

TECHNICAL INSIGHTS

GENETIC

TECHNOLOGY ALERT



SUNFLOWER SHOOT EXTRACT DOWN REGULATES MMP-3 AND OXSR-1 EXPRESSION IN HUMAN SKIN

Excessive exposure to ultraviolet (UV) radiation, such as UVA and UVB emitted from sun will cause the skin damaging effect. Therefore, current sun-care products are formulated to provide UVB and UVA protection. However, the energy absorption of the UV-light by the filters will cause further reactions, such as free radicals and reactive oxygen species (ROS) reaction. Furthermore, studies show that sunscreen formulations are not able to fully protect the skin against sunburn cell formation and the expression of matrix metalloproteinase-3 (MMP-3) expression. The MMP-3 is capable of degrading collagen types II, III, IV, IX, and X, proteoglycans, fibronectin, laminin, and elastin, which are the important component for the maintenance of healthy skin structure. In addition, MMP-3 is able to activate other MMPs, such as MMP-1, MMP-7, and MMP-9, which are the critical enzymes responsible for reconstruction of connective tissue. Therefore, according to various investigations, MMP-3 may involve in wound repair, progression of atherosclerosis, and tumor initiation.

Mibelle Biochemistry's SunActin is an active ingredient designed to complement sun-care product, as it can counteract the negative effects of UVA and UVB radiation and protect the skin. Mibelle--is derived from the combination of organic sunflower sprouts and liposomal natural alpha-tocopherol. The mechanism of the sun protection and anti-aging properties are proven by reduction of the skin structure damaging molecular factors, MMP-3 to prevent further cascading molecular pathway.

The *ex vivo* evaluation were performed in the reconstructed human epidermis, a more efficacious and ethical way to replace animal testing. The screening of gene expression of MMP-3 and OXSR-1 (marker gene for oxidative stress) via DNA microarray, enable rapid and accurate identification of the quantitative analysis of the SunActin treatment effects according to the genetic profile in skin. In human skin fibroblast cells, SunActin was examined for its protective effect against stress-induced premature senescence. Cellular senescence is a molecular reaction induced by damaged DNA and potentially associated with ageing. Therefore, it is crucial to prevent premature senescence. According to the study by Mibelle Biochemistry, protection against premature senescence was observed compared to the untreated cells. Furthermore, SunActin is able to generate energy production in the form of

adenosine triphosphate (ATP) on human keratinocytes. Biological energy is produced by mitochondria where, glucose and other molecules are oxidized to carbon dioxide and water. Subsequently, the energy released is stored in the form of ATP. Therefore the ATP level represents the indication of ageing level. In addition to aforementioned protective features, SunActin enable synergistic effect to boost the sun protecting factor (SPF) value of the sun block product's formulation.

SunActin is well-positioned as a naturally derived active ingredient with the combination of nanotechnology. SunActin exerts the sun care product's ability to boost protective effect of sunscreens by increasing SPF; therefore, offers formulation options to reduce sunscreen filter quantities, as excessive of inorganic sunscreen filters often compromises on the rheological profile and are costly, whereas organic sunscreen filter is oily and causes skin irritation.

The impressive product positioning and successful market penetration of Mibelle Biochemistry personal care active ingredients is driven by their motto of "inspired by nature--realized by science." SunActin with two appealing benefits, sun protection and anti-aging, can be used in the personal care products formulation by both young and mature consumers--as the awareness of sun protection and early prevention on aging for both male and female are rising. Furthermore, current market trends are moving toward nature-derived product platform, SunActin with sunflower sprout extract are therefore meeting the market positioning and target consumers.

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