

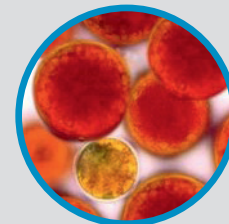
Improve Your Vision with AstaReal®

Benefits of natural astaxanthin for vision & eye health



What is Natural Astaxanthin?

It is a naturally occurring carotenoid which is derived from the microalgae *Haematococcus pluvialis*. As well as being the most powerful antioxidant known to science, it also



has potent anti-inflammatory properties. Natural astaxanthin's distinct advantage 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.

Research & Key Findings

A large body of research has shown that natural astaxanthin supplementation can improve symptoms linked to Computer Vision Syndrome such as eye fatigue and blurred vision, by improving accommodation responsiveness, range and resilience.

Shiratori *et al.* 2005 investigated the efficacy of natural astaxanthin on accommodation speed. 40 healthy subjects suffering asthenopia (eye fatigue) took a 6mg/d natural astaxanthin supplement vs placebo for 4 weeks. The astaxanthin group showed significant improvement in accommodation speed vs placebo group (Figure 1).

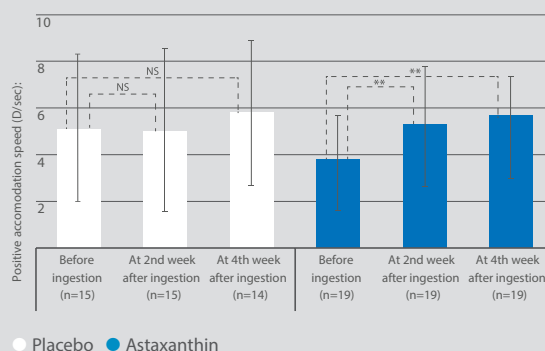


Figure 1. Double blind study by Shiratori *et al.* 2005, showing a significant improvement in the negative accommodation speed (near to far) in the Ax group after 4 weeks of supplementation (6mg/d) vs placebo.

Each value shows mean \pm standard deviation.
** Significant difference compared with before start of ingestion, $p < 0.01$ (paired t-test).

Retinal blood flow is the essence of vision since it is the base of the eye's internal balance. Low quality of the blood's antioxidant capacity and blood fluidity can lead to a disturbance of the eye's capillary circulation. It is believed that astaxanthin supplementation improves the nutrition, oxygenation, waste-removal and tissue rejuvenation function of the eye.

Help Refocus Tired Eyes

Computer Vision Syndrome (CVS) is a by-product of today's computer world. It is a temporary condition resulting from focusing the eyes on a computer display for protracted, uninterrupted periods of time. The most common symptoms of CVS are eye fatigue, blurred vision and itchy eyes.

Widespread and heavy usage of visual display devices is commonplace in modern society, with the average worker spending more than 45 hours in front of a computer screen every week. The National Institute of Occupational Safety and Health in the USA found that over 88% of office workers reported eyestrain. Another report from Europe showed that 23% of Swedish schoolchildren suffer from eye fatigue due to heavy use of video games.

Accommodation is defined as the ability of the eye to change its focus from distant to near objects (and vice versa). A human eye can change focus from distance infinity to 7cm in 350 millisecond. This dramatic change in focal power occurs as a consequence of reduction in the zonular tension induced by the ciliary muscle. Put simply, the circular ciliary muscles inside the eyes contract to focus on near subjects and relax to focus on distant subjects. During a long computer session, the eyes exert substantial energy to focus on the computer screen. This is why vision can be temporarily blurred after a long computer session.

Clinical studies have shown that natural astaxanthin supplementation improves eye fatigue by quenching cellular inflammation that emerges during persistent visual stress and tension of the ciliary muscle.



A double blind study conducted by Nagaki Y *et al.* in 2010 investigated the efficacy of natural astaxanthin on accommodation ability. 42 subjects were supplemented with 9mg/d AstaReal® natural astaxanthin vs placebo for 4 weeks. The results concluded that the astaxanthin group had significantly higher accommodation ability compared to the control group (Figure 2).

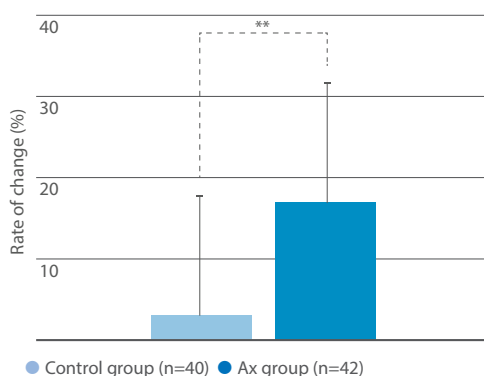


Figure 2.
Another double blind study by Nagaki Y *et al.* (2010) showing a significant improvement in the accommodation ability in the Ax group after 4 weeks.

There are several other studies that have investigated astaxanthin's efficacy on accommodation, with each showing promising results. In addition, many clinical trials have also shown that astaxanthin can improve blood capillary circulation of the eyes and consequently combat the development of ocular diseases. Please refer to the reference list for more information.

Did you know?

Seabirds are known to consume large amounts of fish and marine organisms that contain astaxanthin. After digestion, astaxanthin concentrates in the eyes of the seabird. Researchers hypothesize that astaxanthin provides superior eye protection against free radicals generated by UV glare. In addition, astaxanthin is thought to maintain the bird's "zoom in, zoom out" refocus speed of the ciliary muscle as it accommodates the lens as the bird hunts its prey.



Benefits of Natural Astaxanthin for Vision & Eye Health:

- 1 Improves symptoms linked to Computer Vision Symptom and eye fatigue
- 2 Improves capillary blood flow
- 3 Reduces inflammation of the ciliary muscle
- 4 Improves accommodation responsiveness, range & resilience

AstaReal® – The Most Studied Brand

There are over 400 peer-reviewed studies on astaxanthin and 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.

Superior Product Range

AstaReal AB offers a range of bulk products to fit different formats, allowing for the development of innovative products that add astaxanthin's unsurpassed antioxidant power.

In addition, AstaReal AB has developed a range of finished formulations containing AstaReal® natural astaxanthin, each expertly developed to support a number of health areas.



References & Selected Publications

1. Nagaki Y *et al.*, Effects of astaxanthin on accommodation, critical flicker fusions, and pattern visual evoked potential in visual display terminal workers. *J Trad Med.* 2002;19:170-73.
2. Nakamura A *et al.*, Changes in Visual Function Following Peroral Astaxanthin. *Jpn J Clin Ophthalmol.* 2004;58:1051-54.
3. Nitta T *et al.*, Effects of astaxanthin on accommodation and asthenopia – Dose finding study in healthy volunteers. *J Clin Therap Med.* 2005;21(5):534-56.
4. Nagaki Y *et al.*, The supplementation effect of astaxanthin on accommodation and asthenopia. *J Clin Therap Med.* 2006;22:41-54.
5. Nagaki Y *et al.*, Effect of astaxanthin on accommodation and asthenopia. *Folia Ophthalmologica Japonica.* 2010;3(5):461-68.
6. Saito M *et al.*, Astaxanthin increases choroidal blood flow velocity. *Graefes Arch Clin Exp Ophthalmol.* 2012;250:239-45.