

Eye-health solutions

Petra Larmo, PhD, R&D manager at **Aromtech** (Tornio, Finland), discusses nutrition for the health of aging eyes, why sea buckthorn oil can offer help for dry eyes and how lutein protects the macula.

Dry-eye syndrome is a multifactor disease of the tears and ocular surface. It causes symptoms of discomfort, vision problems and instability of the tear film. The syndrome involves increased tear-film osmolarity and inflammation, which may damage the ocular surface. The tear film that covers the ocular surface is made up of three layers: the mucous layer; the aqueous layer, from secretions of the lacrimal gland; and the outermost layer, lipids secreted by the meibomian glands. The eyes of people suffering from dry eye are lacking in the aqueous layer secreted from the lacrimal glands, or an insufficient lipid layer leading to excess evaporation of the aqueous tear film. The osmotic concentration of the tear film is increased in these cases, which activates the inflammation reaction and damages the surface of the eye.

Studies indicate that the symptoms of dry eyes, such as a sensation of dryness, burning or having a foreign object in the eye, are experienced by approximately 15% of people who are in their 50s or older. The risk increases with age, and up to 34% of people over 65 are reported to suffer from the condition. Various external factors, such as work at a monitor screen, wearing contact lenses and use of certain medications, increase the risk of dry eyes. The symptoms are especially commonplace in wintertime, when the air's humidity is low. Also, dry eyes are more common in women than in men.

Sea buckthorn oil

Dry eyes are most commonly treated with moisturising eye drops. They alleviate the symptoms but do not eliminate the inflammation that maintains and intensifies the dry-eye syndrome. Research carried out by the University of Turku's Department of Biochemistry and Food Chemistry in cooperation with the Faculty of Medicine found that the intake of sea buckthorn oil had beneficial effects on the symptoms of dry-eye syndrome and on the most important clinical indicator of dry eyes, the tear films' osmotic concentration.

The sea buckthorn oil used in the study had a standardised composition, with oil from the soft sea buckthorn berry and the sea buckthorn seed extracted via supercritical carbon-dioxide extraction (SBA24 sea buckthorn oil, Aromtech). Oil in the soft portions of the sea buckthorn berry is rich in carotenoids, including beta-carotene, a precursor to vitamin A, along with omega-7 and omega-9 fatty acids. The oil in sea buckthorn seeds, however, is rich in essential omega-3 and omega-6 fatty acids. Both oils are rich in tocopherols and tocotrienols (vitamin E compounds) and plant sterols.

It is likely that the combination of various components in sea buckthorn oil had an effect in the alleviation of dry-eye in the study. It has been observed that the lipid layer of the tear film in people with dry eyes is thinner and may have a lower carotenoid content than that of healthy people. Carotenoids,



tocopherols and tocotrienols have been shown to exhibit anti-inflammatory effects

Lutein maintains the health of the macula

Age-related macular degeneration damages the area of central vision, the macula. Oxidative stress and the resulting oxidative changes in the structure of the retina are a major contributing factor. Elevated blood pressure and smoking, among other factors, increase the risk of age-related macular degeneration.

Lutein and zeaxanthin are oxygen-containing xanthophyll carotenoids that the human body enriches at the macula of the retina and the lens. According to recent studies, lutein is also accumulated in certain areas of the brain. Lutein and zeaxanthin are effective absorbers of high-energy blue light, and indeed their task on the retina and the lens is to protect the eye from oxidative damage. The human body cannot produce lutein or zeaxanthin; these must be gained from nutrition.

Nutrition supports the health of aging eyes

According to studies conducted in the US, the average intake of lutein and zeaxanthin is approximately 1.7–2.3mg a day. Clinical studies have shown the most reproducible results for the pigment-density of the macula and vision indicators with a daily intake of 10mg of lutein and/or zeaxanthin. Good sources of lutein and zeaxanthin include leafy green vegetables. Sea buckthorn berries also naturally contain lutein and zeaxanthin, but the concentration varies with the genetic background and growth condition of the berry. A nutritional supplement based on sea buckthorn oil and lutein that, on the basis of research results, has been optimised to maintain the health of aging eyes will be placed on the market in Nordic countries in late 2014. ■

Further information

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