SALVONA
Unique&Easy Micro-Encapsulation Solutions

MultiSal™ Asta (MS AS)

Natural environmental protection for your skin

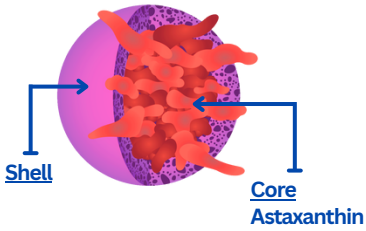


Figure 1: The structure of MultiSal® Astaxanthin, a microsphere composed of hydrophobic center and hydrophilic shell.

WHAT IS ASTAXANTHIN?

Astaxanthin is a blood-red pigment (carotenoid) naturally occurring in microalgae and aquatic animals. The algae undergoes stress via one or a combination of conditions ranging from the lack of nutrients, increased salinity, and excessive sunshine to create astaxanthin. Astaxanthin's properties support the survival of the cell.

The species that consume this stressed freshwater microalgae—salmon, red trout, red sea bream, flamingos, crustaceans (shrimp, krill, crabs, lobsters, and crayfish)—acquire the pigmentation of the red-orange hues in their appearance.

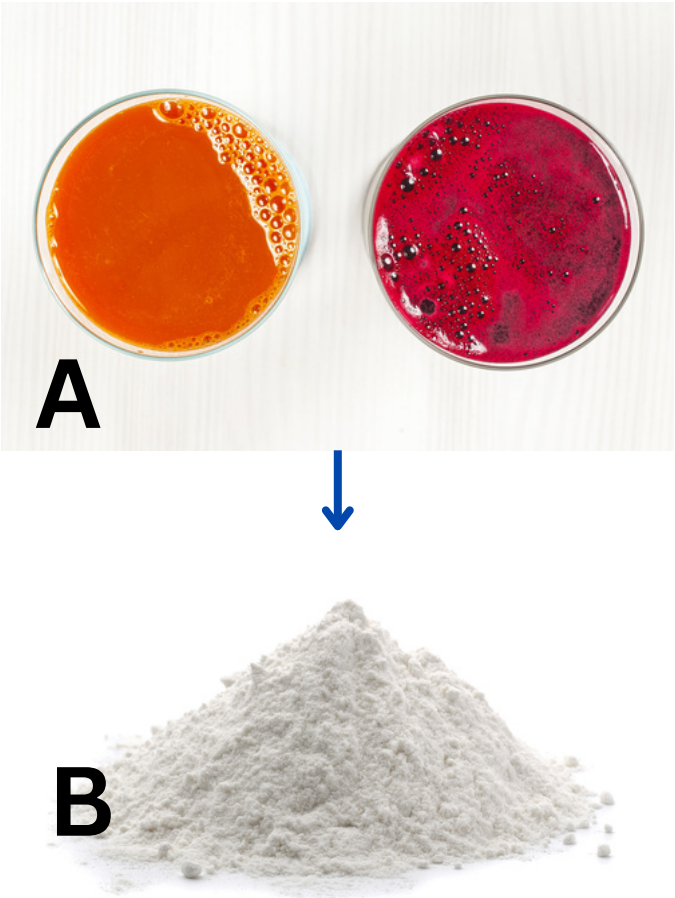


Figure 3: Astaxanthin: A, free form, B: MultiSal™ Asta

UNIQUE FEATURES

A STRONG ANTIOXIDANT

Astaxanthin has strong antioxidant properties linked to improving skin health, protecting cells from damage, and improving the immune system's functions. The antioxidant values of ingredients are expressed in Oxygen Radical Absorbance Capacity (ORAC) units. ORAC value for astaxanthin is 2,822,200. It is up to 6,000 times the antioxidant power of vitamin C, 800 times that of CoQ10, and 550 times that of vitamin E. Studies have suggested astaxanthin protects against oxidation and the effects of ultraviolet light.

BENEFITS FOR THE SKIN

Studies have also shown an increase in moisture retention and elasticity of the skin, as well as skin smoothness and a decrease in inflammation, fine lines, and wrinkles after 4 weeks of use. Astaxanthin reduces erythema in healthy human subjects. Studies show that astaxanthin has anti-inflammatory properties that, in concert with the inhibition of melanin formation, may contribute to the reduction of hyperpigmentation.

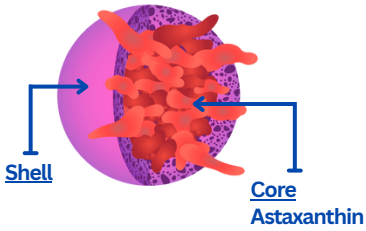
ENVIRONMENTAL PROTECTION

Astaxanthin in algae is a protective agent against the photo-oxidation caused by intense sunlight. Scientists believe that astaxanthin can protect human skin from hazardous environmental elements and may slow down certain premature signs of aging caused by sunlight and pollution.

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MULTISAL™ ENCAPSULATION SYSTEM

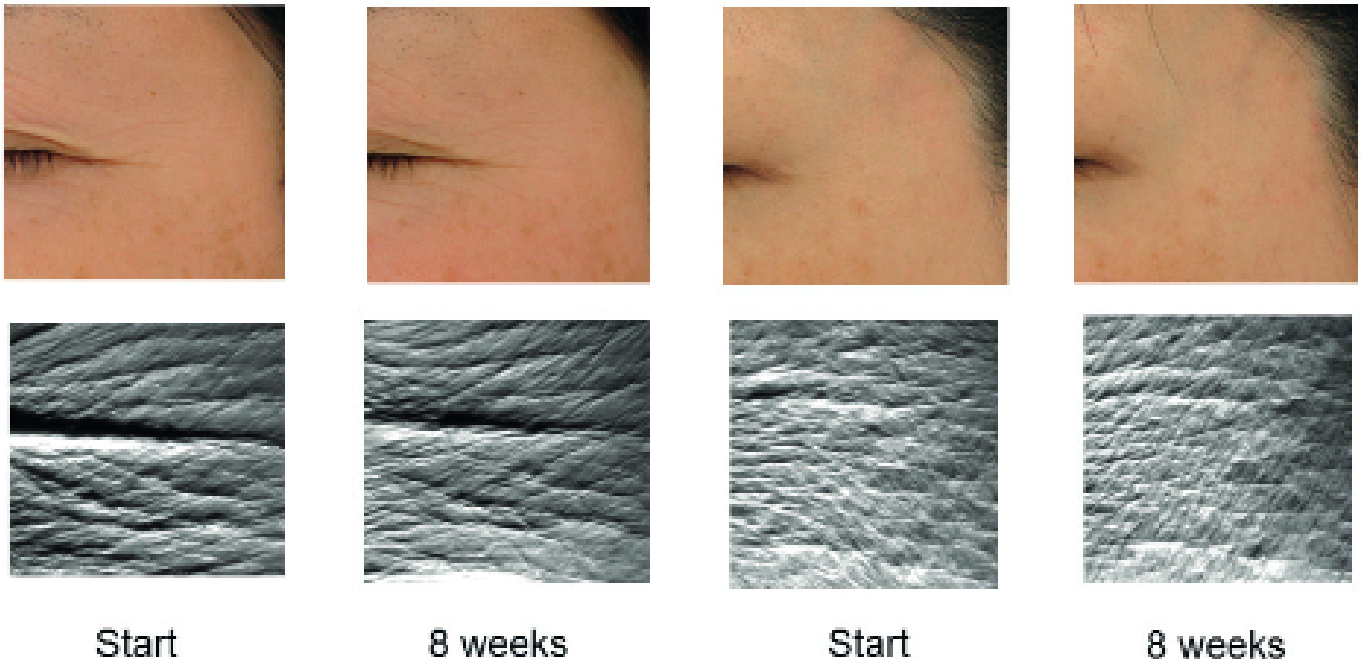


Figure 2: Improvement in skin texture and wrinkles after 8 weeks of treatment with astaxanthin [2].

This proprietary microsphere technology is characterized by a particle size of 20-40 microns as a free-flowing powder. The microsphere is based on the core and shell (Figure 1). The core comprises solid lipid submicron spheres that entrap the more hydrophobic part of astaxanthin. The submicron spheres are then encapsulated within the microspheres to form a free-flowing product. The outer shell stabilizes the astaxanthin as a powder and retains its potency when stored at room temperature. MultiSal™ astaxanthin is easily suspendable in a water-based formula.



Figure 5: Cream with 2% MultiSal™ Asta.

MULTISAL™ ENCAPSULATION SYSTEM

Stability: Astaxanthin is found in nature either conjugated with proteins (e.g., salmon muscle or lobster exoskeleton) or esterified with one or two fatty acids, which stabilize the molecule. The encapsulation conjugates astaxanthin with fat molecules that help to stabilize it in the same way it happens in nature.

Solubility: Astaxanthin, similar to other carotenoids, is a very lipophilic compound with low bioavailability. The encapsulation assists in increasing the bioavailability of astaxanthin in skin tissue.

Easy formulation: Microspheres make the formulation much easier. As a free-flowing powder, MultiSal is easier to control than raw astaxanthin. MultiSal makes the lotions smooth and homogeneous after a short time of gentle mixing.

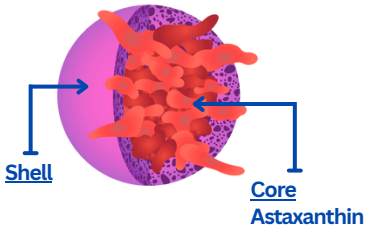
Globally Compliant

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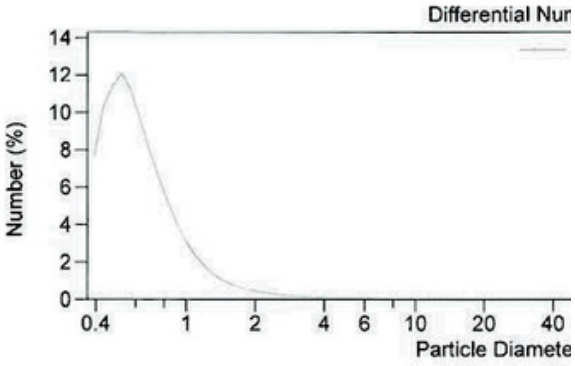


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Technical Data Sheet

Particle Size



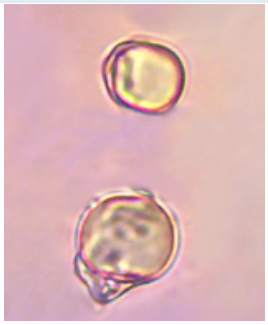


Figure 4: Spheres of MultiSal™ Asta in lotion base. 400x magnification.

INCI for MS AS

Astaxanthin
Butyrospermum Parkii (Shea) Butter
Aqua
Hydrolyzed Corn Starch Octenylsuccinate
Isopropyl Myristate

Technical Data

Specification	Characteristic
Appearance @ 20C	Free-Flowing Powder
Odor	Mild
Color (Visual)	Red-Orange
pH (1% Solution)	3.5-5.5

Natural Environmental Protection Cream

Ingredients	(W/W%)
Multisal Astaxanthin	0.60- 2.0
Zea Mays (Corn) Starch	2.00
Propanediol	2.00
XANTHAN GUM	0.50
Isostearyl Isostearate	8.50
Glyceryl Stearate	3.50
C14-22 Alcohols (and) C12-20 Alkyl Glucoside	2.00
Cetearyl Alcohol	1.25
Helianthus annuus (Sunflower) Seed Oil	1.00
Coconut Oil	1.00
Butyrospermum Parkii (Shea) Butter	0.50
Squalane	4.00
C13-15 Alkane	4.00
Phenethyl Alcohol (and) Pentylene Glycol (and) Propanediol	2.00
Water/Aqua	66.55 - 67.25
Total	100

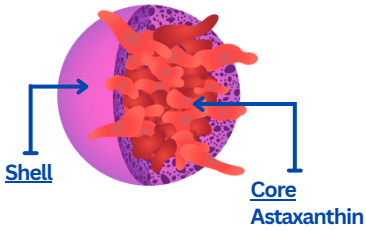
References

Naguib YM, Antioxidant activities of astaxanthin and related carotenoids. J Agric Food Chem. 2000 Apr;48(4):1150-4.
1: Astaxanthin wins full GRAS status. Nutraingredients-usa.com. Retrieved on 2013-04-25. 2: Algatechnologies gets GRAS for AstaPure astaxanthin. Foodnavigator-usa.com. Retrieved on 2013-04-25.
2: Yamashita, Eiji. "Cosmetic Benefits of Astaxanthin on Humans Subjects." Acta Biochimica Polonica., vol. 59, no. 1, 2012, https://doi.org/10.18388/abp.2012_2168.

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Substantiation

Astaxanthin	Orac values of Astaxanthin	Research Support, Non-U.S. Gov't: Brunswick Laboratories Test Report for Fuji Health Sciences, Inc., Batch No. B-10267b - 2010
Improvement of skin	"Significant improvements as a deep impact were observed in skin wrinkle (crow's feet at week-8), age spot size (cheek at week-8), elasticity (crow's feet at week-8), skin texture (cheek at week-4), moisture content of corneocyte layer (cheek in 10 dry skin subjects at week-8) and corneocyte condition (cheek at week-8)." "Results may suggest that astaxanthin derived from H. pluvialis can improve skin condition in all layers such as corneocyte layer, epidermis, basal layer and dermis"	Yamashita, Eiji. "Cosmetic Benefits of Astaxanthin on Humans Subjects." Acta Biochimica Polonica., vol. 59, no. 1, 2012, https://doi.org/10.18388/abp.2012_2168 .
UV protection	"Astaxanthin has shown anti-inflammatory and uv-protective abilities. Topical astaxanthin prevented the development of erythema after uv-exposure in 71.42% of subjects."	KOPERA, D., & KIM, J. H. (2021). UV-protective Properties of Topical of Astaxanthin Half Side Controlled Pilot Study. International Journal of Clinical & Experimental Dermatology 6 (1): 13, 16, 2.
Anti-aging	"Our findings indicated that astaxanthin inhibited inflammatory cytokine secretion from epidermal keratinocytes and MMP-1 secretion by dermal fibroblasts in response to UVB irradiation... Long-term astaxanthin supplementation may prophylactically inhibit skin deterioration induced over time by environmental damage and consequently retard the skin aging process via its anti-inflammatory effect."	Tominaga, K., Hongo, N., Fujishita, M., Takahashi, Y., & Adachi, Y. (2017). Protective effects of astaxanthin on skin deterioration. Journal of clinical biochemistry and nutrition, 61(1), 33-39.
MultiSal®	Unique encapsulation technology	https://www.salvona.com/core-technologies

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