



PUGOS™

PUGOS PRODUCTS PRIVATE LIMITED

ASTASHINE™

Natural Astaxanthin Capsules

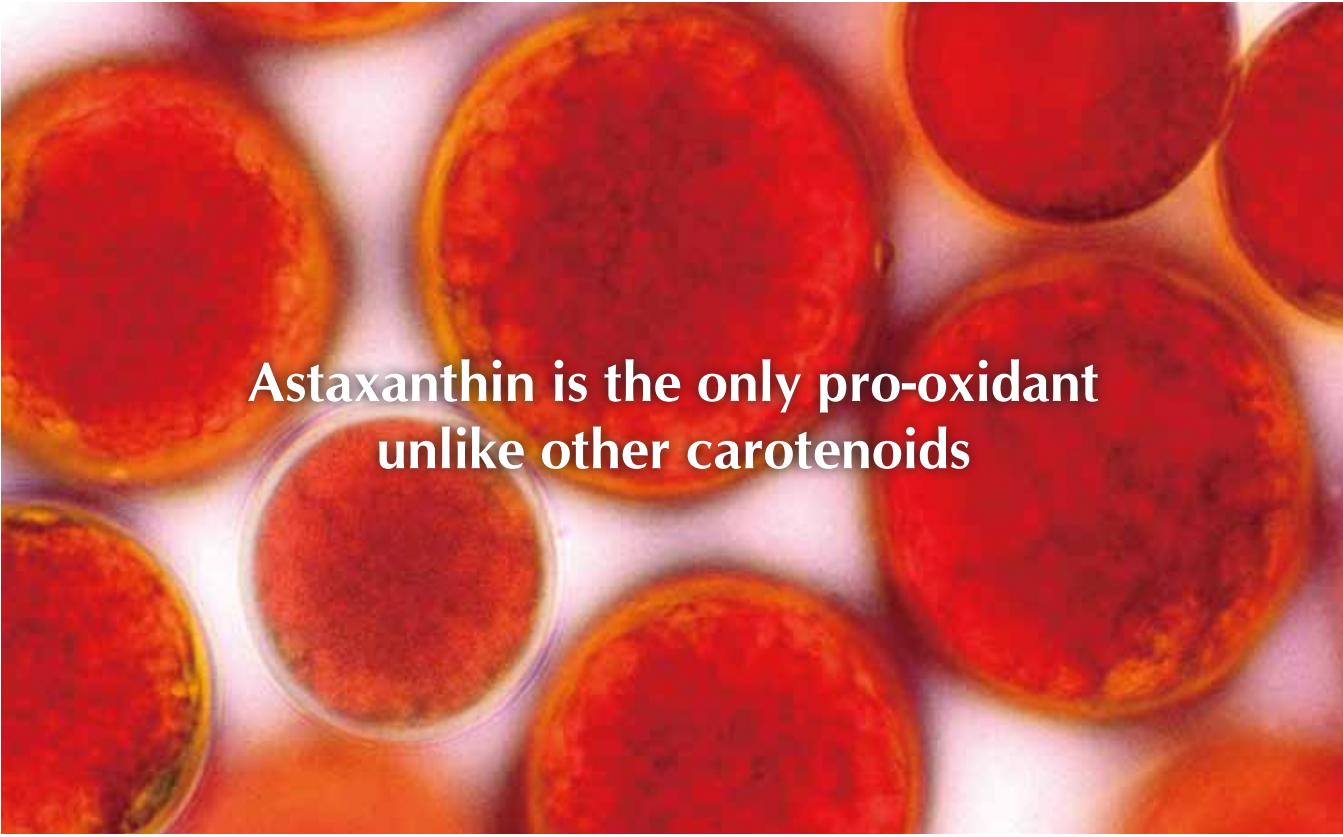
MULTIFUNCTIONAL ANTIOXIDANT SUPPLEMENT



An
Excellent Choice
For Healthy Life Style

Product Review

Astaxanthin : King Of Carotenoids



Astaxanthin is the only pro-oxidant unlike other carotenoids

Astaxanthin is naturally occurring xanthophylls carotenoid, derived from the microalgae *Haematococcus pluvialis*. Astaxanthin chemical structure allows it to uniquely span and protect cell membranes and other similar structures against lipid attack by quickly neutralizing reactive oxygen species. Astaxanthin contains two oxygenated groups on each ring structure, which is responsible for its enhanced antioxidant features. Its antioxidant property is due to its ability to quench singlet oxygen, providing defense from photo oxidative damage.

The presence of the hydroxyl and keto ending on each ionone ring explains some unique features such as its ability to be esterified, a higher antioxidant activity and a more polar configuration than other carotenoids. Astaxanthin have terminal carbonyl group that is conjugated to a polyene backbone and is more potent antioxidant and scavenger of free radicals than carotene carotenoids such as carotene.

It is found in living organisms particularly in the marine environment where it is present in microalgae, plankton, krill and seafood. It gives salmon, trout, and crustaceans such as shrimp and lobster their distinctive reddish coloration.

It is also present in yeast, fungi, complex plants and the feathers of some birds including flamingos and quail. **In 1999 United States Food and Drug Administration has approved for use as a dietary supplement (nutraceutical).** The microalgae *Haematococcus pluvialis* produces the astaxanthin isomer (3S, 3S), which is the same as the form found in wild salmon.

In 2013 FSSAI has given product approval for *Haematococcus pluvialis*

Research has demonstrated that the antioxidant activity of astaxanthin is approximately 10 times stronger than other carotenoids tested (e.g., zeaxanthin, lutein, tunaxanthin, canthaxanthin, beta-carotene) and 100 times greater than those of vitamin E (alpha-tocopherol).

AstaReal Astaxanthin in ASTASHINE : Mother Nature's Most Powerful Antioxidant

SOURCE : Haematococcus pluvialis-Fresh water microalgae

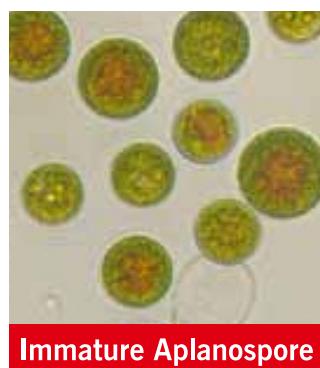
Haematococcus pluvialis is a freshwater microalgae belonging to family Chlamydomonadaceae. Strains of the algae extend across habitats ranging from the African lakes to the Arctic snow fields. Typical habitats are ephemeral ponds and rainwater pools, for example, rock pools in the Stockholm archipelago.

Under favorable conditions, the motile green cells of *Haematococcus pluvialis* thrive, reproducing primarily by cell division. In unfavorable conditions, the cells enter a resting state and become spores with thick cell walls. When transforming into this spore phase, these algae not only store fats as an energy source, but also begin producing and accumulating astaxanthin.

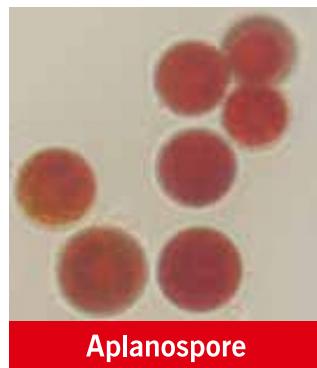
Astaxanthin acts like a field force that protects the nuclear DNA and cell content from oxidation and UV radiation. The encapsulated form of the algae is called an aplanospore and in this form, the algae can survive for long periods even under harsh conditions.



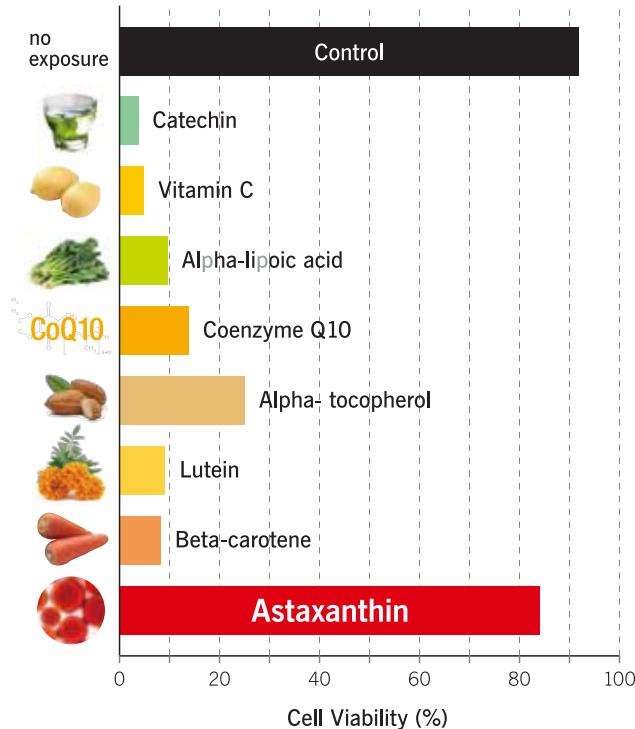
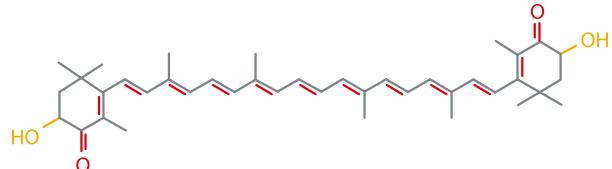
Vegetative Cell



Immature Aplanospore



Aplanospore



Tominaga K., et al. (2009). Food Style 21, 13(1), 84–86.

Singlet Oxygen Quenching Power

Astaxanthin is

500 times stronger than **Vitamin E**

560 times stronger than **Green tea catechins**

800 times stronger than **CoQ 10**

3000 times stronger than **Resveratrol**

6000 times stronger than **Vitamin C**

Nishida Y., et al. (2007). Carotenoid Science. 11, 16–20.

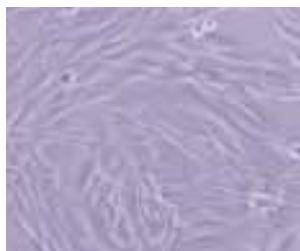
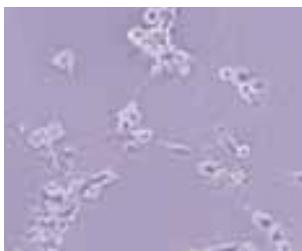
Astaxanthin has exceptional antioxidant activity to fight singlet oxygen when compared to other antioxidant

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Protective Effect of Natural Antioxidants on Human Fibroblasts Natural astaxanthin vs. other antioxidants

Human dermal fibroblasts were pre-incubated with antioxidants before exposure to singlet oxygen, and cell viability was measured to compare the protective efficacy.

Antioxidant concentration level: 10 µM



Control Group

Fibroblasts attacked by singlet oxygen are small and round. Cell viability is decreased.

Tominga K., et al. (2009). *Food Style* 21. 13(1), 84–86.



NDL removed USDA ORAC database due to evidences that the values of antioxidant capacity have no relevance to the effects of specific bioactive compounds, including polyphenols on human health.

O.R.A.C. POWER (Oxygen Radical Absorbance Capacity)

Compared to the most heralded superfoods, astaxanthin contains the highest O.R.A.C (Oxygen Radical Absorbance Capacity) power

Tomato 700

Banana 879

Olive Oil 1,150

Spinach 1,515

Broccoli 2,809

Garlic 5,346



Black beans 8,040

Pomegranate 10,500

Ginger 14,840

AstaREAL Astaxanthin 28,222

Just more than ORAC AstaReal Astaxanthin is highly researched and pro-antioxidant.

ORAC can sometimes be misleading

- ORAC score is that it's done in a test tube, and sometimes what happens in test tube has no correlation to what happens in your body.
- There are about 1,234,845.6 different types of oxidizing reactions that can take place in your body, and an ORAC score measures exactly 1 of them.
- ORAC value is not Holy Grail of health or even antioxidant capacity.
- ORAC is not officially validated by Government agencies.

ASTASHINE™

Super Food vs. Astaxanthin

Astaxanthin is extensively researched in over 400 peer reviewed clinical studies

Effect of Astaxanthin on individual organs

NEUROVASCULAR PROTECTION

Decreases the oxidation of red blood cells, decreases the incidence of ischemic stroke, and improves memory and learning.

SKIN AGING DEFENSE

Prevents UV induced wrinkle formation, skin sagging, and age spots ; improves skin elasticity and skin dryness.

LIVER HEALTH and METABOLIC SYNDROME

Inhibits progression of fatty liver disease, restores insulin-glucose balance, increases fat burning, and decreases inflammatory markers.

LOWERING GASTRIC INFLAMMATION

Reduces *Helicobacter pylori* inflammation, gastric ulceration, indigestion, acid reflux, stomach pain, and heartburn.

MUSCLE RESILIENCE

Enhances power output, endurance, and recovery after exercise ; prevents muscle damage and muscle atrophy.

EYE FATIGUE RELIEF

Reduces eye fatigue in subjects suffering from visual display syndrome

IMMUNE SYSTEM BOOSTER

Reduces DNA damage in immune cells and enhances the immune response.

CARDIOVASCULAR HEALTH

Fights atherosclerosis by decreasing blood pressure, lipid deposits, lipid peroxidation, and vascular inflammation

ANTI-DIABETES / KIDNEY PROTECTION

Reduces glucose toxicity and kidney inflammation ; improves pancreatic function, insulin resistance, and insulin sensitivity.

FERTILITY

Improves sperm parameters and fertility.

CAPILLARY CIRCULATION

Improves blood flow and capillary integrity; reduces blood cell oxidation and the risk of thrombosis.

**2 caps of ASTASHINE
per day provides** *fssai*

(Food Safety and Standards Authority of India)
approved daily dose of 4mg

ASTASHINE™

ASTAXANTHIN for a Unique Cell Membrane Protection

Free radicals are unstable, highly reactive molecules that have unpaired electrons. They can be generated naturally in our bodies by different metabolic activities, enzymatic reactions and exercise. These radicals are usually produced in a scale that the body's natural antioxidants can handle.

Constant exposure to toxic environment like pollution, smoking, alcohol, and UV radiation creates a significant imbalance between the body's natural antioxidant capacity and its ability to neutralize free radicals. The result is a damaging condition called "oxidative stress".

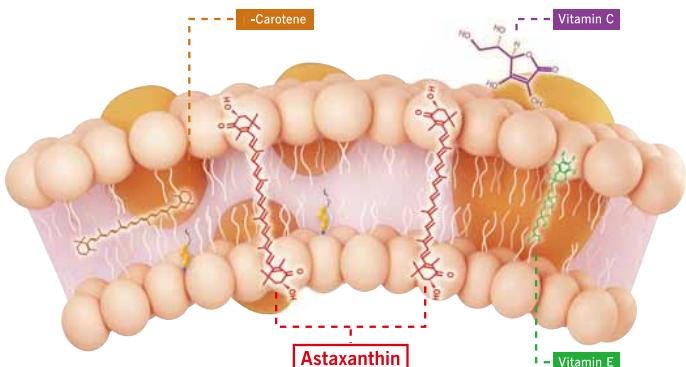
One of the primary causes of human aging is oxidative stress caused by free radicals. They have harmful effects on lipids, proteins, DNA and can cause damage to the human body.

Antioxidants are molecules that work against the oxidation of the cells. They are stable enough to offer electrons to free radicals and thus help neutralize them. They provide protection against the damaging effects of free radicals.

According to the study Nishida et al., (2007), astaxanthin is the most powerful antioxidant known to science until this moment. Its power comes from its unique structure that allows it to quench free radicals in the inner and outer layer of the cell membrane unlike other antioxidants.



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Role of Astaxanthin as a unique cell membrane antioxidant

- Helps in bridging the cell membrane with potent protection against free radicals.
- Helps to neutralize radical species of nitrogen, sulfur or carbon in addition to oxygen.
- Helps to bind with radicals to form an unreactive adduct.
- Helps to reduce per-oxidation by preserving the membrane structure.

ASTASHINE™

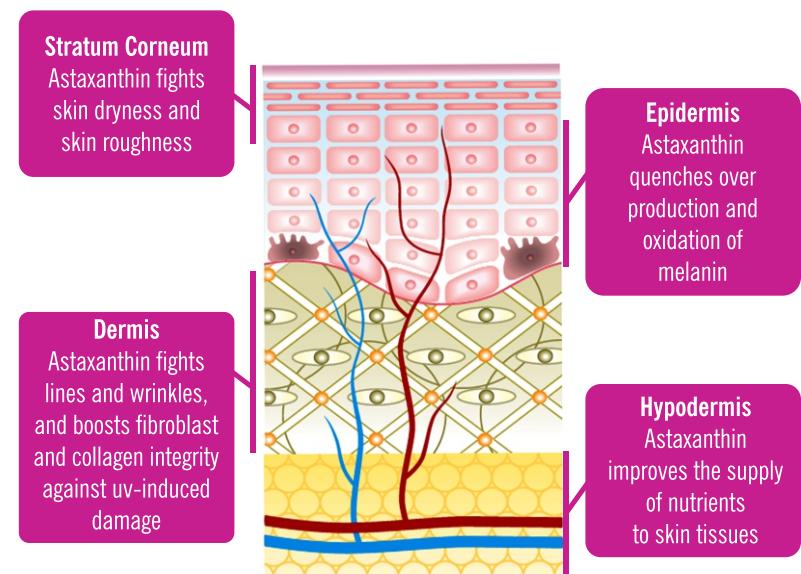
ASTASHINE - EVERY DAY FOR A BEAUTIFUL SKIN FROM THE INSIDE OUT



Reveal Your Skin's Natural Beauty with Astaxanthin

Astaxanthin provides protection from aging in all skin layers

Extensively Researched in peer reviewed clinical studies

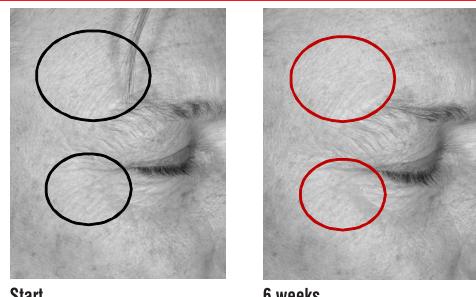


Inhibits age spots and atopic dermatitis



Source: Tominaga et al., 2009 Food Style 21 13(1):84-86

Reduces wrinkles and maintain elasticity



Source: Yamashita 2006. 49 Subjects. Randomized, double-blind, placebo controlled (6 weeks).

Clinical Benefits

1. Helps to revitalize photo aged skin by quenching oxidative stress and inflammation in all skin layers.
2. Helps to reduce the size of wrinkles and improves skin microtexture.
3. Helps to reduce age spots by inhibiting overproduction and oxidation of melanin.

Satoh A et al., 2011; 80(1/2):7-11.
Tominaga K et al., Cosmetic Acta Biochim Pol. 2012; 59(1):43-7

ASTASHINE™

ASTASHINE - A NATURAL SUPPORT FOR A HEALTHY HEART

Potential benefits of Atherosclerosis

PROGRESSION	ASTAXANTHIN
Monocyte Migration/ Infiltration Monocytes infiltrate the arterial wall and differentiate into macrophages. Scavenger receptors causes the macrophages to selectively take in large amounts of oxidized LDL resulting in the formation of foam cells	✓ Increase HDL cholesterol level ✓ Reduce Triglycerides level ✓ Decrease lipid peroxidation ✓ Reduce plaque formation ✓ Improve vascular tone ✓ Increase plaque stability ✓ Decrease foam cell formation ✓ Reduce blood pressure ✓ Reduce plaque rupture ✓ Improve blood flow
Early Lesion Foam cells release ROS, cytokines or MMP's that cause smooth muscle cell proliferation. Some macrophages can die in advancing lesions by apoptosis	
Complication of Atherosclerosis disruption of unstable plaques and thrombosis occurs as platelets and fibrin try to cap the rupture, where it can block blood flow.	



Clinical Benefits

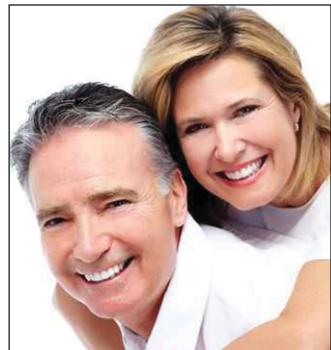
1. Helps to Improve blood lipid profile.
2. Helps to reduce oxidative stress.
3. Helps to enhance capillary circulation.



Iwabayashi M et al., Anti-aging medicine. 2009;6(4):15-21.
Miyawaki H et al., J Clin Biochem Nutr. 2008; 43(2):69-74.

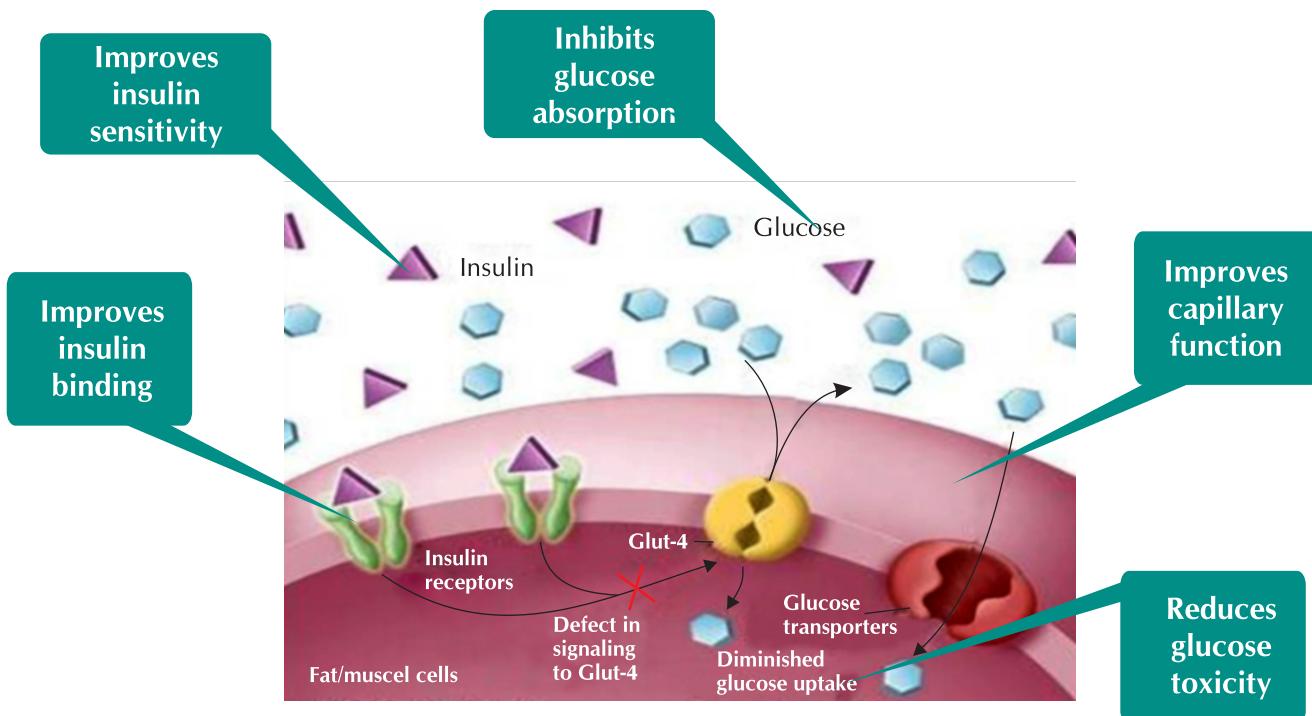
ASTASHINE™

ASTASHINE - A NATURAL SUPPORT FOR DIABETES



Astaxanthin helps to provide protection from type 2 diabetes and diabetic nephropathy

Live healthier for longer



Clinical Benefits

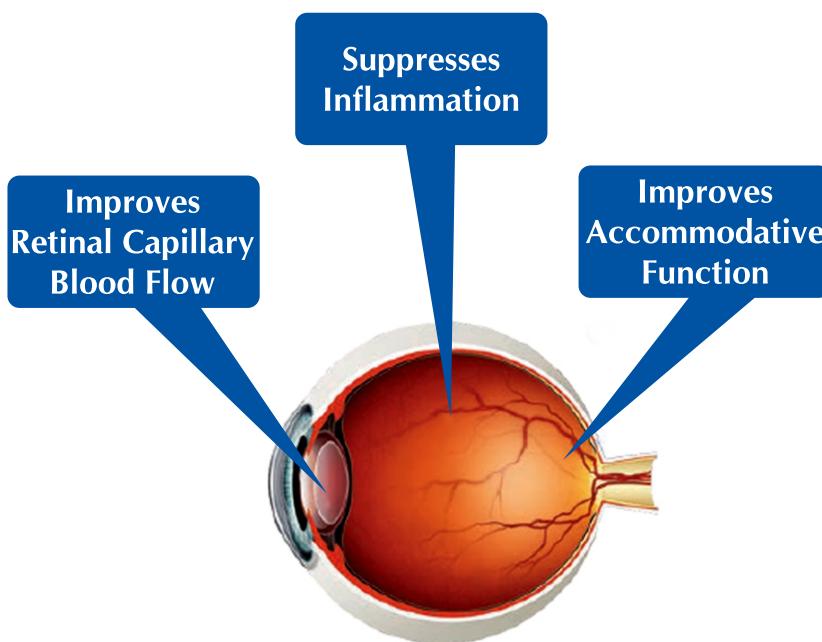
- Helps to prevent dysfunctioning of pancreatic β -cells from glucose toxicity.
- Helps to reduce progressive kidney damage from diabetes.
- Helps to diminish the incidence of diabetic microvascular complication.
- Helps to reduce lipid per oxidation and oxidative stress.



Iwabayashi M. (2009). J. Anti Aging Med., 6 (4):15-21.
Manabe E. (2008). Astaxanthin. J. Cellular Biochem. 103 (6):1925-37.
Naito Y. (2004) 20:49-59. Nutritional Outlook April. "Fighting Diabetes "

ASTASHINE™

WITH ASTASHINE VIEW YOUR WORLD WITH SHARPER EYES



Helps Reduce
the Eye Fatigue
in Computer
Workers

Reclaim your eye sight naturally
with **ASTASHINE**



Clinical Benefits

- Helps to relieve eye fatigue symptoms by improving capillary blood flow circulation.
- Helps to Improve quality of vision by preserving the “zoom-in & zoom-out” refocus of the eye ciliary muscle.
- Helps to relieve eye inflammation and shoulder stiffness in heavy PC workers.

Nagaki Y et al., 2010;3(5):461-68
Nagaki Y et al. J Trad Med. 2002;19:170-73.

ASTASHINE™

ASTASHINE - UNLOCKS YOUR FULL POTENTIAL



Clinical Benefits

- Helps to boost power output and muscle endurance during training.
- Helps to lower lactic acid, fatigue and muscle soreness.
- Helps to reduce muscle damage and inflammation.
- Helps to improve blood flow and antioxidant status.
- Helps to improve muscle metabolism and fat utilization.

Finaud J, Lac G, Filaire E. Sports Med. 2006;36(4):327-358.

Tian Y et al. Eur J Appl Physiol. 2010;110:971- 976.

Semba RD, Lauretani F, Ferrucci L. 2007;15;458(2):141-145



ASTASHINE™

ASTASHINE - KEEPS YOUR MIND IN TUNE



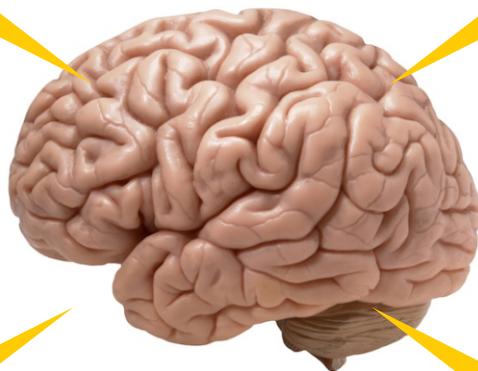
Natural Astaxanthin helps keep the brain healthy

Astaxanthin reduces mental health declined based on CogHealth scores in the elderly

Astaxanthin improves blood flow and increases antioxidant capacity

Astaxanthin reduces inflammation by the NF-κB pathway

Astaxanthin improves endothelial and microcirculatory condition



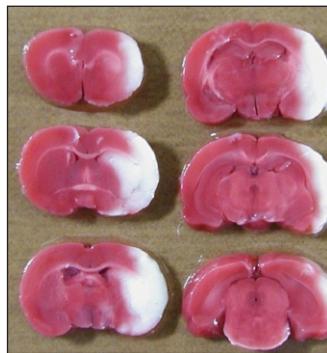
Clinical Benefits

- Helps to improve age-related forgetfulness, multitasking and alertness.
- Helps to decrease oxidation of red blood cells, which is linked in prevention of dementia.
- Helps to enhance capillary blood flow and blood antioxidant quality.
- Helps to modulate blood pressure, lowers stroke risk and improves vascular endothelial health.

Zanotta et al., Cognitive effects of a dietary supplement made from extract of Bacopa monnieri, astaxanthin, Chang et al. J Med Food 13 (3) 2010, 548-556.
Nakagawa et al. British J. of Nutr 2011; 105: 1563-1571.

ASTASHINE™

Astaxanthin helps to prevent cerebral ischemia, an occlusion of cerebral blood flow to core region of major brain artery resulting in cell death and infarction in the brain .



Control Group

Cerebral Ischemia damage of cell death (white Area) in middle artery occlusion / reperfusion model



Astaxanthin Treated Group

Reduction in Cerebral Ischemia damage in the presence of astaxanthin (white area) in middle artery occlusion reperfusion model.

Role of Astaxanthin in Gastric Health



- ✓ It helps in decreasing oxidative stress by reducing inflammation and controlling bacterial infection by shifting the immune response.
- ✓ It helps in alleviating dyspeptic symptoms by retarding inflammation.
- ✓ Helps to reduce gastric pain and abdominal pain.

Bennedsen M, Wang X, Willen R. *Immunol Lett.* 1999; 70: 185-189.
Wang X, Willen R, Wadstrom T. *Antimicrob Agents Chemother.* 2000; 44: 2452-2457.

Role of Astaxanthin in Hypertension



- ✓ Helps to enhance vascular resilience and maintains vessel integrity.
- ✓ Helps to restore vessel dilation and constriction.
- ✓ Helps in reduction of arterial blood pressure.

Hussein G, Nakamura M, (2005). *Biol. Pharm. Bull.*, 28(1):47-52.
Iwabayashi M, Fujioka N, (2009). *J. Anti Aging Med.*, 6 (4):15-21.

Clinical benefits of Astaxanthin in Immune system



- ✓ Natural astaxanthin possesses potent anti-inflammatory properties.
- ✓ Helps to enhance the capacity of lymphocytes and phagocytes.
- ✓ Helps in strengthening the immune system by protecting immune cells against oxidative stress.

Park, J.S., Chyun, J.H., 2010. *Nutr. Metab.* 5, 7-18
Macedo RC et al. *Eur J Nutr.* 2010; 49:447- 457

Clinical benefits of Astaxanthin in cancer



- ✓ Helps to mitigate the side effects of cancer therapy.
- ✓ Helps to slower cancer cell growth.
- ✓ Helps to modulate immune response against tumor cells.
- ✓ Helps in reducing tumor growth and inhibits stress-induced suppression of tumor fighting natural killer cells.

Okada, F. *Redox Rep.*, 7, 357, 2002.
Black, H.S. *Nutr. Cancer*, 31, 212, 1998.
Kurihara, H. et al. *Life Sci.*, 70, 2509, 2002.

Clinical benefits of Astaxanthin in detoxification and liver function

- ✓ Helps to protect mitochondrial cells against lipid per oxidation.
- ✓ Helps to induce xenobiotic metabolizing enzymes.
- ✓ Helps in scavenging of radicals to prevent oxidative damage of liver.



Gradelet, S. et al., *Xenobiotica*, 26, 909, 1996.
Astorg, P. et al., *Nutr. Cancer*, 27, 245, 1997.
Kistler, A. et al. *Arch. Toxicol.*, 75, 665, 2002.



Helping and empowering people from all walks of life to become the best version of themselves

“**PUGOS**” is a division of Lactonova, a leading developer and manufacturer of quality nutritional supplements backed by solid scientific evidence and has a global vision and approach to provide nutritional supplements with highest grade and safety and also a preferred partner of AstaReal, the first company in the world to commercially produce *Haematococcus pluvialis*.

WHO WE ARE

“PUGOS” exists because we believe every person needs to believe they matter.

When people truly believe they matter, their lives can change for the better. Moreover, when people truly believe other people matter, it can change the entire world. Our mission is to help and empower people from all walks of life to become the best version of themselves. We truly want people to have “purpose and goals for Life.”

For us, “**PUGOS**” means knowing you matter, and that what you’re doing right now is significant. It sparks a whole new energy and purpose for life that simply cannot be surpassed.

OUR STORY

“**PUGOS**” is a community which is grown out of the passion and a combination of youth and ancient wisdom, it brings together association of major powers in the pharmaceutical industry known for their best in the world scientific research, state of the art manufacturing capabilities backed by various patents and clinical data and pure science in innovating new products for the man kind to live healthy.

“**PUGOS**” is a product of Japanese perfection, American passion for innovation and Indian ambition put together to show the world the power of innovative product extracted in its natural form, our products are powered by three major giants with vast experience and with a ancient wisdom married with youthful passion to succeed, we find our wisdom from the vast experience of FUJI Chemicals Japan and our innovation with Asta Real USA and youthful passion in LACTONOVA.

Global preferred partnership with AstaReal

PRODUCTION

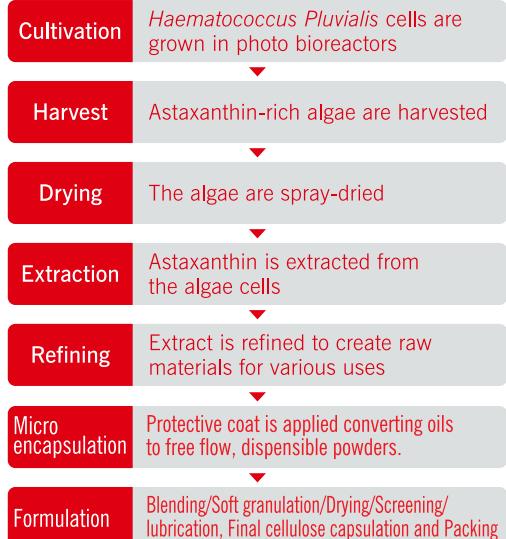
AstaReal was the first company in the world to commercially produce natural astaxanthin from *Haematococcus pluvialis*. AstaReal has a production facility in Gustavsberg, Sweden and in Moses Lake, Washington in the United States. It has the best quality product with the highest amount of astaxanthin per kilogram of biomass.



Photo bioreactors have been individually crafted and specifically designed to allow for optimal maturation of the cells. Thanks to this unrivaled technology, able to ensure hygienic conditions and an environment that allows the culture to reach unsurpassed levels of maturity. The result is superior natural astaxanthin products with the highest quality, stability and concentration available in the market.

CULTIVATION TECHNOLOGY HIGHLY ADVANCED TECHNOLOGY RESULTING IN SUPERIOR PRODUCTS

Production Process Example of AstaREAL®



ASTASHINE™

MICRO ENCAPSULATION at LACTONOVA

"As a creative pioneer in the field of Encapsulation Technology, have built a reputation for Flexibility, quality and Innovative thinking".

Microencapsulation of Astaxanthin Powder 2.0 % w/w:



Microencapsulation is a process by which we apply a protective coating called a matrix around a small particle called the core or active. Encapsulation turns liquids/oils and other ingredients into dust free powders that are simple to process, easy to dose and cost-effective to use. Matrix encapsulation allows for the enclosure of more than one active ingredient within one particle, giving you increased flexibility and control. Encapsulation also constitutes a competitive tool to create new properties to usual materials. Getting stable functional ingredients, mixing such compounds in a hydrophilic food powder can prove to be a real challenge. In addition to protection, microencapsulation allows the conversion of oils/ingredients to free-flowing, easily suspendable and dispersible powders.

Several constraints make the development of an encapsulation process difficult. First, encapsulation is an extra cost, which has to be minimized to be economically acceptable.

This applies to the materials used to "build" the microcapsules, but also to the equipment or processing conditions. The number of food-grade materials suitable for microencapsulation is also very limited. In the Nutraceutical industry, the food engineer has to play finely with the coating/membrane formulation to achieve appropriate and specific properties. Microencapsulation enhanced the oxidative stability of Astaxanthin oil in the powder form during storage.

**ASTASHINE contains the most studied
and extensively researched natural astaxanthin**



Manufacturing facility & corporate office

ASTASHINE™



SAFETY

There are over 400 peer-reviewed studies on astaxanthin. AstaReal® has been featured in the vast majority of these studies. The clinical database for AstaReal® contains over 50 human studies, including 23 double-blind, placebo-controlled trials, with more than 1,400 participants undergoing treatments lasting from 2 weeks to 6 months. The doses used in these trials ranged from 2 to 45 mg/day. All studies revealed no adverse effects based on hematological findings, serum chemistry, urinal analysis, and self-report questionnaires.

The specifications of AstaREAL® astaxanthin are recognized as the international reference standard for astaxanthin esters derived from the microalgae *Haematococcus pluvialis* in the authoritative Food Chemicals Codex (8th edition), published by U.S. Pharmacopeial Convention in 2012.

- 90 times stronger than synthetic Astaxanthin
- Only pro-oxidant with over 400 peer reviewed clinical trials.



Astaxanthin in ASTASHINE

It has been tested in human subjects in over 400 peer reviewed clinical studies to support its highest antioxidant claims and not just having a very high ORAC score.

ASTASHINE

Many Reasons to Choose ASTASHINE



The Most Studied Astaxanthin in ASTASHINE

AstaReal has sponsored a large number of efficacy studies including over 40 clinical studies conducted in Japan, Sweden and the United States.

The Safest Astaxanthin in ASTASHINE

AstaREAL has sponsored over 40 safety reports, including a large number of clinical studies with subjects undergoing treatments lasting from 2 weeks to 6 months.

Breadth of Intellectual Property

AstaReal is the leading holder of patents related to the use of astaxanthin for human health.

Health Professional Recognition

Astaxanthin in ASTASHINE has been endorsed by internationally acclaimed dermatologists, ophthalmologists, urologists, internists, endocrinologists, cardiologists and nutritionists.

Athlete Recognition

Astaxanthin in ASTASHINE has been endorsed by leading triathletes, Olympic medalists, trail runners, track runners, racing drivers and volleyball, baseball and football players.

Pioneer in Microalgae Biotechnology

AstaREAL was the first company in the world to commercially produce natural astaxanthin in ASTASHINE from *Haematococcus pluvialis*. That is why AstaREAL products are backed by the highest level of expertise and longest experience in the field of microalgae research and production.

ASTASHINE™

CONTACT US

Our customers are invited to contact us. Your comments and suggestions help us to make the most recognized name in the industry. This is an efficient way to attend our customer's requirements.

Kindly provide us the possible information regarding what you are looking for, so that we can get the right information you need.

Mother Natures's Power for Human Health

TM
ASTASHINE



For product related enquiry : pmd@pugos.in

For complan related enquiry : ceoindia@pugos.in

For customer related enquiry : icc@pugos.in

CONTACT DISTRIBUTORS



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