

# Health Benefits of Tocotrienols

## Cholesterol Reduction

- Inhibit cholesterol production in the liver, thereby lowering total blood cholesterol. (Ref 1.15,1.19)
- Alpha tocotrienol suppresses hepatic HMG-CoA reductase activity that results in the lowering of LDL cholesterol levels. (Ref 1.10)
- Tocotrienols which are naturally occurring in palm oil have been shown to suppress lower plasma cholesterol in humans. (Ref 1.20)
- Combination of gamma-tocotrienol and alpha-tocopherol is found to be a potential hypolipemic agent in hyperlipemic humans at atherogenic risk. (Ref 1.10)
- Tocotrienols inhibit cholesterologenesis by suppressing HMG-CoA reductase. (Ref 1.13)

## Reversing Arteriosclerosis

- Reverses arterial blockage (carotid arteriosclerosis), hence reducing the risk factors for cardio-vascular diseases such as arteriosclerosis and stroke. Palm based tocotrienols is the first natural compound shown by human studies to have the ability to reverse arteriosclerosis. (Ref 2.5,2.6)
- Medical human research showed that patients with confirmed carotid arteriosclerosis, who consumed 240mg of palm based tocotrienols per day for 18-36 months, had a decrease in the amount of cholesterol plaque in their carotid artery while those receiving placebo did not show such an effect. (Ref 2.5,2.6)
- Palm based tocotrienol protects the ApoE knockout mice against cholesterol build-up and hence prevent arteriosclerosis. (Ref 2.10)

## Protection Against Ischemia/Reperfusion Heart Injury

- Medical study suggests that palm based tocotrienols were more efficient than alpha-tocopherol alone in the protection of the heart against oxidative stress induced by ischemic reperfusion. (Ref 2.3)

## Inhibition of Platelet Aggregation

- Delta-tocotrienol was significantly more potent than alpha and gamma-tocotrienols in inhibiting platelet aggregation.
- Palm based tocotrienols may serve as an antithrombotic agent by decreasing platelet aggregation significantly. (Ref 2.1)

## Anti-cancer and Tumour Suppressive

- Palm based tocotrienols has been shown to inhibit human breast cancer cells irrespective of estrogen receptor status. Tocopherol has no effect at all on human breast cancer cells. (Ref 5.3)
- Delta - tocotrienol was found to be the most effective tocotrienols in inducing apoptosis (cell death) in estrogen-responsive and estrogen-nonresponsive human breast cancer cells. (Ref 5.13)
- Confers anti-cancer properties. (Ref 5.4)
- Inhibits tumor growth of certain cancers. (Ref 7.5, 5.10, 5.12, 5.11)
- Alpha-tocotrienol and gamma-tocotrienol have been shown to prolong the life span of cancer-infected mice. (Ref 7.1)
- Gamma-tocotrienol is 3 times more potent in inhibiting growth of human breast cancer cultured cells than Tamoxifen. (Ref 5.7,5.8)

## Potent Natural Super - Antioxidant

- Alpha-tocotrienol has been shown to be 40 - 60 times more potent than alpha-tocopherol as an antioxidant in the prevention of lipid peroxidation. (Ref 4.1)
- Delta-tocotrienol is the most potent antioxidant (highest antioxidant potency) of all commercially available tocotrienols and has been shown to be the most effective tocotrienol in inhibiting human breast cancer and liver cancer cells. (Ref 7.5)
- Effective antioxidant in the prevention of protein oxidation and lipid peroxidation after strenuous exercise for athletes, joggers and body builders. (Ref 4.11, 4.8)

## Anti - Aging, Cosmetics and Personal Care

- Preferentially accumulates at the strata corneum of the skin. First line of defense against free radicals generated in the skin by UV/ ozone rays. Prevention of skin aging and damage by oxidative rays. Being a more potent antioxidant, the tocotrienols neutralizes free radicals at a faster rate and hence protect tocopherols. (Ref 10.4, 10.5)
- Protection against UV-induced skin damage and skin aging. (Ref 10.4, 10.5)
- Tocotrienols topically applied onto the skin was found to penetrate rapidly through the skin and the highest concentrations were found in the uppermost 5 microns. (Ref 4.17, 10.3, 10.4, 10.5)
- Tocotrienol-treated skin contained Vitamin E concentration levels of 7 - 30 fold higher than that of control values. (Ref 10.2)
- Tocotrienol augments the efficacy of sunscreens, containing compounds that reduce penetration of, or absorb ultraviolet radiation. (Ref 10.4, 10.5)

## Lower Blood Pressure

- Palm gamma-tocotrienol has the ability to prevent development of increased blood pressure in Spontaneously Hypertensive Rats (SHR) after 3 months of supplementation. (Ref 3.2, 3.1) The End.