Antioxidants and the skin: understanding formulation and efficacy

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Abstract

Antioxidants are molecules capable of inhibiting the oxidation of other molecules. Although oxidation reactions are essential for life, they can also be damaging. All living organisms maintain complex systems of multiple types of antioxidants to protect their cells from oxidative damage. Antioxidants can also act as pro-oxidants, under certain circumstances. The efficacy and benefit of an antioxidant is, therefore, very much dependent on the delivery of the antioxidant to the organism. Topically applied antioxidants constitute an important group of pharmacologically active agents capable of preventing the occurrence and reducing the severity of UV-induced skin damage and skin aging. Antioxidants protect skin cells against the damaging effects of reactive oxygen species (ROS), such as singlet oxygen, superoxide, peroxyl radicals, hydroxyl radicals, and peroxynitrite. ROS induced oxidative stress in the skin has been linked to cancer, aging, inflammation, and photodamage. This review focuses on antioxidants used in the cosmetic industry for protection of skin, formulation methods used to enhance their efficacy, and methods used to test the efficacy of antioxidants in topical formulations.

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