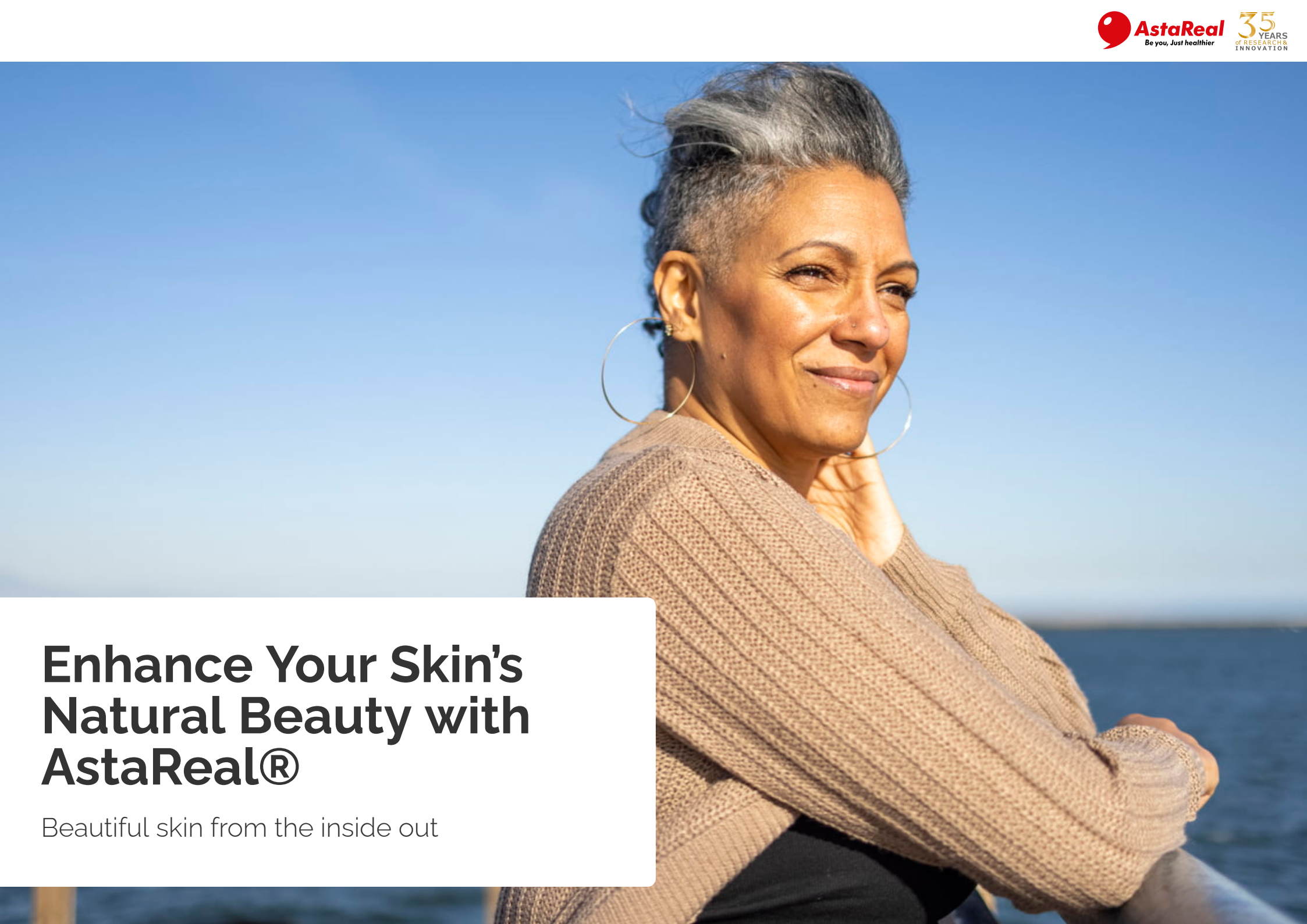




AstaReal® Natural Astaxanthin

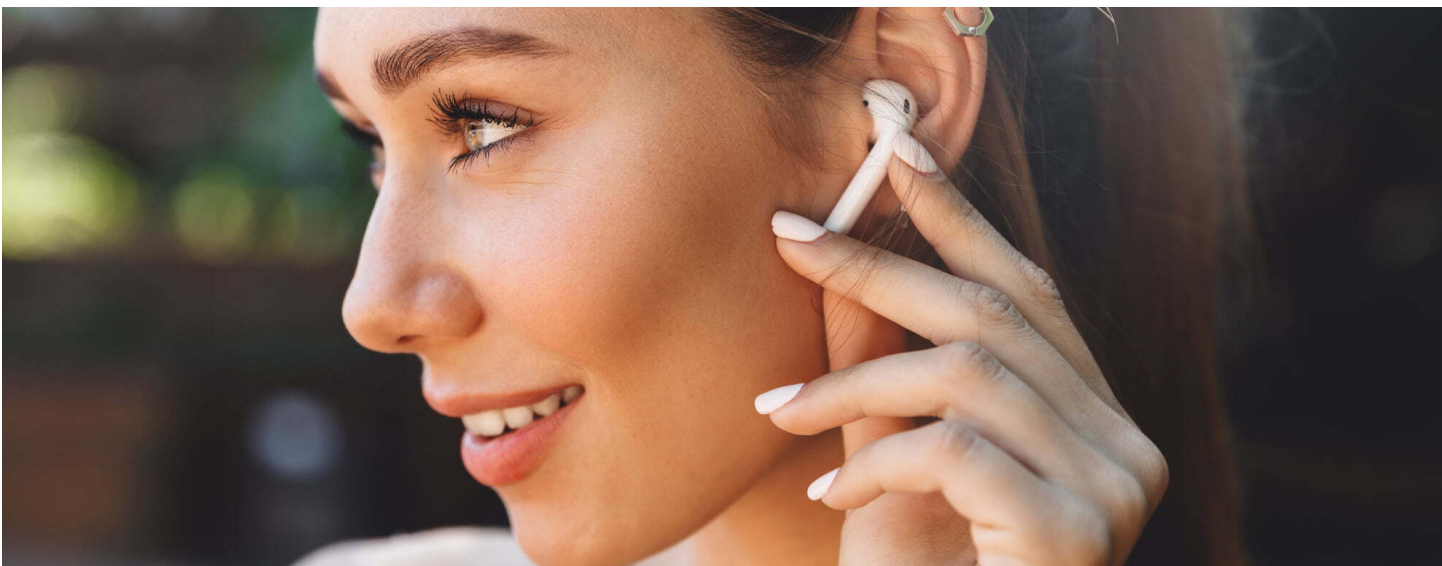
Astaxanthin - One of Nature's
Most Powerful Antioxidants

Beauty from within



Enhance Your Skin's Natural Beauty with AstaReal®

Beautiful skin from the inside out



Beauty from the inside out

Serums and creams reach the surface of the skin, but they do not penetrate the deeper layers that contribute to skin elasticity and nourishment. As a nutritional supplement, AstaReal® astaxanthin promotes healthy skin from the inside out: it improves the supply of nutrients to the hypodermis – the deepest layer of skin – protects collagen integrity in the dermis, neutralizes UV-induced free radicals in the epidermis and prevents roughness by improving moisture retention in the outermost layer, the stratum corneum.

Counteracting skin deterioration

Long-term prophylactic supplementation with AstaReal® astaxanthin may inhibit age-related skin deterioration, thanks to its antioxidative and anti-inflammatory effects.¹⁻³ Prolonged oxidative stress in the skin leads to chronic inflammation and skin deterioration. Astaxanthin may contribute to maintaining skin health throughout seasonal changes, when environmental factors such as UV light and dryness place our skin under stress. The combination of oral supplementation and topical application of astaxanthin has been shown to be

Benefits of natural astaxanthin for skin:

- Improves skin elasticity by strengthening the collagen in dermis
- Reduces wrinkle size and improves skin micro texture
- Revitalizes photoaged skin by quenching free radicals in all dermal layers

UV protection

Astaxanthin's antioxidant capacity also exerts a protective effect on different types of cells in the skin, e.g. fibroblasts and keratinocytes. *In vitro* studies have shown that astaxanthin can restore the endogenous antioxidant balance in fibroblasts and to reduce the level of pro-inflammatory cytokines produced by keratinocytes.^{5,6} Animal studies indicate astaxanthin accumulates in the skin and protects against UV-induced damage such as photoaging.⁷ It has also been suggested that astaxanthin could be used as a natural enhancer of sunscreens.



Skin moisture and elasticity

As indicated by scientific research, AstaReal® astaxanthin can also improve skin moisture, elasticity and wrinkles. It has been shown that crow's feet wrinkles, elasticity and transepidermal water loss improve after 6 weeks of daily supplementation with 6 mg of AstaReal® astaxanthin.⁴ The underlying mechanisms involves scavenging of free radicals and inhibition of enzymes degrading collagen and elastin in the skin.⁸ Furthermore, astaxanthin may improve the water retention in the outer epidermal layer by

A growing market

More than ever, consumers are interested in beauty that starts from within. Strong interest from younger people keen to preserve their natural youth is a major driver behind the category's growth. Similarly, the ever-expanding aging population wants to retain a youthful appearance into later life, thus contributing to the demand for high quality beauty ingredients. Clearly, this creates an opportunity for natural ingredients such as astaxanthin.

What is Natural Astaxanthin?

It is a naturally occurring carotenoid which is derived from the microalgae *Haematococcus pluvialis*. As well as being one of the most powerful antioxidants known to science, it also has potent anti-inflammatory properties. One distinct advantage of astaxanthin in comparison to other antioxidants, is its ability to span the entire lipid bilayer of the cell membrane, thus providing superior protection from the inside out. This is vital to astaxanthin's healthy-aging power as protection is provided to the different layers of the skin; from the visible surface to the delicate deep layers where new skin is formed. In contrast to many natural antioxidants, astaxanthin exerts antioxidant benefits without having harmful prooxidant side effects.



**Tips for formulating
beauty supplements
with natural
astaxanthin**

5 Tips for formulating beauty supplements with natural astaxanthin

#1: Use innovative dosage forms

From capsules to liquid shots, sachets to soft gums, the possibilities for developing astaxanthin beauty products are almost unlimited. AstaReal's bulk product range includes different astaxanthin concentrations in the form of algal biomass, oil, microencapsulated and water-dispersible powder, thus allowing the development of innovative dosage forms.

#2: Choose the right dose

Low doses of astaxanthin are effective without affecting quality or benefits. Studies have shown significant results after short-term supplementation, ensuring your customers will feel the benefits of astaxanthin working in your formula. Dosages in clinical research range from 4 to 16 mg astaxanthin

with majority based on a dose of 4-6 mg astaxanthin per day. Depending on where your products are sold, dosage recommendations may vary. To help determine which dose is right, just contact us and we will be happy to offer advice.

#3: Combine it with other key ingredients

AstaReal® astaxanthin can be easily combined with a range of other ingredients. For example, combinations with collagen offer synergistic effects for skin health.⁹ Other antioxidants, like ubiquinol and vitamins E and C, can help to protect the antioxidant capacity of astaxanthin. Lipids support astaxanthin absorption. Mimicking its natural presence in krill oil, astaxanthin partners perfectly with omega-3 too, and could even enhance the

#4: Sustainability and traceability score high

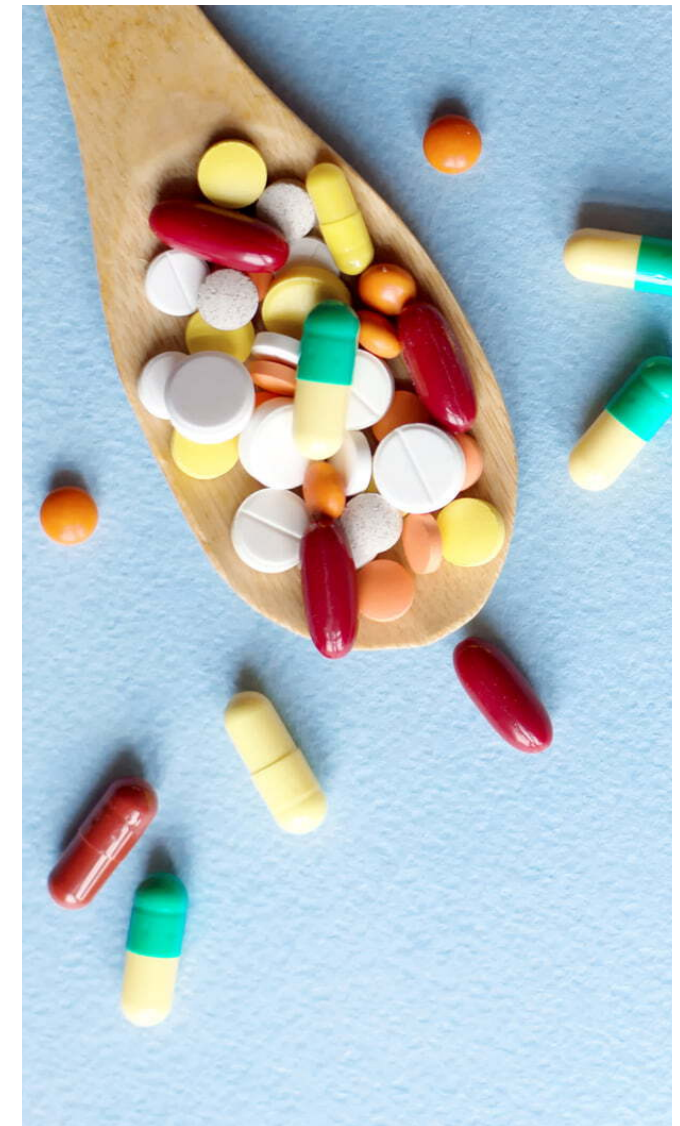
Consumers are increasingly paying attention to the origin of the products they buy. Thus, demand for more naturally and sustainably sourced products will continue to rise. Consequently, the industry is looking for plant-based sources of traditional ingredients, such as antioxidants, and is starting to focus on algae. Microalgae are the primary food source of basically all marine and freshwater food chains. The freshwater microalgae *Haematococcus pluvialis* represent a sustainable, plant-based alternative to astaxanthin and other healthful ingredients like omega-3s.

#5: Pay attention to quality and origin

Astaxanthin's quality is affected by the environment in which the algae is cultivated. AstaReal rejected outdoor production methods as they are susceptible to contamination. Instead, we process our microalgae indoors under controlled conditions. This results in a safe product with at least 5% astaxanthin in the biomass and without any environmental impurities.

References & Selected Publications

1. Ito, N.; Seki, S.; Ueda, F. The Protective Role of Astaxanthin for UV-Induced Skin Deterioration in Healthy People-A Randomized, Double-Blind, Placebo-Controlled Trial. *Nutrients* 2018, 10 (7), E817.
2. Tominaga, K.; Hongo, N.; Fujishita, M.; Takahashi, Y.; Adachi, Y. Protective Effects of Astaxanthin on Skin Deterioration. *J Clin Biochem Nutr* 2017, 61 (1), 33–39.
3. Lee, S.-J.; Bai, S.-K.; Lee, K.-S.; Namkoong, S.; Na, H.-J.; Ha, K.-S.; Han, J.-A.; Yim, S.-V.; Chang, K.; Kwon, Y.-G.; Lee, S. K.; Kim, Y.-M. Astaxanthin Inhibits Nitric Oxide Production and Inflammatory Gene Expression by Suppressing I(Kappa)B Kinase-Dependent NF-KappaB Activation. *Mol Cells* 2003, 16 (1), 97–105.
4. Tominaga, K.; Hongo, N.; Karato, M.; Yamashita, E. Cosmetic Benefits of Astaxanthin on Humans Subjects. *Acta Biochim Pol* 2012, 59 (1), 43–47.
5. Lyons, N. M.; O'Brien, N. M. Modulatory Effects of an Algal Extract Containing Astaxanthin on UVA-Irradiated Cells in Culture. *J Dermatol Sci* 2002, 30 (1), 73–84.
6. Yoshihisa, Y.; Rehman, M. U.; Shimizu, T. Astaxanthin, a Xanthophyll Carotenoid, Inhibits Ultraviolet-Induced Apoptosis in Keratinocytes. *Exp Dermatol* 2014, 23 (3), 178–183.
7. Komatsu, T.; Sasaki, S.; Manabe, Y.; Hirata, T.; Sugawara, T. Preventive Effect of Dietary Astaxanthin on UVA-Induced Skin Photoaging in Hairless Mice. *PLoS One* 2017, 12 (2), e0171178.
8. Suganuma, K.; Nakajima, H.; Ohtsuki, M.; Imokawa, G. Astaxanthin Attenuates the UVA-Induced up-Regulation of Matrix-Metalloproteinase-1 and Skin Fibroblast Elastase in Human Dermal Fibroblasts. *J Dermatol Sci* 2010, 58 (2), 136–142.
9. 2010, 58 (2), 136–142.; Cho, S.; Lee, S.-R.; Shin, M.-H.; Chung, J. H. Supplementating with Dietary Astaxanthin Combined with Collagen Hydrolysate Improves Facial Elasticity and Decreases Matrix Metalloproteinase-1 and -12 Expression: A Comparative Study with Placebo. *J Med Food* 2014, 17 (7), 810–816.
10. Rundblad, A.; Holven, K. B.; Bruheim, I.; Myhrstad, M. C.; Ulven, S. M. Effects of Fish and Krill Oil on Gene Expression in Peripheral Blood Mononuclear Cells and Circulating Markers of Inflammation: A Randomised Controlled Trial. *J Nutr Sci* 2018, 7, e10.





Why AstaReal?



Trusted Science

AstaReal is an authority in human clinical studies and is the only brand of natural astaxanthin backed by over 70 clinical studies. With clinical studies across indications such as skin health, muscle performance, vision, cognitive function, heart health, immune function and anti-fatigue – you can be assured that AstaReal® is supported by solid clinical evidence. Our global team of experts can also guide you in the proper usage of our clinical outcomes dependent on the regulatory framework of your target market.



Unrivalled Quality Standards

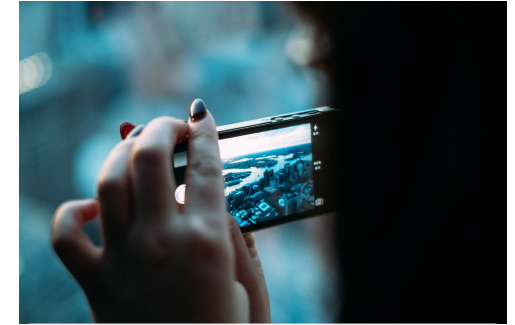
Stability and purity of natural astaxanthin matters as poor quality can have a negative impact on your final formula. Our cultivation process allows for optimal maturation of the cells, resulting in a superior product with the highest quality, stability and concentration available on the market.

AstaReal® is ISO 9001, FSSC 22000, HACCP, Informed Ingredient, Halal and Kosher certified. Our Halal certification opens a range of opportunities for our partners. AstaReal® A1010, L10 and EL25 are registered by the Vegan Society.



Worldwide Expertise

Take your product to the world – our partners benefit from access to talented, high performance local teams of technical, marketing and regulatory experts with in-depth knowledge of the target regions.



Your Partner for Innovation

The AstaReal® product range allows the development of innovative dosage forms, from traditional to on trend. Reach out to hear about the latest market insights that may inspire you in choosing the perfect delivery format for your target market.

Read more here
www.astareal.se

Thank you for reading!

**We will be happy to discuss the best
AstaReal® astaxanthin applications in your
new product development projects.**

**Let our astaxanthin expertise work for you and
get in touch with us.**

AstaReal AB
Signum, Forumvägen 14, Level 16
131 53 Nacka, Sweden
+46 (0) 8 5701 3950
info@astareal.se
www.astareal.se