

# Nourish and protect skin with natural tocotrienols

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Air pollution is prematurely ageing the faces of people living in cities by accelerating wrinkles and age spots. The effects of toxic fumes on skin are being seen in both western cities as well as in more visibly polluted Asian cities. In some cases, it may be the primary cause of ageing. The pollution is also being linked to worsening skin conditions such as eczema and hives. The scientific discoveries are now driving the world's biggest cosmetics companies to search for solutions, including medicine-like compounds that directly block the biological damage. But doctors have warned some common skin care routines such as scrubs may worsen the damage from air pollution. Fortunately, there are a number of safe and natural substances that have been scientifically proven to effectively help counteract, and in some cases, even help reverse the physical signs of skin ageing such as hyperpigmentation. One of these is vitamin E tocotrienols. Taking vitamin E tocotrienols capsules is considered good for many health benefits. But very few are aware that this nutrient is amazing for skin health when it is directly applied on the affected areas.

Tocotrienols are the more potent form of vitamin E found in vegetable oils (especially palm oil), wheat germ, barley, saw

palmetto, and certain types of nuts and grains. It is used in cosmetics and personal care products because of its antioxidant properties, and is found primarily as a skin conditioning agent and UV absorber. The vitamin E tocotrienols protect cell membranes, active enzyme sites, and DNA from free radical damage, and therefore can prevent signs of ageing including wrinkles and fine lines, better than the other well-known half, tocopherol. Tocotrienol's distinct chemical structure confers it unique biochemical properties responsible for providing skin health benefits beyond antioxidation. This distinct chemical structure enables its cellular uptake in biological systems 70 times higher than  $\alpha$ -tocopherol.<sup>1</sup> Tocotrienol has excellent antioxidation activity in cells of up to 60 times higher than tocopherol<sup>2</sup> which confers its ability to help protect the skin from ageing and UV-induced damage caused by constant and prolonged sun exposure.

## Tocotrienols inhibit skin pigmentation

The study found that tocotrienols are effective in inhibiting the production of skin pigment, melanin, indicating a potential means for skin lightening. Our research showed tocotrienols' ability to promote skin

lightening through inhibition of tyrosinase, the key enzyme protein in melanin biosynthesis. In the study, tocotrienols reduce melanin production by 55% through tyrosinase inhibition that is up to 150 times more potent as compared to other skin lightening agents such as kojic acid.<sup>3</sup> Interestingly, when tocotrienols are combined with kojic acid, the two compounds work in synergy and reinforce the inhibition of enzyme tyrosinase activity.<sup>3</sup>

Another key finding of the study concerns the production of skin melanin induced by ultraviolet light (UVB). The process takes place through a mechanism that is different from the normal activation of enzyme tyrosinase. Researchers found that, among palm vitamin E members,  $\gamma$ - and  $\delta$ -tocotrienols possess the highest sun protection factor (SPF) and are effective in blocking the biosynthesis of melanin arising from exposure to UVB.<sup>3</sup> The findings of this study are highly promising in the bid for skin lightening effect of tocotrienols.

## Tocotrienols possess potent photoprotective effects

Tocotrienols have been shown to provide photoprotective effects to UV irradiation and the skin reactions (redness, swelling and itchiness) are significantly reduced. Formulations with DavosLife E3 exhibited

a radical skin factor (RSF) of 4.15. The RSF measures a substance's ability to reduce free radicals generated in the skin during UV exposure. An RSF of 4.15 suggests that tocotrienols formulations reduce free radical production in the skin resulting from exposure to the sun's harmful UVA and UVB rays by 76%.<sup>4</sup> Our research showed that topical application of DavosLife E3 after UV exposure can reduce the severity of redness to a level comparable to an over-the-counter anti-inflammatory gel.<sup>4</sup>

### Tocotrienols enhance wound healing

Fibroblasts are critical in supporting normal wound healing. They are involved in breaking down the fibrin clot and replacing it with extra cellular matrix (ECM) components such as collagen to support the other cells associated with effective wound healing. Tocotrienols trigger the migration of fibroblasts to the wound area suggesting Tocotrienol's potential role in skin repair and wound healing. The skin repair properties of DavosLife E3 was investigated using MatTek's EpiDerm FT in vitro skin model. The *in vitro* skin was treated topically with 1%  $\alpha$ -tocopherol, DavosLife E3 or control. Our research indicates that after 6 days of treatment, DavosLife E3 stimulate epidermal migration and skin repair more than twice as fast as  $\alpha$ -tocopherol.<sup>5</sup>

### Tocotrienols maintain cellular health

Results from pre-clinical studies showed that tocotrienols have the ability to prevent cellular ageing by reversing the effects of oxidative stress in human diploid fibroblasts (HDF). In addition, tocotrienols increased the length of DNA structures called telomeres. Telomeres progressively grow shorter each time a cell divides. In most cells, telomere length is closely associated with cellular ageing: the shorter the telomere, the older the cell.<sup>4</sup> A randomised, double-blind, placebo-controlled study with 64 human subjects aged 37-78 years old showed a significant reduction of DNA damage in their blood samples after 3 months of 160 mg daily dose of

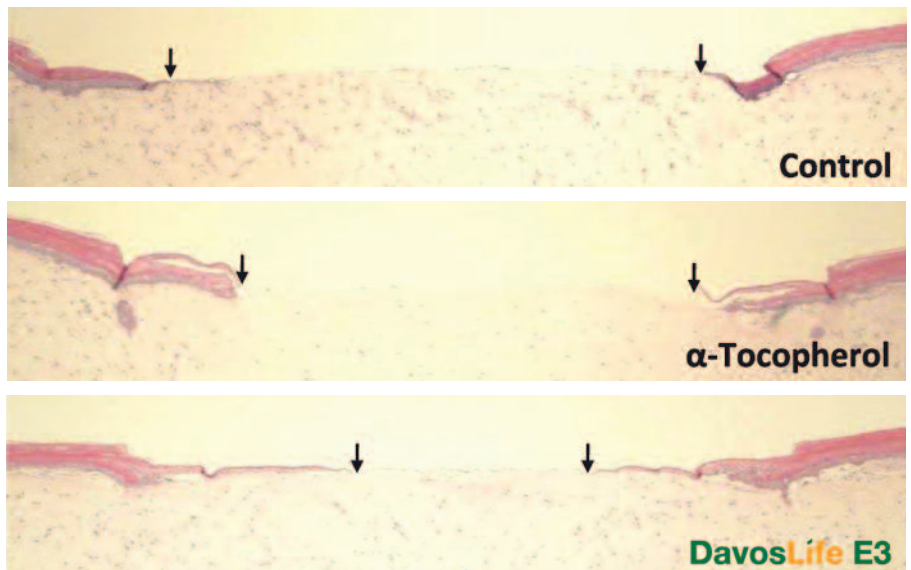


Figure 1: After 6 days of treatment, DavosLife E3 stimulates epidermal migration and skin repair more than twice as fast as  $\alpha$ -tocopherol.

tocotrienols. The positive effects continued to the end of the trial at 6 months.<sup>6</sup> Results from these studies show that tocotrienols have the potential for maintaining cellular health.

### Conclusion

DavosLife E3 (formerly known as Naturale3) DVL range of products contains a complete spectrum of all tocotrienol isomers ( $\alpha$ -,  $\beta$ -,  $\gamma$ - and  $\delta$ -) and  $\alpha$ -tocopherol, as occurs naturally in an optimal ratio for overall health benefits, not limiting to promoting skin health and protection. It is an amber coloured liquid miscible with oil, partially miscible with ethanol and immiscible with water. DavosLife E3 DVL is highly stable under wide range of pH conditions and temperature range, which make it ideal for formulation in cosmetics and personal care products. With our proprietary technology, DavosLife E3 DVL 95 has the highest

concentration of mixed tocotrienols and  $\alpha$ -tocopherol available in the market. It is suitable for skin care applications due to its less intense colour (light yellow) and viscosity.

Safety assessment conducted by the Cosmetic Ingredient Review (CIR) Expert Panel concluded that Tocotrienols are safe as used in cosmetics. DavosLife E3 DVL range of tocotrienols products have been granted attestation by Ecocert Greenlife and assessed as compliant to the Cosmos standard.

Davos Life Science will showcase DavosLife E3 range of Tocotrienol-Rich Fraction products at KLK OLEO's booth No J90 at in-cosmetics Asia, Bangkok, Thailand on 31 October to 2 November 2017. [PC](#)

### Reference:

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Tocotrienols  
Natural extracts from Palm fruits  
(*Elaeis guineensis*)