

Formulating Eye Health Products

By Judi Quilici-Timmcke, M.S., Contributing Editor

Consumers who are over 40 may purchase eye health products out of the fear of aging, problems with vision loss or going blind. The aging process increases the incidence of cataracts, macular degeneration and glaucoma.

Age-related problems occur throughout the body, including the eye and all of its intricate parts. Macular degeneration alone affects over 10 million Americans and is the leading cause of blindness in individuals over 55 years old. Consequently, conventional medicine has not provided much hope to help restore loss of eyesight. More research is being performed in alternative health practices to support individuals with macular degeneration and to help prevent vision loss.

Of course, improving dietary habits, increasing exercise, not smoking and protecting the eyes from the sun are important, but dietary supplements and nutritionally supportive eye drops have provided some hope for the American consumer. The Age Related Eye Disease Study (AREDS) was a major boost in the confidence of dietary supplements for eye health. This study, published in the *Archives of Ophthalmology* in 2001, demonstrated that individuals who received antioxidants compared to a placebo had a 25- percent reduction of the incidence of developing advanced macular degeneration.¹

There is a wide variety of eye health products available on the store shelves that range from homeopathic eye drops to herb, vitamin and mineral capsules providing various functions, especially in the anti-aging category. Many of these products contain ingredients that have been shown to protect or help heal eye dysfunction. To formulate eye health products it is critical to review the scientific literature to determine what ingredients have been used successfully in peer-reviewed studies that significantly benefit eye conditions and at what doses. The eyes need nutrients to help protect against oxidative damage, which is associated with the aging process. There are studies that administer dietary supplements to individuals with dry eye syndrome, glaucoma, cataracts, diabetic retinopathy, macular degeneration and night blindness. Dry eye syndrome is an eye disorder causing pain and irritation, and can be devastating to many people, especially women. The eyes are dry because of a small quantity of tears available to bathe the eyes; if not treated, it can cause cornea scarring resulting in vision loss.

There are many important questions that need to be taken into consideration when developing dietary supplements for the eyes. Where do you begin to formulate such a product? What nutrients do the eyes need to maintain health? Are there particular conditions that could benefit from added nutrients in a dietary supplement to support one's diet? And do consumers with eye problems think these nutrients are important enough to purchase?

Nutrients to Support Eye Health

To formulate eye health products, it is critical to review the scientific literature to determine what ingredients have been successfully administered in peer reviewed studies with significant eye benefits and at what doses.

It's natural to start with basic vitamins and minerals. There is good documentation showing nutrients such as vitamins A, C, E and the B vitamins like B2 (riboflavin) have antioxidant properties. Many Americans have poor diets and may lack these compounds. Vitamins and minerals may be incorporated into eye formulations since they are vital for the eyes; but, they should not overlap and be duplicated in other formulas of a product line such as multiple vitamin/mineral products, unless dosages are within safe levels. **Vitamins B2, B12 and folic acid** protect against cataracts.² One study demonstrated that long-term use of a multivitamin, as well as B vitamin and vitamin A supplements, was associated with reduced incidence of either type of cataracts.³ The study further revealed that folic acid or vitamin B12 supplements also supported against cataracts.

Various population studies have shown **vitamin E** doses higher than the amount from the diet are beneficial to health and provide protection against cataracts.⁴ Since vitamin E is fat-soluble, it poses some formulation challenges, as it is generally added to an oilbased product or used as a powder in a capsule; but, because of the higher percentage of product needing to be used to provide the active, it will take greater space in the capsules and increase cost. This also brings up the question: does your product line already have a multiple vitamin/mineral product that contains vitamin E?

Additional nutritional support comes from the antioxidant carotenoids and flavonoids. **Carotenoids** are plant pigments that contain colors such as red, yellow and orange. There are over 600 identified carotenoids with health benefits, and appear to have an affinity for different regions of the body. The carotenoids are recommended to be taken all together, although individually they have shown great benefit. Since they are fat-soluble, carotenoids should be paired with food containing fat.

Beta-carotene

and **alpha-carotene** are referred to as provitamin A carotenoids, as the body can convert them to **vitamin A** as needed. **Lutein, zeaxanthin and astaxanthin** are also carotenoids with an affinity for the eye area and the ability to protect the macula.⁵ The macula, found in the retina, is involved in recording images and sending them to the brain from the eyes; it is important for reading fine print, driving and observing small objects. Lutein may help to filter damaging effects from light. Tests have shown 6 mg of lutein from food sources provides protection.

Bioflavonoids

are water-soluble plant-based antioxidants that have additional beneficial effects on eye health. For example, the eyes are supplied with oxygen and nutrients through minute capillaries; bioflavonoids may increase the integrity of these blood vessels, enhancing their function. Research performed by Jack Masquelier, Ph.D., on the original Oligomeric ProanthoCyanidins (**OPC**) has shown they improve capillary fragility and permeability. Research has also demonstrated improvements in patients with retinopathy by supporting blood vessels of the eyes and thereby reducing exudations (fluid seeping through blood vessels). OPC is expensive to formulate with, but the significant amount of research makes it worth the added cost.

The citrus flavonoid blend of **rutin** and **quercetin** also offers antioxidant properties and, in large doses, increases the integrity of the small blood vessels. Quercetin has also been shown to control levels of aldose reductase, an enzyme that converts glucose into sorbitol. High levels of sorbitol are

associated with cataracts, neuropathy, retinopathy and other problems from high levels of free radicals.

Two botanical sources of important flavonoids for eye health are **Ginkgo biloba** and **bilberry**. Standardized ginkgo extract contains flavonoids that quench free radicals, help to improve blood circulation through the body and possibly lower intraocular pressure in the eyes. And bilberry standardized to 25-percent anthocyanidins has been studied for night vision and helping the eye adapt to darkness.

The beneficial **omega-3 fatty acids** also have a role to play in eye health. A research study performed in 2005 demonstrated that omega-3 fatty acids help to reduce dry eye risk by 68 percent.⁶ Brigham and Women's Hospital (BWH) and the Schepens Eye Research Institute evaluated data from surveys of more than 37,000 women enrolled in the BWH-based Women's Health Study. The study showed that if the dietary ratio of omega-6 to omega-3 fatty acids was greater than 15-to-1, there was a 2.5-times higher risk for dry eye syndrome. Many companies are now developing products with omega-3 fatty acids to help protect against dry eye syndrome.

Finally, there is some support for the use of **carnosine** (beta-alanyl-L-histidine), which has been shown to promote eye health when provided in a topical eye drop.⁷ Although the same research does not exist for an oral form, it has been formulated into a capsule form.

There is a strong interest in the eye health category. Consumers over the age of 40 may purchase eye health products to protect themselves from age-related vision problems. Various nutritional supplements have been studied and demonstrate that they support eye health. Thus, a good review of the scientific literature is necessary to develop a successful product.

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