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Unique&Easy Micro-Encapsulation Solutions

2101

MultiSal® Vitamins C+E

Dual Antioxidant Encapsulation for Brighter, Younger-Looking

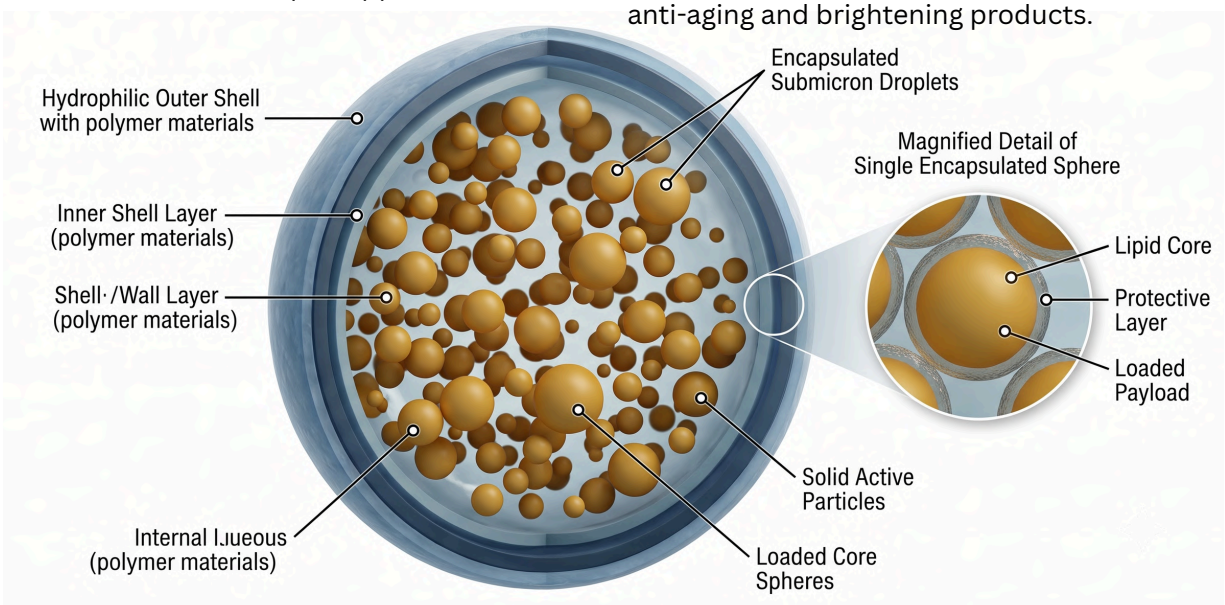
MultiSal Vitamins C+E (MS Vit C+E) is an advanced encapsulation technology designed to maximize the benefits of two of the most recognized antioxidants in skin care: Vitamin C (Ascorbic Acid) and Vitamin E (Tocopherol).

By combining these actives within protective microspheres, MS Vit C+E improves stability, extends shelf life, and enables sustained delivery to enhance skin performance and the consumer experience.

MS Vit C+E utilizes Salvona's proprietary double-layer encapsulation technology. Vitamin C and Vitamin E are first encapsulated in submicron delivery spheres and then re-encapsulated within approximately 10-30-micron microspheres. This architecture improves stability, protects sensitive antioxidants, simplifies formulation, and delivers fresh antioxidants to the skin upon application.



MS Vit C+E transforms highly reactive antioxidants into a free-flowing powder that can be easily incorporated into a wide range of cosmetic formulations. The encapsulation protects the Vitamins from oxidation and discoloration while preserving activity, allowing formulators to create more robust and effective anti-aging and brightening products.



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MS Vit C+E Technology Architecture

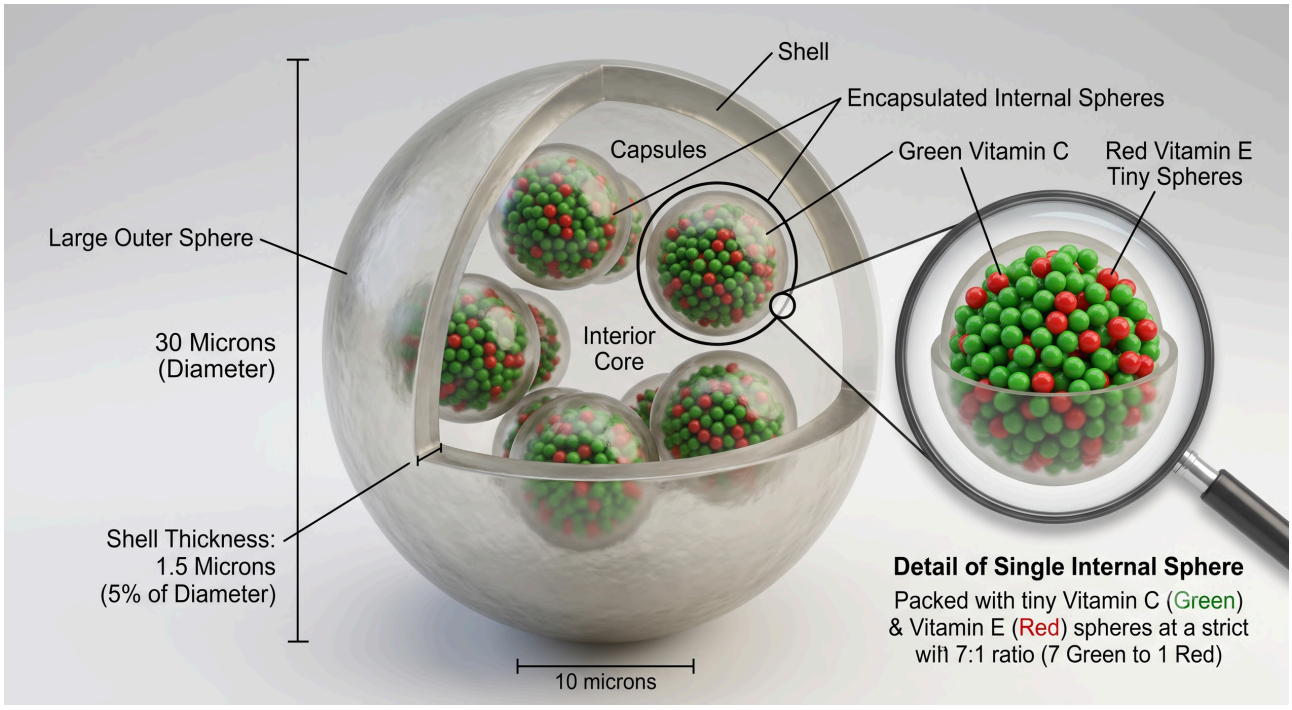
MS Vit C+E utilizes Salvona's proprietary double-layer encapsulation technology designed to maximize antioxidant stability, improve handling, and optimize delivery performance.

In the first stage, Vitamin C and Vitamin E are encapsulated individually or together within submicron delivery spheres, protecting these highly sensitive antioxidants from oxygen, moisture, light, and interactions with other formulation ingredients. The lipid property of tocopherol also functions as the inner core of the sphere.

These antioxidant-loaded submicron particles are then incorporated into a second encapsulation step, where they are re-encapsulated within larger, approximately 10-30 micron porous microspheres.

This dual encapsulation structure provides an additional protective barrier during manufacturing, storage, and formulation processing while converting reactive liquid or sticky materials into a free-flowing powder.

Upon application to the skin, friction, moisture, and mechanical forces gradually release the submicron antioxidant reservoirs, making fresh Vitamin C and Vitamin E available at the skin surface as needed.



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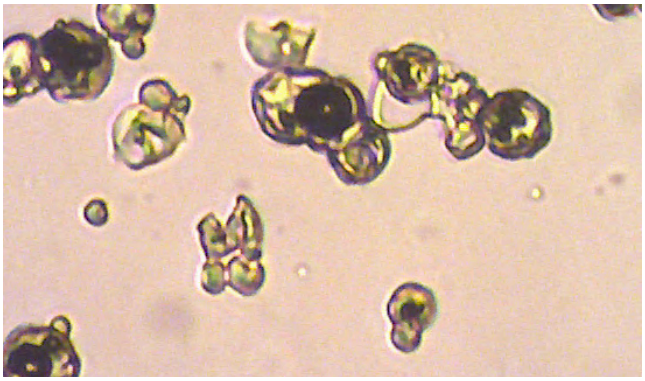
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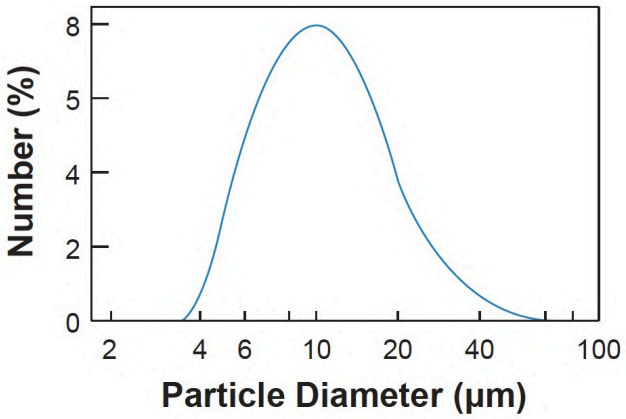
This unique architecture offers several advantages:

- Superior protection against oxidation and degradation.
- Improved shelf stability compared with conventional Vitamin C systems.
- Easier incorporation into emulsions, powders, sticks, and anhydrous formulations.
- Enhanced sensory properties and formulation flexibility.
- Controlled release of antioxidants during product use.
- The ability to formulate high-performance antioxidant products without complex stabilization strategies.

The result is a highly stable, easy-to-use antioxidant delivery system that combines the potency of fresh Vitamin C and Vitamin E with the manufacturing benefits of a free-flowing powder ingredient.



Microscopy (x60) of dry MS Vit C+E shows round spheres with an average diameter of 10 microns.



The particle size distribution of dry none aglomorated powder



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Technical Data

INCI: L-Ascorbic Acid, L-Alpha Tocopherol, Sodium Starch Octenylsuccinate, Corn Starch, Silica

Specicifications

Specifications	Characteristics
Appearance @ 20°C	Free flowing powder
Color	Off-white
Odor	Characteristic
pH (1 % solution)	3.0 ± 1.0
Storage (°C)	Closed container at 12-32°
Shelf Life (months)	24
Loading	Vit C: 7% Vit E: 21%

Marketing Claims

- Dual Antioxidant Technology
- Stabilized Vitamin C
- Advanced Free Radical Protection
- Supports Collagen Production
- Brightens and Illuminates Skin
- Helps Improve Skin Tone Uniformity
- Helps Reduce Visible Signs of Aging
- Encapsulated for Extended Performance
- Clean Beauty Compatible
- Suitable for Sensitive Skin Formulations

Key Benefits

Benefit	Explanation
Enhanced Stability	Protects Vitamin C and E from oxidation, heat, moisture, and light exposure.
Extended Shelf Life	Reduces discoloration and potency loss commonly associated with free Vitamin C.
Dual Antioxidant Synergy	Vitamin C regenerates oxidized Vitamin E, creating a stronger antioxidant network.
Brighter Skin	Helps improve skin radiance and reduce the appearance of uneven skin tone.
Collagen Support	Vitamin C supports collagen synthesis for firmer, younger-looking skin.
Environmental Protection	Helps defend skin against pollution and free radical damage.
Easy Formulation	Free-flowing powder disperses easily into emulsions, powders, sticks, and anhydrous systems.
Sustained Performance	Encapsulation provides controlled availability of actives on the skin surface.

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Recommended Applications

- Skin Care
- Anti-aging serums
- Brightening creams
- Night repair treatments
- Moisturizers
- Eye creams
- Facial masks
- Color Cosmetics
- Primers
- Foundations
- BB and CC creams
- Powder makeup
- Lip Care
- Lip balms
- Lip oils
- Lipsticks
- Body Care
- Body lotions
- Hand creams
- After-sun products

Typical Formulation Levels

Application Use Level

- Facial Serum 2–5%
- Anti-Aging Cream 3–7%
- Brightening Lotion 2–5%
- Eye Cream 1–3%
- Lip Balm 1–3%
- Powder Makeup 1–5%



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Demonstration of Antioxidant Protection Using an Apple Browning Model

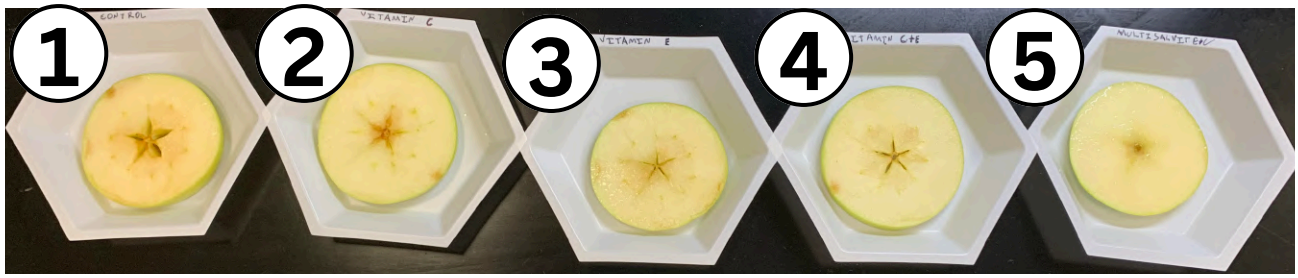
To illustrate the protective effects of Vitamin C and Vitamin E in both free and encapsulated forms, we designed a simple experiment using the natural browning of fresh apple slices as a model for oxidative degradation.

Fresh apple slices were prepared and divided into five treatment groups. Each group received an equivalent amount of antioxidant in different forms, including free and encapsulated systems, allowing a direct comparison of their ability to inhibit oxidation over time.

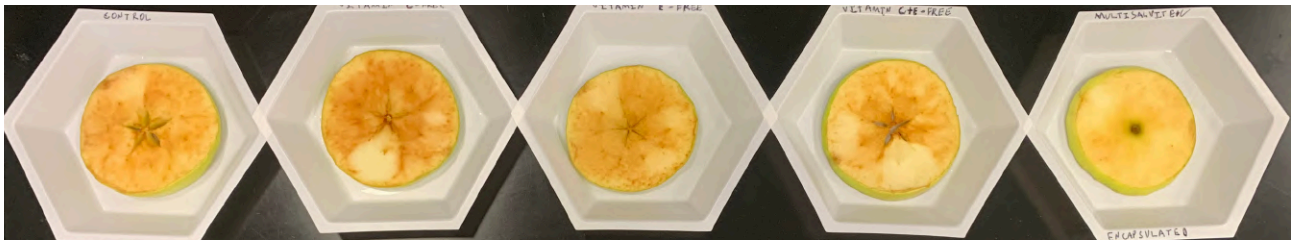
Apple browning results from enzymatic oxidation and provides a rapid, visible indication of antioxidant effectiveness. The extent of browning was monitored throughout the study using both visual observations and objective instrumental color measurements.

The results demonstrate the ability of encapsulation technology to preserve antioxidant activity and provide sustained protection against oxidation compared with conventional free antioxidants, highlighting the advantages of MS Vit C+E in terms.

Immediately after application



24 Hours after application



The oxidation process was simulated on fresh-cut apple slices. The top photo shows immediately after addition, and the bottom shows after six hours.

- 1: Control, no treatment; 2: Free Vitamin C, 3: Free Vitamin E, 4: Free Vitamin C and Vitamin E, 5: MS Vit C+E.

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Oxidation causes apple tissue to progressively darken over time due to enzymatic browning reactions. Colorimetric analysis was performed to quantitatively evaluate changes in apple color following treatment with the different antioxidant test groups.

The following figure presents antioxidant performance using the colorimetric parameter L* (lightness), which measures brightness on a scale ranging from 0 (black) to 100 (white). Higher L* values indicate reduced browning and, therefore, greater protection against oxidative degradation.



Vitamin Dust™

Vitamin Dust™ is a new generation of targeted skin treatment that delivers fresh antioxidants directly where they are needed most. This ultra-fine powder combines MultiSal® Vitamin C+E microspheres with a silky cosmetic powder for immediate absorption and an elegant skin feel. Consumers simply apply the powder with a fingertip to areas of hyperpigmentation, age spots, or uneven skin tone. The proprietary double-layer encapsulation protects Vitamins C and E until application, delivering potent antioxidants in a concentrated, water-free, and highly stable format for extended performance.



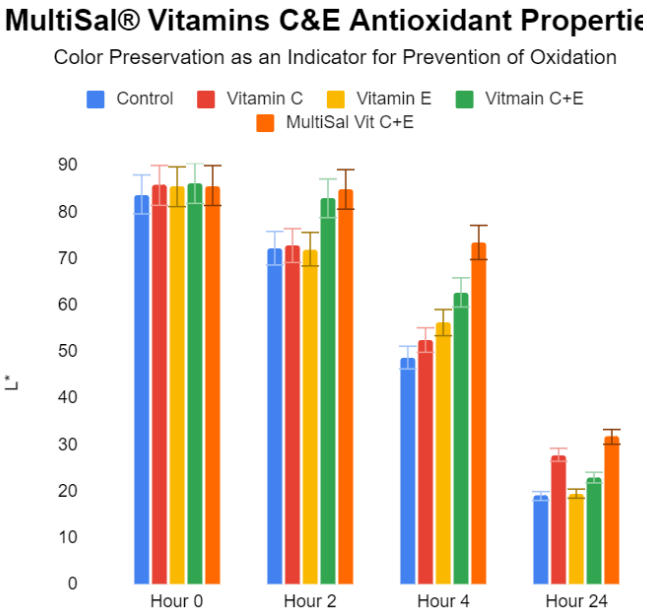


Figure 3: Luminescence of apple slices after applying test groups over 24 hours.

The control, Vitamin C, and Vitamin E test groups experienced higher oxidation levels immediately, and this persisted over time. Free Vitamins C+E suppressed oxidation better than the individual vitamins, but the effect was not sustained. MS Vit C+E **proved to be the most suitable antioxidant over extended periods.**

MultiSal® technology platform can be adapted for food and nutraceutical applications.

The current MS Vit C+E product is sold for skin care.
The limiting factor is not the encapsulation technology itself, but rather the regulatory status and food approval of each ingredient used in the formulation and manufacturing process. The current cosmetic version contains ingredients and processing aids selected for topical use rather than ingestion.
Salvona can adapt MultiSal® Vitamin C+E for food and nutraceutical applications through a custom encapsulation development project. The food-grade version would be formulated with food-approved vitamins, lipids, emulsifiers, carriers, and processing aids to support stability, shelf life, taste masking, and controlled delivery.

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Stability of MultiSal® Vit C+E in a Lotion

Formulation

The stability of MS Vit C+E was evaluated in a standard lotion formulation and compared with free Ascorbic Acid under accelerated aging conditions.

A lotion containing 1% MS Vit C+E was prepared and compared against a control lotion containing an equivalent level of 1% free Ascorbic Acid.

Both formulations were subjected to accelerated stability conditions consisting of continuous exposure to 40°C and UV light for 7 days to simulate the oxidative and photochemical stresses encountered during product storage and use.

Following incubation, the formulations were evaluated for visual appearance and color change.

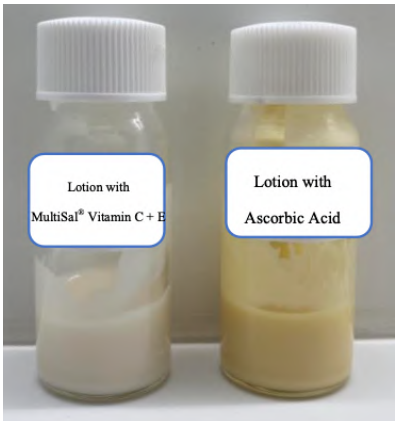
Results: The lotion containing free Ascorbic Acid exhibited significant discoloration and evidence of oxidative degradation, whereas the formulation containing MS Vit C+E maintained substantially better color stability and appearance.

These results demonstrate the ability of Salvona's proprietary double-layer encapsulation technology to protect sensitive antioxidants from heat, light, and oxygen, thereby preserving product aesthetics, extending shelf life, and maintaining antioxidant performance throughout the product's intended life cycle.

Time: 0



7 days at Room Temperature



7 days at 40 °C



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Consumer Experience

For a facial serum containing MS Vit C+E, consumer perception and clinical outcomes will depend on the loading of the MultiSal microspheres and the overall formulation.

Assuming a typical 1- 3% antioxidant delivery level, the following consumer benefits would be realistic and defensible for a 4–8-week consumer study.

Short-Term Benefits (2–4 Weeks)
Expected consumer-perceived improvements:

Benefit	Expected Consumer Perception
Skin radiance	Moderate to significant improvement
Skin brightness	Noticeable improvement
Skin texture	Smoother appearance
Hydration	Improved skin comfort
Even skin tone	Mild to moderate improvement
Overall appearance	Improved healthy appearance





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The combination of Vitamin C (Ascorbic Acid) and Vitamin E (Tocopherol) is considered one of the most effective antioxidant systems in cosmetic science because the two vitamins protect different parts of the skin and regenerate each other, creating a synergistic effect greater than either ingredient alone.

Benefit	Explanation	Key Reference
Synergistic Antioxidant Protection	Vitamin C protects the aqueous phase of the skin while Vitamin E protects lipid membranes and sebum. Together they provide broader protection against oxidative stress.	Burke KE, *Photoprotection of the Skin with Vitamins C and E* (2011). (ResearchGate)
Vitamin C Regenerates Vitamin E	During antioxidant activity, Vitamin E becomes oxidized. Vitamin C restores oxidized Vitamin E back to its active form, extending antioxidant performance.	Al-Niaimi & Chiang, *Topical Vitamin C and the Skin* (2017). (PMC)
Enhanced UV Protection	Topical Vitamin C and E together provide significantly greater photoprotection than either vitamin alone.	Lin et al., *J Am Acad Dermatol* (2003). (ResearchGate)
Reduced Photoaging	The combination reduces oxidative damage associated with wrinkles, loss of elasticity, and collagen degradation.	Burke KE (2011). (ResearchGate)
Supports Collagen Production	Vitamin C stimulates collagen synthesis while Vitamin E protects newly formed collagen fibers from oxidative degradation.	Al-Niaimi & Chiang (2017). (PMC)
Improved Skin Brightening	Vitamin C inhibits melanin formation while Vitamin E reduces oxidative inflammation associated with pigmentation disorders.	Rattanawiwatpong et al. (2020). (PMC)
Improved Barrier Function and Hydration	Vitamin E supports skin barrier lipids and reduces TEWL, while Vitamin C supports dermal structure and repair.	Clinical and dermatological literature. (Verywell Health)
Reduced Environmental Damage	The combination protects against UV radiation, pollution, ozone, and particulate matter-induced oxidative stress.	SkinCeuticals CE Ferulic data and dermatology literature. (SkinCeuticals)

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