride synthesis and VLDL secretion. *Journal of Atherosclerosis and Thrombosis*, 17(10): 1019 – 1032.
4. Cheng, H.S., Ton, S.H., Tan, J.B.L. and Abdul Kadir, K. (2017). The ameliorative effects of a tocotrienol-rich fraction on the AGE-RAGE Axis and Hypertension in High-Fat-Diet-Fed rats with metabolic syndrome. *Nutrients*, 9: 984.
5. Wong, W.Y., Ward, L.C., Fong, C.W., Yap, W.N. and Brown, L. (2017). Anti-inflammatory γ- and δ-tocotrienols improve cardiovascular, liver and metabolic function in diet-induced obese rats. *Eur J Nutr*., 56 (1): 133 – 150.

Tocotrienols, The Extraordinary Vitamin E

Vitamin E is not just a single molecule, but a family of eight fat-soluble substances that are sub-divided into two classes of structurally-similar molecules. These two classes are tocopherol and tocotrienol, each of which have four structurally and chemically diverse molecules termed as alpha (α), beta (β), delta (δ), and gamma (γ) respectively.

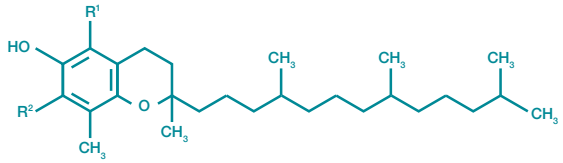
Tocotrienols have up to **60X more antioxidative potency** compared to α-Tocopherol, and have **unique anti-inflammatory properties** not seen in α-Tocopherol[1].



TOCOTRIENOLS

Tocotrienols have unsaturated isoprenoid side chains with three double bonds. This unique property gives it better flexibility with a higher efficiency of penetrating into the cell membrane. Tocotrienols are potent ANTIOXIDANTS* with unique ANTI-INFLAMMATORY properties.

α : $R' = CH_3$, $R'' = CH_3$
β : $R' = CH_3$, $R'' = H$
γ : $R' = H$, $R'' = CH_3$
δ : $R' = H$, $R'' = H$



TOCOPHEROLS

Tocopherols, in contrast, have saturated side chains. They also function as antioxidants, but this chemical structure gives them a lower antioxidative capacity as compared to tocotrienols.

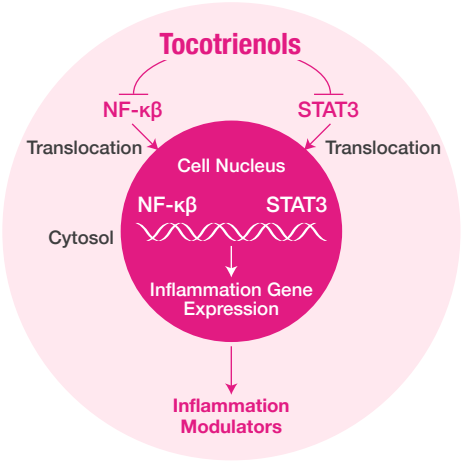
α : $R' = CH_3$, $R'' = CH_3$
β : $R' = CH_3$, $R'' = H$
γ : $R' = H$, $R'' = CH_3$
δ : $R' = H$, $R'' = H$

Tocotrienols have Unique Properties that Positively Impact Different Areas of the Body

Tocotrienols are naturally sourced from plant species like oil palm, rice and Annatto seed.

Each analogue of tocotrienol are functionally unique, with α-, β-, δ-, and γ-tocotrienol each exerting different beneficial effects on health and disease that are separate from the biological functions of α-tocopherol.

Potent Anti-Inflammatory Agent



Tocotrienols have pronounced and potent effects on NF-κβ (key master regulator of inflammation) and STAT3 (master inflammatory transcriptional factor) to reduce inflammation[2,3,4].

Reference:
1. Serbinova, E., Kagan, V., Han, D., and Packer, L. (1991). Free radical recycling and intramembrane mobility in the antioxidant properties of alpha-tocopherol and alpha-tocotrienol. Free Radical Biology and Medicine, 10: 263 – 275.
2. Guang et al. (2015). Am J Transl Res;7(9): 1612-1620
3. Ng et al. (2012). Food Chemistry; 134: 920–925
4. Aggarwal et al. (2010). Biochem Pharmacol.; 80(11): 1613–1631.

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