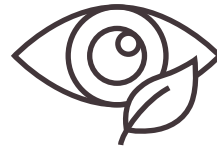




Studies show  
phytonutrients may  
play an important  
role in vision *health*



## Vision *health* has become an issue for people of all ages



Vision loss and eye disorders are no longer primarily an age-related health issue. Though older adults are more at risk of developing eye disorders, changing lifestyle factors have made people of all ages susceptible to vision issues.

The rapid increase in the use of digital devices over the past few decades has led to a rise in ocular problems across all age groups. Common symptoms range from blurred vision and dry eyes, to eye strain, eye pain and visual fatigue. Laboratory and epidemiological findings also indicate that oxidative stress induced by free radicals has serious implications for both systemic and ocular diseases<sup>1</sup>.

The rate of ocular disease, particularly among aging populations in developed countries, has also increased. This rise is often linked with eye strain and external factors such as prolonged exposure to blue light and UV rays<sup>2</sup>.

### The link between diet and vision health

Lifestyle also plays a role. A diet high in red and processed meats, fried foods and fats can have a detrimental effect on vision health. A US observational study of middle-aged men and women found that those who ate unhealthy diets were three times more likely to develop late-stage

age-related macular degeneration than people who ate a more balanced, healthier diet<sup>3</sup>.

While the connection between diet, cardiovascular health and obesity are widely documented and understood, there is a low level of awareness about the link between diet and vision health. The lead author of the aforementioned study Dr. Amy Millen, Department of Epidemiology and Environmental Health, University at Buffalo, says "Diet is one way you might be able to modify your risk of vision loss from age-related macular degeneration"<sup>4</sup>.

Though some eye conditions such as ocular malformations or glaucoma are hereditary, it is possible to lower the risk of developing certain eye conditions and maintain vision health by eating a nutrient-rich diet. To bridge any nutritional gaps, daily dietary supplements may help protect against a range of degenerative diseases, including conditions that affect the eyes.

## The role of plant-based *active* compounds in vision health

There is substantial scientific evidence to support that a number of plant-based active compounds may play a key role in vision health.



### Anthocyanins – regenerate and strengthen

Anthocyanins are widely used in eye health supplements in Europe and East Asia, in particular Japan.<sup>5</sup> Found in many fruits and vegetables, the concentration of anthocyanins differs according to plant type and the plant's origin.

A number of scientific studies indicate that anthocyanins may play a supportive role in vision health.<sup>6</sup> The studies established that anthocyanins:

- Have a relaxing effect on the ciliary muscle, which can help in the treatment of both myopia and glaucoma<sup>7</sup>
- Stimulate the regeneration of rhodopsin (a photo-receptor protein in the rods of the retina cells)<sup>8</sup>
- Inhibit axial and ocular length elongation, which prevents myopia<sup>9</sup>
- Improve nocturnal vision and clinical symptoms in myopia subjects<sup>10</sup>

Two particular plant extracts rich in anthocyanins have beneficial effects on vision health – wild bilberry of European origin (*Vaccinium myrtillus*) and blackcurrant (*Ribes nigrum*)<sup>11</sup>. A range of studies have been conducted that indicate:

- Bilberry anthocyanins may enhance night vision acuity<sup>12</sup>
- Blackcurrant (*Ribes nigrum*) anthocyanins are absorbed and distributed in ocular tissues as intact forms and pass through the blood-aqueous barriers and blood-retinal barriers<sup>13</sup>
- Blackcurrant anthocyanins improve vision health and may have a beneficial effect on the prevention and treatment of optical disorders, such as eye fatigue, dark adaptation myopia and help improve retinal blood circulation in normal tension glaucoma patients<sup>6</sup>

## Lutein and zeaxanthin – carotenoids *protect* against light and oxidation

Two of the most widely recognized antioxidants for vision health are the carotenoids lutein and zeaxanthin. The richest source of lutein and zeaxanthin is the petals of the marigold flower (*Tagetes erecta*).<sup>14</sup>

Concentrations of lutein and zeaxanthin are found within the eye, with lutein predominant in the

peripheral macula and zeaxanthin more centralized in the mid-peripheral and center of the macula. It is understood they provide protection against Age-related Macular Degeneration (AMD) – it is hypothesized that they can absorb blue light, neutralize free radicals and stabilize cell membranes.<sup>15</sup>



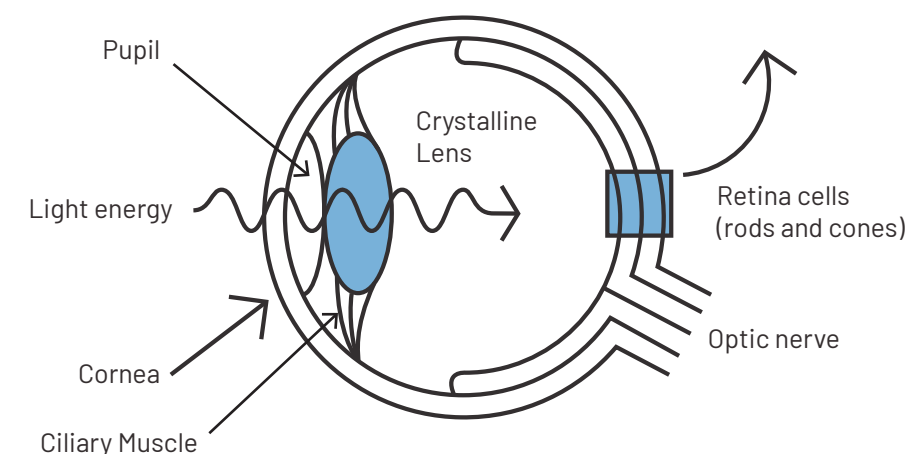
## Mixed carotenoids – a synergistic *antioxidant* blend

Other carotenoids detected in the eye are  $\alpha$ -carotene,  $\beta$ -carotene, and lycopene, which are found in the retinal pigment epithelium and choroid. They are also linked to a lower risk of AMD, though evidence is inconsistent. However recent studies show that a high intake of bioavailable carotenoids, particularly lutein, zeaxanthin and  $\alpha$ -carotene are associated with the reduced risk of advanced AMD<sup>16</sup>.

The richest source of natural mixed carotenoids is palm fruit (*Elaeis guineensis*). Compared to other

carotenoid-rich plants, palm fruit has the highest  $\alpha$ -carotene content (approximately 35%), and is rich in  $\beta$ -carotene, and lycopene.<sup>17</sup>

A number of scientific studies have found that consuming a variety of carotenoids is more effective than consuming a single compound, as the synergistic effect provides a more pronounced antioxidant defense mechanism<sup>18</sup>. Therefore, food supplements that comprise a mix of the major carotenoids may help strengthen antioxidant defenses and support eye health.



## The *vision health* supplement market is predicted to surpass \$US290 million by 2024<sup>19</sup>



## Scientific evidence is behind the rapid growth of the vision health supplement market

Based on this evidence, it can be concluded that vision supplements may have an important role in a personalized dietary supplementation strategy. In fact, dietary supplements may be a necessity considering the widespread dependency on blue light-emitting digital devices, high-fat diets lacking essential nutrients, and aging populations – all proven risk factors for vision loss and eye disorders.

It is also important to point out that many of these natural antioxidants are not produced in the human body. This further strengthens the argument that incorporating a mix of phytonutrients in the diet that are rich in carotenoids and other polyphenolic compounds – such as anthocyanins and flavonoids that work in synergy – may have a beneficial and protective effect on vision health.

Additional clinical trials are needed to validate these health claims and firmly establish the credibility of vision health supplements. Further scientific evidence will not only help build confidence among consumers, it will also help raise the legitimacy of food supplements and the important role phytonutrients play in health and nutrition.

Rich in anthocyanins, our NutriPhy® Bilberry supports vision health.

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