

## Stabilized Retinol for Antiageing Skin-Care Formulations

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### Abstract

Retinol (Vitamin A) is a highly potent active cosmetic ingredient for skin care. In particular it is a very effective anti-ageing treatment. Premature ageing of the skin occurs as a result of excess sun exposure. Retinol is a member of the class of skin care actives called retinoids, which are known to prevent and reverse the signs of photoaged skin. The appearance of wrinkles and irregular mottled skin pigmentation are reduced. Retinol is an extremely sensitive material; it degrades rapidly in the presence of atmospheric oxygen. Until recently, special techniques to exclude oxygen during production and packaging of skin-care formulations were required in order to ensure that the activity of the retinol remained intact. RetiSTAR™ is a stabilized form of retinol that can be handled without these precautions, allowing for easier and more economical manufacturing of effective antiageing skin-care products.

### Photoageing of the skin

Solar irradiation is the primary cause for premature ageing of the skin. The ultraviolet (UV) spectrum covers the electromagnetic wavelengths from 290 – 400 nm. ( Fig.1).

UVB is the most energetic and affects cellular and extracellular components directly. For example, it causes degradation of DNA. UVA has lower energy and acts indirectly; it causes chromophores within the skin to become excited, transferring energy to oxygen and thereby causing reactive oxygen species (ROS) to form. These attack lipids and affect the mitochondria of the skin cells and they cause degradation of the extracellular matrix (collagen and elastin) of the skin. This extracellular matrix is the main structural component of the skin and damage to it causes the visual appearance of photoageing, in the form of wrinkles. UVA penetrates deeper into the skin than UVB, reaching the dermis where these structural proteins reside. Low amounts of UVB exposure can cause sunburn which is directly linked to the development of skin cancer. Overexposure to UVA can also contribute to skin cancer but it is considered to be the primary cause for premature skin ageing.

ROS, which include species such as superoxide anion ( $O_2^-$ ), singlet oxygen ( $^1O_2$ ), and hydroxide radical ( $HO\bullet$ ) cause an increase in the levels of matrix metalloproteinases (MMP), enzymes which break down collagen and elastin. These are proteins that give the skin its

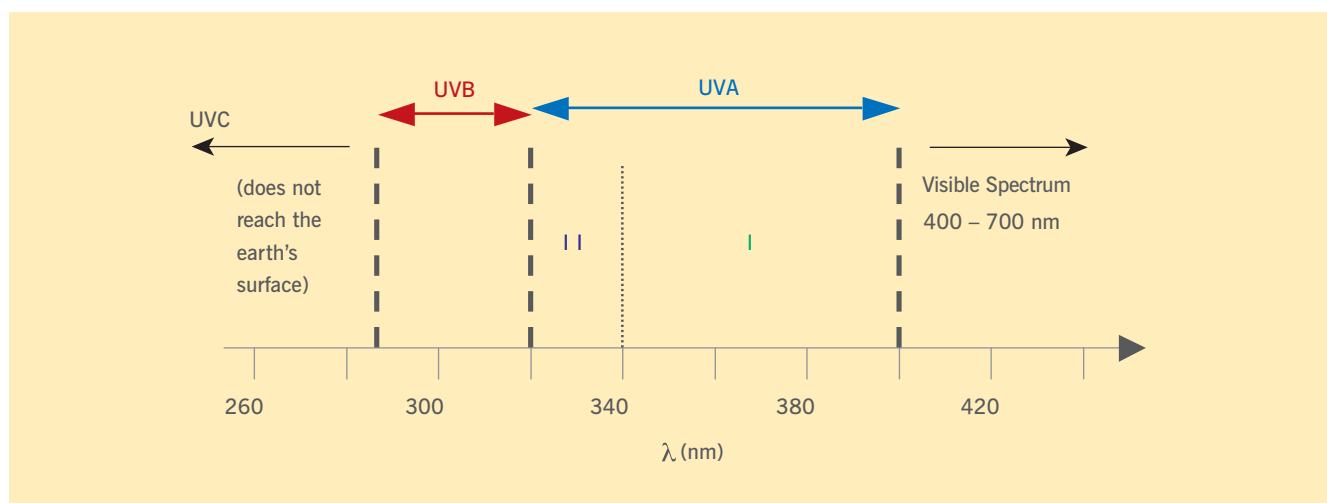


Figure 1: Solar UV radiation covers wavelengths between 290 and 400 nm