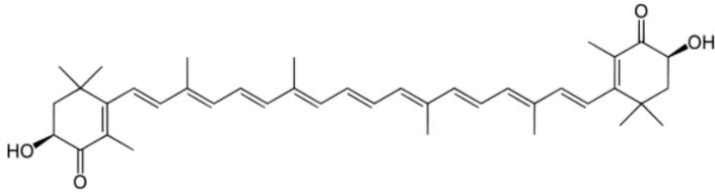


Astaxanthin 12 mg

TECHNICAL SUMMARY

Astaxanthin is a naturally occurring carotenoid derived from non-GMO *Haematococcus pluvialis* microalgae. Due to its unique structure, astaxanthin plays an important role in cellular free radical protection and healthy immune system responses.* Astaxanthin has been shown in clinical studies to promote normal cognitive function and may help to maintain a positive mood in adults.* In the eye, it helps to neutralize free radicals and helps to manage eyestrain due to computer usage.*

Structure Formula:Chemical Name: Astaxanthin (3,3'-Dihydroxyl-β,β-



carotene-4,4'-dione).

Allergens and Additive Disclosure: Not manufactured with wheat, gluten, milk, egg, fish, or shellfish ingredients. Produced in a GMP facility that processes other ingredients containing these allergens. Mixed tocopherols from non-GMO soy and sunflower.

Delivery Form: Softgels

ROLE AS NUTRIENT/FUNCTION

Astaxanthin has pleiotropic biochemical properties and it may be incorporated into cellular membranes where it acts as an electron donor.* It has been shown to be a stronger lipid peroxidation inhibitor than other carotenoids such as zeaxanthin, lutein, canthaxanthin, and β-carotene.* Astaxanthin is able to scavenge reactive oxygen and nitrogen species (ROS and NOS) within the cells that are involved in the immune system's response to normal environmental stress.* This results in the suppression of nuclear factor-κB and inhibition of nitric oxide synthase and cyclooxygenase-2.

NATUROKINETICS®

Liberation: The softgel capsule is tested in water using a USP testing method with dissolution occurring between zero and 60 minutes.

Absorption: Absorption of oral astaxanthin occurs in the intestine via passive diffusion, usually requiring that the carotenoid first undergo enzymatic esterification. This process allows astaxanthin to be taken up into enterocytes and to be subsequently released into the lymphatic system. Absorption and bioavailability are limited by the highly lipophilic properties of astaxanthin. Its bioavailability has been studied in humans using single doses ranging from 40 to 100 mg. Maximum blood concentrations (T_{max}) occur between 6.7 ± 1.21 hours and 21.3 ± 6.53 hours; C_{max} ranges from 55.2 ± 15.0 µg/L to 1.3 ± 0.1 mg/L. Half-lives range from 15.9 ± 5.3 hours to approximately 55 hours. These variations in bioavailability seem to depend on a variety of factors including preparation (e.g., fractions of free and esterified astaxanthin, proportion of astaxanthin isomers, etc.), formulation (e.g., co-administration with fat or surfactants)

Supplement Facts

Serving Size 1 Veggie Softgel

	Amount Per Serving	% Daily Value
Astaxanthin (from <i>Haematococcus pluvialis</i> Extract) (AstaReal®)	12 mg	†

† Daily Value not established.

Other ingredients: Vegetarian Softgel Capsule [modified corn starch (non-GMO), glycerin, water, carrageenan, sorbitol], Organic Extra Virgin Olive Oil, d-alpha Tocopherol (from sunflower seed oil) and Mixed Tocopherols (from rapeseed/sunflower seed oil).

- Supports Brain Health*
- Helps Manage Eyestrain*

SUGGESTED USAGE: Take 1 softgel daily with a fat-containing meal, or as directed by your healthcare practitioner.

and consumption (e.g., with or without meals) or smoking habits. To increase absorption and bioavailability, it is recommended that it be taken with a fat-containing meal.

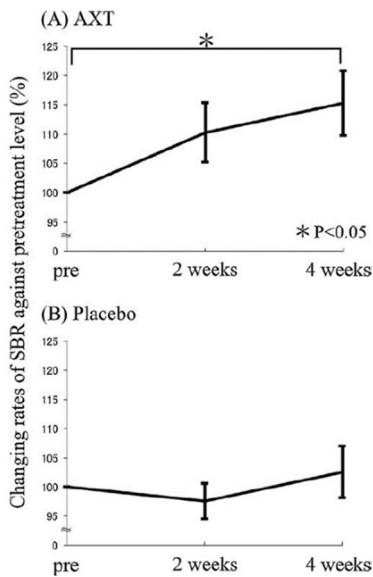
Distribution: Astaxanthin is predominantly carried in esterified form with plasma lipoprotein complexes. Preclinical research has shown that astaxanthin is predominantly found in the spleen, kidneys, adrenals, liver, skin, and eyes.

Metabolism: In *in vivo* and *in vitro* studies, metabolism of astaxanthin has been shown to occur in the liver by hepatocytes mainly through CYP3A4 and CYP2B6.¹

Elimination: Biliary excretion is the predominant eliminatory route, followed by urinary elimination. The half-life of astaxanthin in human volunteers is about 16 h after oral administration.

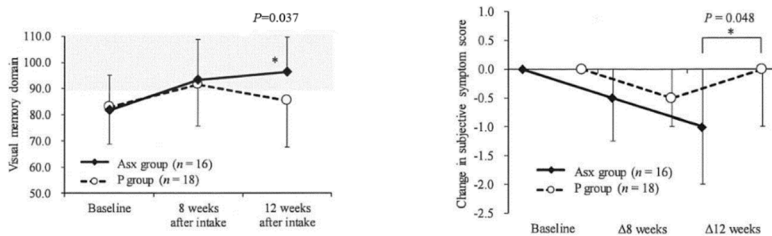
CLINICAL VALIDATION

- In a placebo-controlled clinical trial, 24 volunteers (average age 28 y) consumed astaxanthin at doses of 1.8, 3.6, 14.4, and 21.6 mg per day for 14 days. No other changes were made in the diet. Fasting venous blood samples were taken at days 0 and 14. Susceptibility of LDL to oxidation was measured as LDL lag time. LDL lag time was significantly longer in all astaxanthin groups as compared with day 0 (5.0, 26.2, 42.3, and 30.7%, respectively, with the increasing dose of astaxanthin administered) and no differences were shown in the control group from day 0 to 14.*
- In a randomized, double-blind, placebo-controlled trial, 20 healthy volunteers who ingested 12 mg astaxanthin or placebo capsules over a 4-week period were tested for retinal blood flow using laser speckle flowgraphy (LSFG). LSFG values were used to calculate the square blur rate (SBR), which is a quantitative index of relative blood flow velocity. After 4 weeks of astaxanthin supplementation, the authors observed a significant increase of the macular SBR.*



Changing rates of macular flow vs. baseline after ingestion of astaxanthin (A) and placebo (B).

- In a randomized, double-blind, placebo-controlled trial, 22 healthy volunteers experiencing mild forgetfulness who ingested 12 mg astaxanthin or placebo capsules over a 12-week period were assessed for cognitive function. Subjects in the astaxanthin group exhibited significant improvement in memory scores.*



Effect of astaxanthin (diamonds) and placebo (circle) on memory as measured on visual memory scale and subjective rating of memory.

SAFETY INFORMATION

Tolerability: Astaxanthin is typically well tolerated. Minor GI discomfort and a reddish coloration of feces have been described during supplementation.

Caution: There is insufficient reliable information available about the safety of astaxanthin supplementation during pregnancy and breast-feeding; avoid using.

INTERACTIONS

Drug Interactions: None known.

Supplement Interactions: Other carotenoids supplements (e.g., beta-carotene, lutein, lycopene) may decrease absorption of astaxanthin due to competition for absorption in the gastrointestinal tract.

Interaction with Lab Tests: None known.

STORAGE

Store in a cool, dry place in original sealed container.

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.