

# Supporting cardiovascular health with astaxanthin



## Abstract

Cardiovascular disease is now the biggest cause of mortality worldwide, a consequence of population aging and unhealthy lifestyles. There is therefore an urgent need for new preventive health strategies, and growing demand for dietary supplements with proven benefits for heart health.

The unique chemical properties of astaxanthin, a powerful natural antioxidant, make it an ideal ingredient for heart health supplements. There is a growing body of scientific evidence – including human trials on groups at high risk of CVD – that it can reduce oxidative stress and inflammation, as well as lowering levels of LDL cholesterol and improving blood flow.

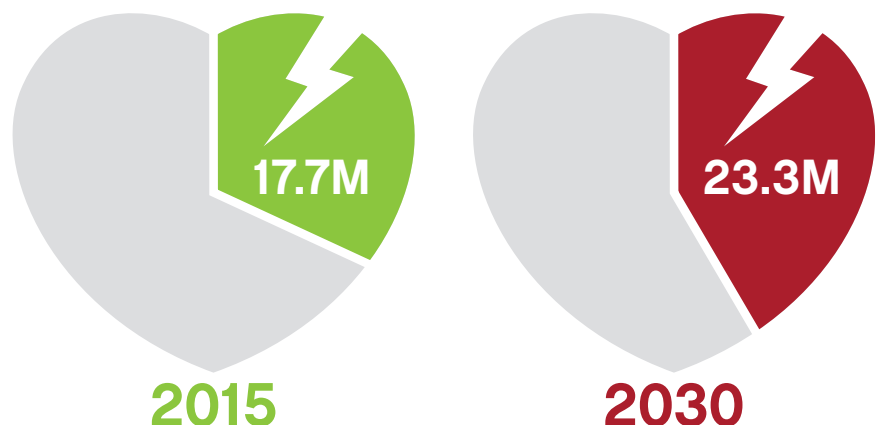
As the prevalence of lifestyle-related health conditions increases, the scientifically supported benefits of supplementation with astaxanthin will make it an increasingly valuable strategy for the maintenance of heart health.

## Cardiovascular disease – The world's biggest killer

Cardiovascular disease (CVD) is the world's biggest killer. In 2015 it accounted for **17.7 million deaths worldwide** – almost a third (31%) of the total.<sup>1</sup> This number is predicted to rise to **23.3 million** by 2030<sup>2</sup>, a consequence of population aging and lifestyle factors such as poor diet and physical inactivity.

Given the increasing prevalence of CVDs – and the fact that the potential of drugs such as statins is often limited due to cost and side effects<sup>3</sup> – it is unsurprising that cardiovascular health is an increasingly important goal for dietary supplement users. Over half of consumers say they are either very or extremely concerned about cardiovascular health, and the number of dietary supplements with a heart health positioning reportedly grew by 71% between 2011 and 2015.<sup>4</sup>

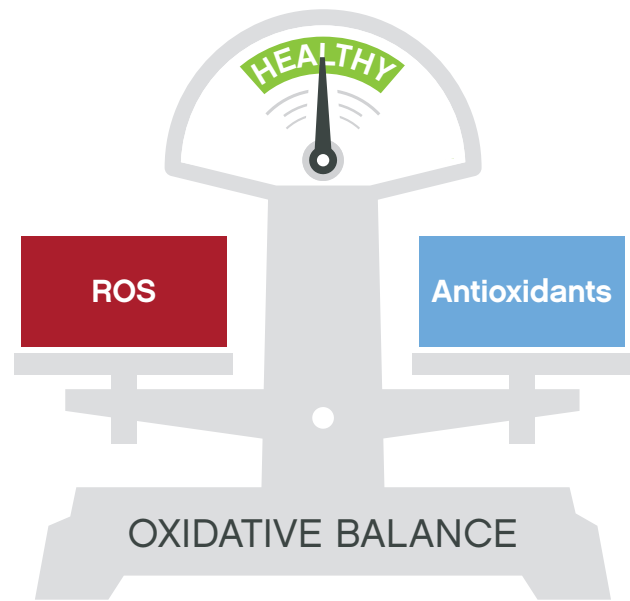
### Global deaths from CVD



## Oxidative stress – a major cause of CVD

Every moment of every day, the body's cells produce millions of unstable molecules called Reactive Oxygen Species (ROS). ROS are formed as a by-product of normal metabolism when food is converted into energy and are essential for many biological processes. However, the overproduction of ROS can have a harmful effect on important cells and tissue in the body.<sup>5</sup> The damage they cause is called oxidative stress and it is a key contributor to CVD.<sup>6</sup> In particular, oxidative stress has emerged as a common mechanism in the hardening and narrowing of arteries caused by the build-up of plaque.

The body produces its own antioxidants to keep ROS under control but this natural defense system grows weaker as we age. Non-enzymatic antioxidants, such as astaxanthin and other carotenoids, can function in tandem with the body's enzymatic antioxidant defenses to "scavenge" ROS and restore a healthy balance, thus combating oxidative stress.



## Astaxanthin – a superior antioxidant for cardiovascular health

Astaxanthin is a carotenoid that occurs naturally in aquatic animals such as lobsters and salmon (contributing to their pinkish-red color) and in many fruits and vegetables. Although it can be produced synthetically from petrochemicals, the natural version is far superior in terms of efficacy and safety.

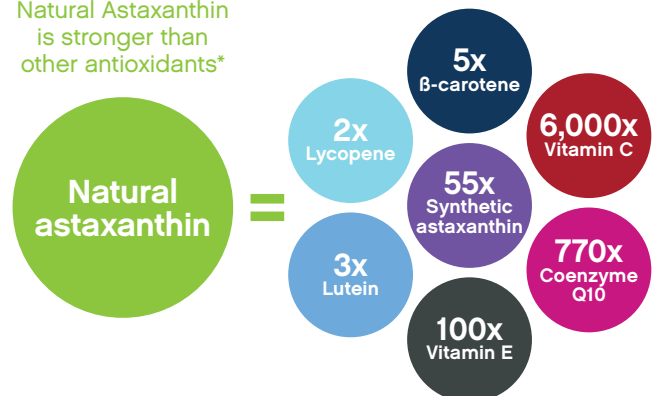
Natural astaxanthin possesses unique chemical properties that have earned it a reputation as a "superior" antioxidant.<sup>3</sup> In its ability to trap energy from singlet oxygen, it is **6,000 times** more powerful than Vitamin C, **100 times** more powerful than Vitamin E and **five times** more powerful than betacarotene.<sup>7</sup> Because of its powers to combat ROS, and a range of other properties, astaxanthin can play an important role in the promotion of cardiovascular health.

Although astaxanthin occurs naturally in seafood, most people do not get enough of it in their diet. For instance, people in the US consume on average only **two to three pounds** of salmon per year, with an estimated astaxanthin intake of **0.029 mg per day**.<sup>8</sup> This is around **200 times less** astaxanthin than the documented dose for health benefits, which ranges from **2mg to 12mg**.<sup>9-15</sup> The microalgae *Haematococcus pluvialis* synthesizes the highest amount of natural astaxanthin in nature, making it an optimal choice for dietary supplements for heart health.

The first major study of astaxanthin's antioxidant properties took place in 1991. Researchers observed lower levels of an oxidation marker in rats fed on a Vitamin-E deficient diet supplemented with astaxanthin than those on the same diet without astaxanthin.<sup>16</sup> Since then, the body of scientific evidence has grown substantially. A recent review of studies of oral administration of astaxanthin concluded that the evidence for astaxanthin as an excellent antioxidant is "clear cut".<sup>3</sup>

Supplementation with astaxanthin may also support a healthy oxidative balance in groups at elevated risk of CVD. For example, heart conditions are more common in postmenopausal than premenopausal women of the same age, and a 2004 study concluded that it would be helpful for women in this group to supplement with astaxanthin.<sup>11</sup> Research has also demonstrated benefits against obesity-induced oxidative stress in overweight adults<sup>17</sup> and in women with an increased oxidative stress burden.<sup>18</sup>

Natural Astaxanthin is stronger than other antioxidants\*

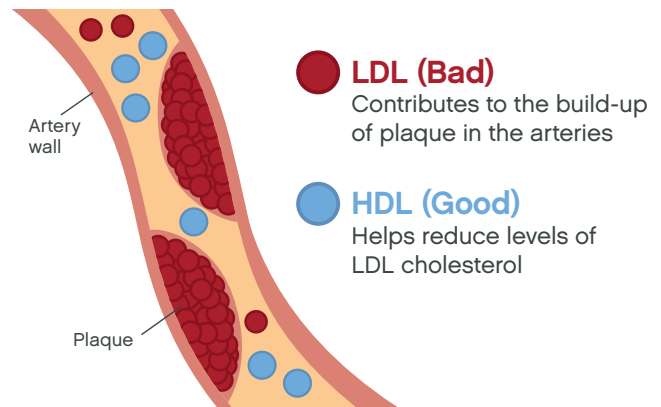


\*Astaxanthin is more effective than other antioxidants in trapping energy from singlet oxygen (Nishida Y, et al. 2007, Capeli et al. 2013)

## Good v Bad Cholesterol – Astaxanthin for a healthier lipid profile

Elevated levels of LDL (“bad”) cholesterol, and low levels of HDL (“good”) cholesterol, increase the risk of CVD.<sup>11</sup> For example, the oxidation of LDL in the blood has a significant role in the build-up of plaque in the arteries, which can restrict blood flow.<sup>11</sup>

Astaxanthin can help support a healthy lipid profile. The first major human study on its effect on dyslipidemia (an excess of LDL and other lipids in the blood) was published in 2010. It found that astaxanthin consumption decreased triglyceride – a lipid that increases risk of CVD – and significantly increased levels of HDL-cholesterol.<sup>15</sup>



## Other benefits for cardiovascular health

Like oxidation, inflammation is strongly linked to the development of CVD, as well as the development of health conditions related to it.<sup>3</sup>

*In vitro* and on animals, astaxanthin has been shown to reduce markers of inflammation<sup>3</sup> and a 2013 study on human vein cells revealed that it inhibits the production of the inflammatory biomarkers involved in endothelial dysfunction and CVD.<sup>19</sup>

Astaxanthin also offers a range of additional benefits for cardiovascular health. For example, its antioxidative and anti-inflammatory properties can significantly shorten blood transit times.<sup>20, 21</sup> Several studies have also indicated potential to lower blood pressure,<sup>29</sup> and a recent meta-analysis concluded that it has a minor glucose-lowering effect.<sup>3</sup>

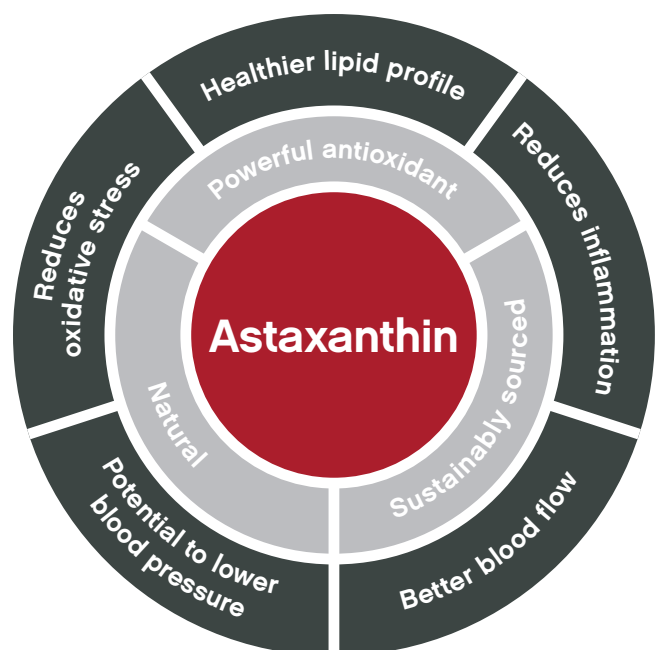
## Conclusion – The ideal ingredient for heart health supplements

There is a growing body of scientific evidence for the benefits of astaxanthin for heart health.

While much of the early research took place *in vitro* or on animals, many recent trials have been conducted on human subjects, consistently indicating positive results for the reduction of oxidative damage and inflammation, as well as benefits such as improved blood flow. Significantly, many of these studies have focused on groups at higher risk of CVD, such as seniors and people with obesity.

There is now a solid scientific foundation supporting the case for astaxanthin as an effective ingredient for heart health supplements. Furthermore, it is safe, natural and can be sustainably produced, adding to its consumer appeal.

As we live longer, new strategies to prevent and treat lifestyle-related diseases will become increasingly important. Astaxanthin’s scientifically proven benefits mean it has enormous potential in the maintenance of cardiovascular health worldwide.





## About Algalif

Algalif™ is a leading supplier of high-grade natural astaxanthin from microalgae, manufactured in an environmentally-friendly way at our state-of-the-art facility in Iceland. Our mission is to help solve the nutritional needs of current and future generations through the development and delivery of sustainable, high-quality microalgae. We produce Astalif™ Astaxanthin, a powerful natural antioxidant with multiple health benefits and a solid scientific foundation.

For more information, please visit [www.algalif.com](http://www.algalif.com) or contact us at [sales@algalif.com](mailto:sales@algalif.com).

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