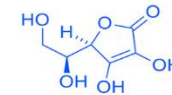




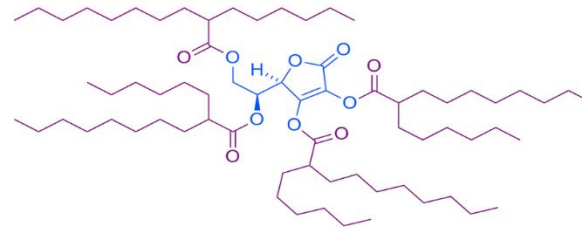
Vitamin C TetraE

Vitamin C TetraE

Vitamin C TetraE is ASCORBYL TETRAISOPALMITATE a stable, fat-soluble Vitamin C ESTER with proven efficacy



Ascorbic Acid



Ascorbyl Tetraisopalmitate

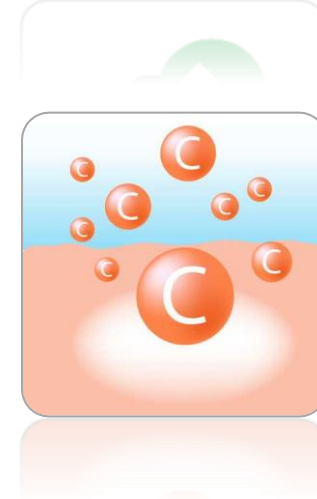
100% Elaborated & Made in France

Vitamin C TetraE vs pure Vitamin C

Vitamin C TetraE (Ascorbyl Tetraisopalmitate) is a derivative of **vitamin C** (L-ascorbic acid)

The 3 main Advantages :

- **Non-acid** form
- **Stable to Heat & Light**
- It converts very easily into **fresh Vitamin C** in the skin ; Ascorbyl Tetraisopalmitate is known to be **better absorbed** by the skin than pure Vitamine C.



The limits of pure Vit C, instability & Lifespan

Comparative analysis between pure Vit C (L-ascorbic acid) and Ascorbyl Tetraisopalmitate:

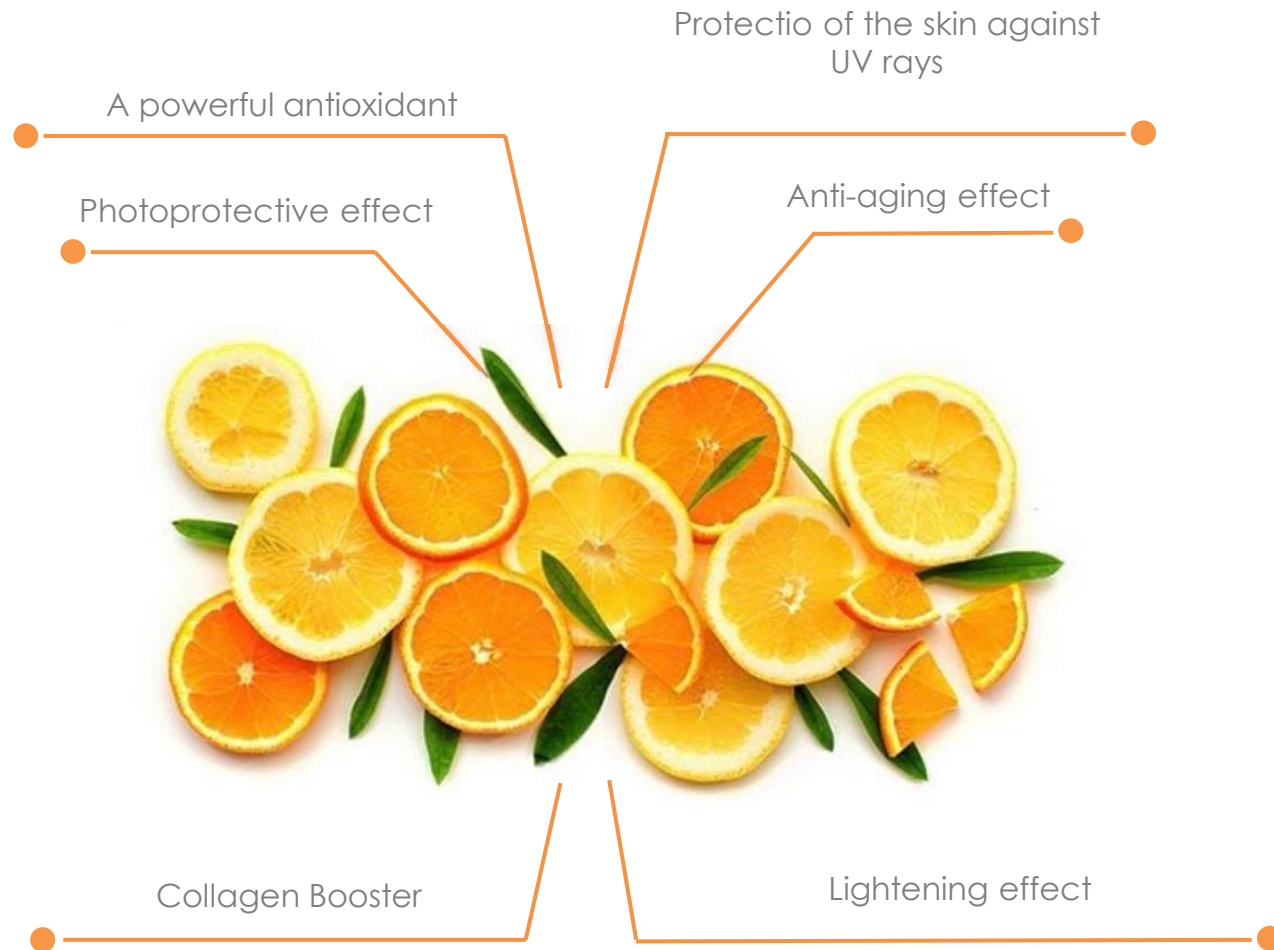
- Pure vitamin C is an unstable molecule, almost half degrades in 30 minutes by oxidation (1) (2). In topical application, fat-soluble Ascorbyl Tetraisopalmitate easily penetrates the skin or biological membranes and thus releases pure vitamin directly at the intracellular level (6). A contrario, when applied topically, most pure vitamin C does not penetrate and has very little chance of reaching the target cells of the skin. It is thus almost impossible to penetrate L-ascorbic acid into the dermis at the optimal dose (3).
- In formulation, Ascorbyl Tetraisopalmitate does not require a low pH (acidic) environment to penetrate the skin. This greatly opens up the formulation spectrum while avoiding excessive acidification that is damaging to the skin.



VS



The benefits of vitamin C for the skin

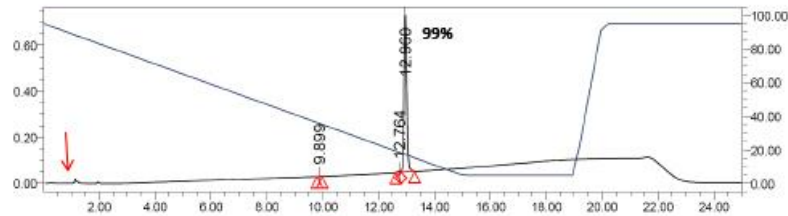


Vitamin C TetraE, > 98% purity (LC-UV)

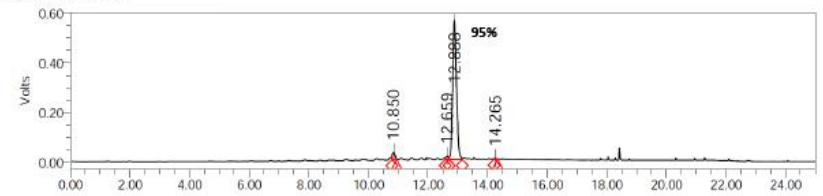
LC UV (220 nm)

LC Corona

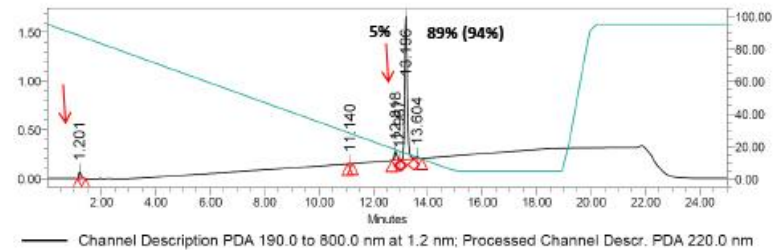
Vitamin CTetraE



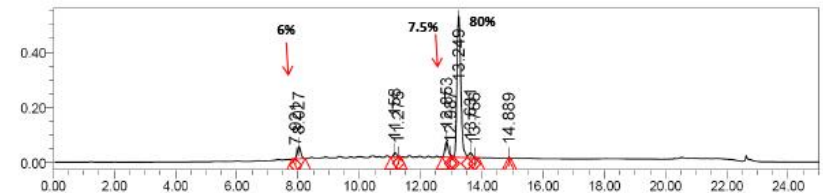
Vitamin CTetraE



Positive Control



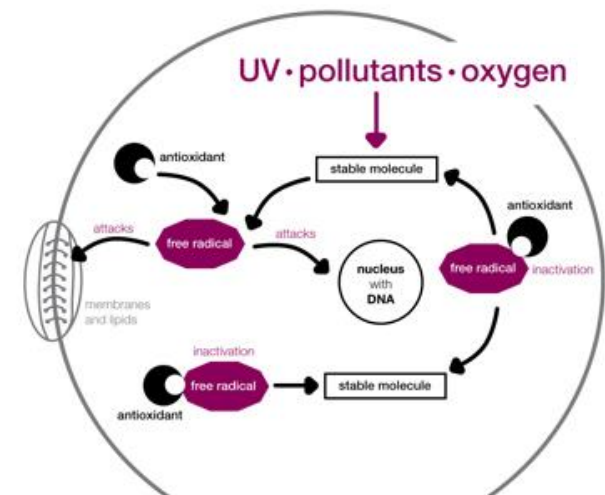
Positive Control



Vitamin C TetraE, a strong antioxidant

- The skin is the organ most exposed to the environment
- Reactive Oxygen Species or ROS begin to build up in your body and more specifically in the skin (14) as we age.
- Oxidative stress also increases with exposure to environmental pollutants and UV rays (13)(17).
- An increase in oxidative stress damages the skin. This stress has the effect of stimulating the production of melanin, blocking the synthesis of collagen while stimulating its degradation. The result is skin that wrinkles and is dotted with age spots, with uneven pigmentation(15).

- Ascorbyl tetraisopalmitate is the vitamin C derivative known for its ability to neutralize ROS at the intracellular level (8).
- Ascorbyl tetraisopalmitate has shown its beneficial action on hair damaged by oxidative stress (17).



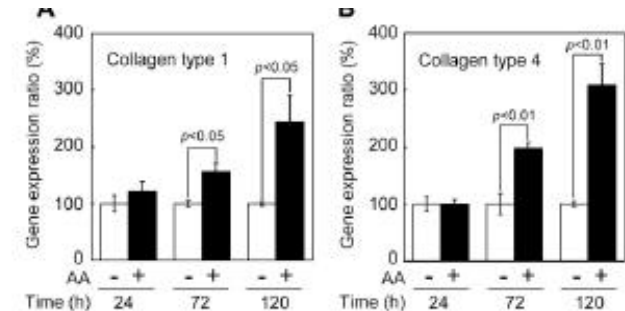
Vitamin C TetraE, A powerful Anti-Age

- The main signs of aging are wrinkles, uneven complexion, rough skin texture and reduced radiance of the complexion. These visual effects start at the heart of the skin and are the result of reduced collagen production, increased photosensitivity and decreased hydration. These causes can be correlated to poor diet, overexposure to the sun, environmental pollutants and poor hydration(18).
- Vitamin C and its derivatives help improve the appearance of the skin, thanks to their anti-aging benefits: better cell survival, better hydration, smoother skin and more collagen synthesis (11) (19) (20) .



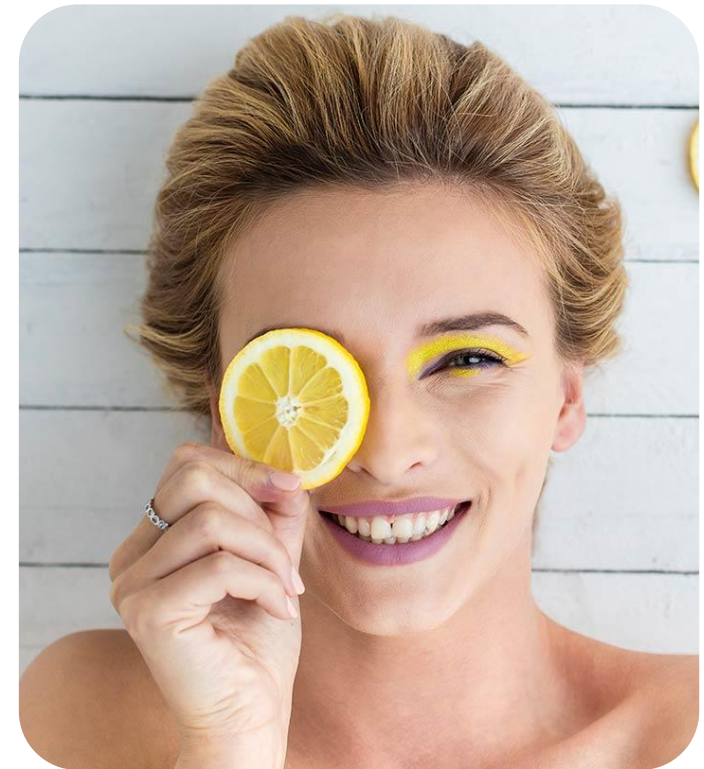
Vitamin C TetraE, Collagen Booster

- Collagen is a major constituent protein fiber of the skin. This fiber ensures the architecture and maintenance of the skin. It gives the skin a firm and youthful appearance.
- In time, and under the influence of environmental attacks, UV rays, pollutants and other free radicals, the skin sees this fiber degrade. Another internal natural factor acts on the degradation of collagen, it is the Collagenase enzyme, it is the natural agent of collagen degradation. This enzyme achieves rapid degradation of skin collagen (27).
- The use of care products containing Ascorbyl tetraisopalmitate allows an increase in the synthesis of collagen (11) (12) (16).



Vitamin C TetraE, Photoprotective Effect against UV

- Over time, exposure to UV rays, whether natural or due to tanning, alters the skin and its appearance. UV exposure causes inflammation of the superficial layers of the skin (epidermis and dermis). This exposure causes deep damage to the DNA of skin keratinocytes (the superficial cells of the skin) and causes them to die rapidly after a process called apoptosis. In addition, UV rays increase the thickness of the skin and also increase its production of melanin. This results in thick, coarse, wrinkled and hyper-pigmented skin (21).
- Thanks to its high penetration capacity (6) (8), Ascorbyl Tetraisopalmitate quickly and effectively protects the keratinocytes of the skin.



Vitamin C TetraE, Melanogenesis under control

- The skin contains specialized cells that allow you to tan: the melanocytes. These cells produce melanin pigments. These color pigments are brown or red, brown melanin protects your skin from damage caused by UV rays (22).
 - The production of melanin is carried out in the melanocytes by a number of enzymes. Most skin whitening ingredients have a melanin-reducing effect, primarily due to their ability to reduce the activity of tyrosinase, an enzyme essential for melanin synthesis. Ascorbic acid has no tyrosinase inhibitory activity. Vitamin C reduces melanin production by strengthening the body's intrinsic anti-oxidant mechanisms and this prevents overproduction of melanin (23).
 - With usual vitamin C preparations, there is a weak melanogenesis suppressing effect (24).
- while many clinical studies show that with products based on Ascorbyl tetraisopalmitate, a significant lightening of the skin and a reduction in melanogenesis (7) (8) (9) (10) (25) (26) .



Vitamin C TetraE, Technical datas

- INCI: Ascorbyl tetraisopalmitate
- CAS: 183476-82-6
- CHINA COMPLIANT (Index 04106)
- NATURAL INDEX ACCORDING TO INTERNATIONAL STANDARD ISO 16128 = 0,91
& AND NATURAL ORIGIN INDEX ACCORDING TO INTERNATIONAL STANDARD ISO 16128 = 1
- Quasi-drug statute in Japan at 3%
- Whitening statute in Korea at 2%
- APPEARANCE, clear to light yellow
- FORMULATION: To add in the oil phase
- STORAGE CONDITIONS: Container closed, 24 months in the dark at room temperature
- DOSAGE of use : 1 to 3%

Vitamin C TetraE , conclusion

1. Antioxidant effect, it blocks oxidative stress (5)(8)
2. Anti-aging effects (9)(19)
3. Photoprotective effect, it protects the skin from attacks by ultraviolet (UV) rays (5) (8)(10)
4. Brightening effect: it improves skin radiance by reducing melanin production (7)(10)
5. Collagen booster effect: it strengthens the skin in collagen for a more youthful appearance (9)(11)(12)(16)(19)



Bibliographie

1. Pumori Saokar Telang. *Vitamin C in dermatology*. *Indian Dermatol Online J*. 2013 Apr-Jun; 4(2): 143–146.
2. Linster CL, Van Schaftingen E. *Vitamin C. Biosynthesis, recycling and degradation in mammals*. *FEBS J*. 2007 Jan;274(1):1-22.
3. Duconge J et al. *Pharmacokinetics of vitamin C: insights into the oral and intravenous administration of ascorbate*. *P R Health Sci J*. 2008 Mar;27(1):7-19.
4. Karin Ried et al. *The acute effect of high-dose intravenous vitamin C and other nutrients on blood pressure: a cohort study*. *Blood Press Monit*. 2016 Jun; 21(3): 160–167.
5. Patricia MBG et al. *In Vitro Antioxidant and In Vivo Photoprotective effects of an Association of Bioflavonoids with liposoluble Vitamins*.
6. N.C.F. Machado et al *Assesment of penetration of Ascorbyl tetraisopalmitate into biological membranes by molecular dynamics* *Computers in Biology and Medecine* 75 (2016) 151-159.
7. Shaher Dochi et al. *Microcapsules for Effective Skin Lightening Formulations*. *EURO COSMETICS Technology R&D Skin Lightening* (2021/06).
8. Ochiai Y et al. *A new lipophilic pro-vitamin C, tetra-isopalmitoyl ascorbic acid (VC-IP), prevents UV-induced skin pigmentation through its anti-oxidative properties*. *J Dermatol Sci*. 2006 Oct;44(1):37-44.
9. Sujata R Mehta-Ambalal et al. *Neocollagenesis and Neoelastinogenesis: From the Laboratory to the Clinic*. *J Cutan Aesthet Surg*. 2016 Jul-Sep; 9(3): 145–151.
10. Makino ET et al. *Evaluation of a hydroquinone-free skin brightening product using in vitro inhibition of melanogenesis and clinical reduction of ultraviolet-induced hyperpigmentation*. *J Drugs Dermatol*. 2013 Mar;12(3):s16-20.
11. Ida Dulinska-Molak et al. *Determining the effectiveness of vitamin C in skin care by atomic force microscope*. *Microscopy Research & technique* (September 2019) Vol 82, Issue 9 ; p 1430-1437.
12. Desmond Fernandes et al. *Combating photoaging with percutaneous collagen induction*. *Clinics in Dermatology* (2008) 26, 192-199.
13. Michael Schieber et al. *ROS Function in Redox Signaling and Oxidative Stress*. *Curr Biol*. 2014 May 19; 24(10): R453–R462.
14. Mark Rinnerthaler et al. *Oxidative Stress in Aging Human Skin*. *Biomolecules*. 2015 Jun; 5(2): 545–589.
15. Kruk J et al. *Oxidative stress and skin diseases: possible role of physical activity*. *Asian Pac J Cancer Prev*. 2014;15(2):561-8.
16. Matthias C. Aust et al. *Percutaneous collagen induction therapy: An alternative treatment for burn scars*. *BURNS* 36 (2010) 836-843.
17. Misono Takeshi et al. *Improvement of hair damage by lipophilic Vitamin C (Ascorbyl Tetraisopalmitate)* *Journal of Society of Cosmetic Chemists of Japan*, 2018 spetember ; 205-209.
18. Puizina-Ivić N et al, *Skin aging*. *Acta Dermatovenerol Alp Pannonica Adriat*. 2008 Jun;17(2):47-54.
19. GC Bonilha et al. *Rheological, texture, and sensory analyses and in vivo clinical efficacy of cosmetic formulations containing ascorbyl tetraisopalmitate*. *Biomed Biopharm Res*. 2020; 17(1): 90-101
20. Diana Crisan et al. *The role of vitamin C in pushing back the boundaries of skin aging: an ultrasonographic approach*. *Clin Cosmet Investig Dermatol*. 2015; 8: 463–470.
21. John D’Orazio et al. *UV Radiation and the Skin*. *Int J Mol Sci*. 2013 Jun; 14(6): 12222–12248.
22. Jody P. Ebanks et al. *Mechanisms Regulating Skin Pigmentation: The Rise and Fall of Complexion Coloration*. *Int J Mol Sci*. 2009 Sep; 10(9): 4066–4087.
23. Panich U et al. *Inhibition of UVA-mediated melanogenesis by ascorbic acid through modulation of antioxidant defense and nitric oxide system*. *Arch Pharm Res*. 2011 May;34(5):811-20.
24. Lee SA et al. *Ascorbic acid increases the activity and synthesis of tyrosinase in B16F10 cells through activation of p38 mitogen-activated protein kinase*. *Arch Dermatol Res*. 2011 Nov;303(9):669-78
25. Stacey J Pilkington et al. *The Tricky Tear Trough: A Review of Topical Cosmeceuticals for Periorbital Skin Rejuvenation*. *J Clin Aesthet Dermatol*. 2015 Sep; 8(9): 39–47.
26. James H. Herndon JR et al. *Hydroquinone-free Skin Brightener System for the Treatment of Moderate-to-severe Facial Hyperpigmentation*. *J Clin Aesthet Dermatol*. 2014 May; 7(5): 27–31.
27. Taihao Quan et al. *Elevated Matrix Metalloproteinases and Collagen Fragmentation in Photodamaged Human Skin: Impact of Altered Extracellular Matrix Microenvironment on Dermal Fibroblast Function*. *J Invest Dermatol*. 2013 May; 133(5): 1362–1366.



EPHYLA SAS

18 parc d'activités de l'Estuaire
56190 ARZAL - FRANCE
+33 (0)2 97 44 61 40

www.ephyla.fr

contact@ephyla3.com

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