

Antaxanthin Benefits - Human Consumption

Astaxanthin as an Antioxidant.

Normal metabolism in organisms generates oxidative molecules, that is, free radicals (molecules with electrons) such as hydroxyls and peroxides, as well as reactive oxygen species (singlets) which are needed to sustain life processes. However, excess quantities of such compounds are dangerous due to their very high reactivity because they may react with various cellular components such as proteins, lipids, carbohydrates, and DNA. This situation may cause oxidative damage through a chain reaction with devastating effects causing protein and lipid oxidation and DNA damage in vivo. This constant free radical attack against an organism is known as oxidative stress. Such damage has been associated with different diseases such as macular degeneration due to the aging process, retinopathy, carcinogenesis, arteriosclerosis, and Alzheimer disease, among other ailments. In order to control and reduce oxidation, the human body generates its own enzymatic antioxidants such as super oxide dismutase, catalase, and peroxidase, as well as other molecules with antioxidant activity. However, in many cases, these compounds are not enough to provide suitable protection against oxidative stress.

An antioxidant is a molecule which has the ability to remove free radicals from a system either by reacting with them to produce other innocuous compounds or disrupting the oxidation reactions. Persons who ingest a higher concentration of carotenoids have a lower risk of chronic diseases such as cardiovascular diseases, cataract development, macular degeneration, and some types of cancer.

Human Health

Anticancer Activity

Activity of carotenoids against cancer has been the focus of much attention due to the association between low levels of these compounds in the body and cancer prevalence. This effect has been partially attributed to suppression of cell proliferation. Mitochondria are the cellular furnaces in which food is turned into energy in the form of ATP. During this process, oxygen is released, producing several oxygen-derived free radicals that play an important role in various diseases. Oxidative stress leading to mitochondrial dysfunction is a critical factor for many diseases, such as cancer, neurodegenerative and lifestyle-related diseases.

Scientists found that astaxanthin decreased induced oxidative stress and protected cultured cells from free radicals. Moreover, astaxanthin helped maintain a higher mitochondria membrane potential and stimulated respiration, allowing for the production of increased levels of cellular energy.

Prevention of Cardiovascular Diseases

The risk of developing arteriosclerosis in humans correlates positively with the cholesterol content bound to Low Density Lipoprotein (LDL) or “bad cholesterol”. Many studies have documented that high levels of LDL are related to prevalence of cardiovascular diseases such as angina pectoris, myocardial infarction, and brain thrombosis. Inhibition of oxidation of LDL has been postulated as a likely mechanism through which antioxidants could prevent the development of arteriosclerosis. Astaxanthin inhibits the oxidation of LDL which presumably contributes to arteriosclerosis prevention.

Astaxanthin Effect Against Helicobacter Pylori Infections

H. pylori is considered an important factor inducing acute gastritis, peptic ulcers, and stomach cancer in humans. Thus, the development of products for therapeutic and prophylactic treatment of the mucous membrane of the gastrointestinal system caused by H. pylori has been proposed. The mechanism of Astaxanthin action to produce this effect is not known but it is suspected that its antioxidant properties play an important role in the protection of the hydrophobic lining of the mucous membrane making colonization by H. pylori much more difficult.

Eye Health

Human clinicals demonstrating reduced eye fatigue with astaxanthin showing significant improvement in accommodation, visual acuity and critical flicker fusion. Furthermore, studies in animals where uveitis was induced demonstrated significant reduction in ciliary body inflammation in subjects administered astaxanthin. Also interesting is a human clinical showing an increase in retinal capillary blood flow with astaxanthin supplementation.

Astaxanthin as a Booster and Modulator of the Immunological System

Astaxanthin has a potential activity as a booster and modulator of the immunological system. Astaxanthin increases the production of T-helper cell antibody and increases the number of antibody secretory cells from primed spleen cells. The supplementation with carotenoids may be useful to restore immune responses. Due to its immunomodulating action, Astaxanthin has also been utilized as a medication for the treatment of autoimmune diseases such as multiple sclerosis, rheumatoid arthritis and Crohn's disease.

Astaxanthin Exhibits a Strong Photoprotective Effect

Scientists compared the abilities of various carotenoids to modulate UVA related injury. Fibroblasts from skin were exposed to moderate doses of UVA, which stimulated cell death, increased levels of free radicals and other reactive substances, decreased antioxidant enzymes activities, and promoted membrane disturbance and enzyme denaturing of hemoglobin. The fibroblasts were treated with carotenoids including astaxanthin 24 hours before exposure to UVA. Of the carotenoids tested, only astaxanthin exhibited a pronounced photoprotective effect and countered all of the UVA induced alterations to a significant extent.

Astaxanthin is Able to Cross the Blood-Brain Barrier to Protect Neurons

Astaxanthin is capable of crossing the hematoencephalic barrier in mammals, a unique and important property for an antioxidant. This characteristic allows astaxanthin to extend its superior antioxidant activity to the central nervous system, which is highly susceptible to damage by free radicals.

Anti-Inflammatory Effects

Several studies have shown the ability of Astaxanthin to reduce inflammation, which could be considered the underlying mechanism for its many beneficial effects. In one example, Astaxanthin was shown to play a role in cytokine regulation by inhibiting the expression of inflammatory cytokines and chemokines.

Diabetic Nephropathy

Studies were demonstrated that astaxanthin reduces glomerular oxidative stress as well as inhibits the increase in urinary albumin. The expression of genes associated with oxidative stress was slightly inhibited in Astaxanthin-treated animals. This approach is the beginning of elucidating the mechanism associated with the genes and pathways involved in the protective mechanism of Astaxanthin.