# Et-VC®

**As Potent as Vitamin C with Better Stability**

## Multi-Functional Vitamin C Derivative

## Et-VC®

Et-VC® is a Vitamin C derivative that provides superb whitening effects, serving as a potent anti-aging active that boosts collagen synthesis and protects skin from DNA damage. It exhibits strong inhibition effect on melanogenesis, reduces dark spots and age spots, fights photoaging by interfering with inflammatory cytokines and reverses ROS production to achieve free radical scavenging purpose. Et-VC® represents a newer form of Vitamin C that offers a better overall performance.

### INCI Declaration

3-*O*-Ethyl Ascorbic Acid

### Benefits

- Anti-oxidation
- Scavenge free radicals
- Protect DNA from UV
- Fight photo-aging
- Stimulate collagen synthesis
- Boost hyaluronic acid
- Anti-glycation
- Reduce dark spots
- Even out skin tone
- Inhibit melanogenesis

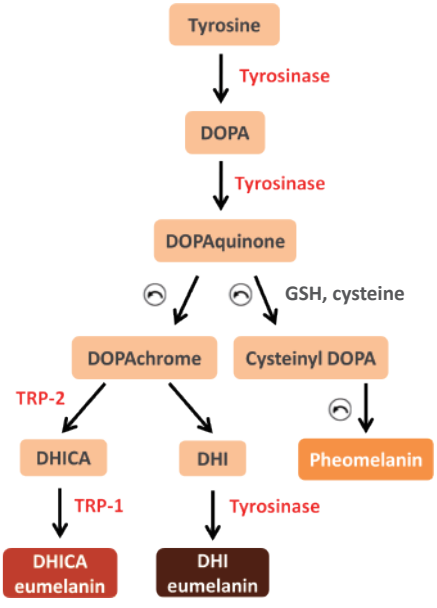
### Applications

- Skin whitening/ lightening
- Anti-aging with correction of dark spots
- Sun care products for outdoor protection
- BB/CC cream

### The Mechanism of Pigmentation

When our skin is exposed to sunlight, UV radiation penetrates through the epidermis layer to reach the basal part of the skin where melanocytes reside. Melanocytes thereafter are stimulated, followed by melanin synthesis, which are distributed and transported to neighboring keratinocytes. This process called melanogenesis which leads to skin pigmentation.

The mechanism of melanogenesis includes several steps starting with the conversion of tyrosine to DOPA, and then DOPA to dopaquinone. Both steps are catalyzed by tyrosinase, the key enzyme controlling the rate-limiting step of melanogenesis. The following auto-oxidation process facilitates dopachrome formation, leading to the production of monomers DHI and DHICA. These monomers automatically become eumelanins which cause the dark pigmentation of our skin. Two melanin generating enzymes, TRP-1 and TRP-2, are also involved in the regulation of melanogenesis.



# Et-VC®

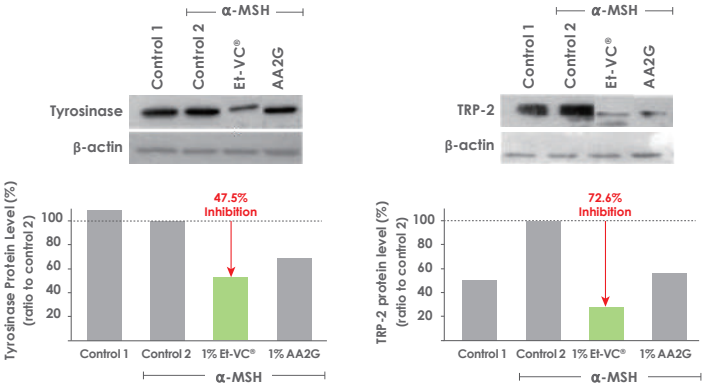
## Efficacy Study

1

### Whitening:

Inhibition of Melanin-Generating Enzymes

Et-VC® and AA2G were applied to the cells together with α-MSH at the same concentration of 1%. The western blot results show that Et-VC® has better performance on inhibiting the melanin-generating enzymes, tyrosinase and TRP-2, compared with the same applied concentration of AA2G.

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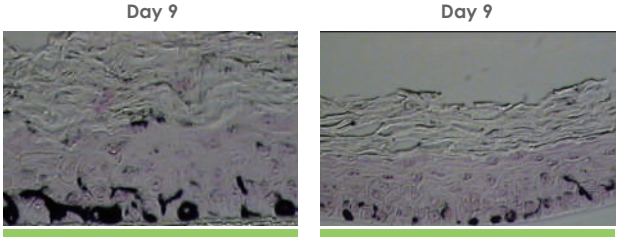
### Whitening:

Inhibition of Melanin Production

MelanoDerm™ is an *in-vitro* tissue model of human epidermis prepared from co-cultured keratinocytes and melanocytes. This assay is designed to assess the potential of a test material to induce changes in tissue pigmentation. The result shows that 3% Et-VC® has excellent ability on reducing skin pigmentation after 9 days of application.

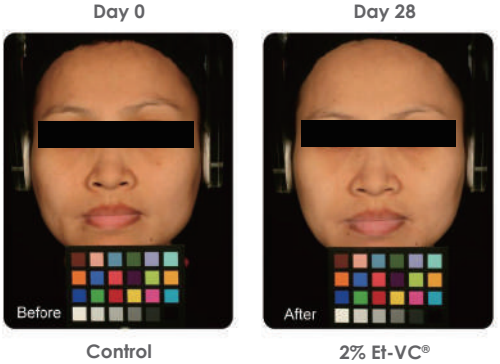



3

### Whitening:

*In-vivo* Skin Lightening Effect

A 28-day skin lightening test was carried out by Spincontrol, according to the chromometry principle. The volunteers comprised 20 healthy Asian females, aged between 25-40 years old with skin type III. A significant improvement in skin lightening was observed under 2% Et-VC® application.



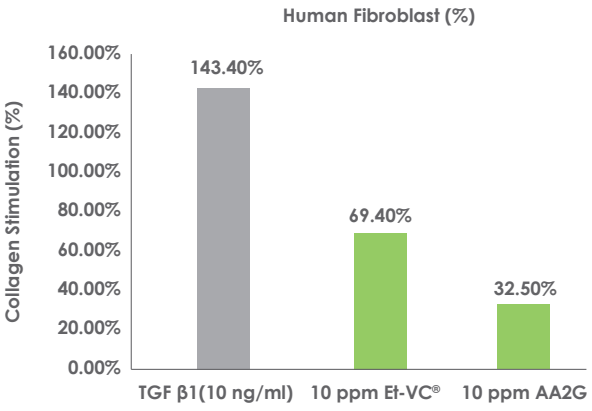
# Et-VC®

## Efficacy Study

### 4 Collagen Boosting Effect:

Natural Collagen Synthesis

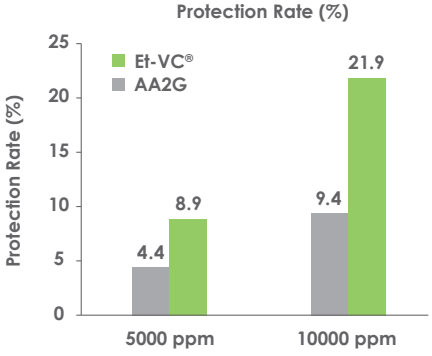
A study on collagen synthesis from fibroblast cells was performed to evaluate the collagen boosting effect. Results show an outstanding effect of Et-VC® (10ppm) on collagen synthesis compared with AA2G.




### 5 DNA Protection:

Comet Assay

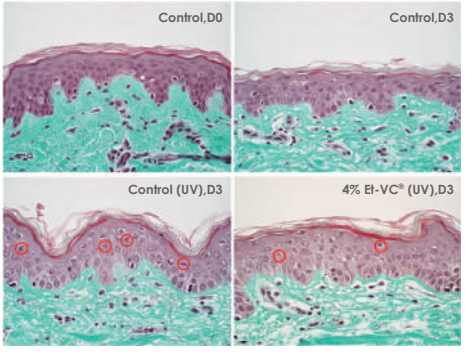
Human fibroblast cells were treated with Et-VC® and AA2G to validate their effects on DNA protection at two different concentrations: 5000 ppm and 10000 ppm. At both concentrations, Et-VC® demonstrated more than twice of the DNA protection rate, when compared with AA2G.




### 6 Sun Protection:

*Ex-vivo* Activity under UVB Irradiation

Sunburn cell (SBCs) are keratinocytes undergoing apoptosis as a protective mechanism against the carcinogenic effects of UVB irradiation. 12 human explants from a 45-year-old Caucasian woman, with skin type III, were prepared to evaluate DNA protection effect of Et-VC® against UVB. Histological results show alterations in the morphology of sample with slight spongiosis, advanced SBCs as well as less smooth surface of the explants after UVB exposure. However, the counting of SBCs along the epidermis decreased (-33.6%) under Et-VC® treatment, indicating its efficacious performance in protecting DNA from UVB damage.




*Sunburn cells are indicated by red circles.

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## Claim Ideas for Et-VC®

- Anti-oxidation
- Scavenge free radicals
- Protect DNA from UV
- Fight photoaging
- Stimulate collagen synthesis
- Boost hyaluronic acid
- Anti-glycation
- Reduce dark spots
- Even out skin tone
- Interfere with melanogenesis

## Applications

- Skin whitening/ lightening
- Correction of age spots and dark spots
- Anti-aging and wrinkle repair
- Sun care and outdoor protection

## Marketing Benefits

- Multi-functional active
- Non irritant, non-mutagenic and non-toxic
- REACH compliant, China approved and Halal approved

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