Micronutrient supplementation is multi-purpose. It has been proven that micronutrient intake works to serve a variety of different functions; from preventing the onset of Alzheimer’s disease\(^1\) to reducing the risk of falling in the elderly.\(^2\) Now, emerging research, such as the new GLARE2 study sponsored by DSM and Kemin,\(^3\) is exploring the beneficial effects micronutrient supplementation has on eye health, visual performance and comfort. According to a Health-Focus International survey, 24 per cent of consumers believe that the consumption of vitamins, minerals and supplements can help prevent and treat specific eye problems.\(^4\) This is reflected in Frost & Sullivan’s survey, where the global market for eye health was projected to grow at a compound annual growth rate (CAGR) of 6 per cent until 2019.\(^5\) With 285 million people visually impaired across the globe, the international eye health supplements market lies on fertile ground and nutritional providers industry-wide are taking heed of opportunities to appeal to younger, healthier audiences.

Alongside eye health, there is a new focus on enhancing visual performance and comfort amongst consumers, which is also covered in the GLARE2 study and includes three aspects: photostress recovery time, contrast enhancement and glare disability. Photostress recovery time determines how fast the eye can recover sight after experiencing a flash of bright light; similar to when sunlight or headlights of an approaching car suddenly impair vision while driving. Contrast enhancement is the ability to detect chromatic borders that allow discrimination of an object from its coloured surroundings, which is important in sport activities such as baseball. Glare disability stems from intra-ocular scatter and refers to the extent of glaring light that a person can tolerate. In a world where individuals encounter glare in a variety of different ways, eye comfort can be enhanced by improving resistance to bright light.

Over the course of an individual’s life, changes in the eye, such as cataracts, can worsen eye health, meaning glare disability is more frequent in older adults as opposed to younger, healthier consumers.\(^6\) However, micronutrient supplementation is important throughout an individual’s life and can help to prevent the onset of eye problems in later stages. It is vital that nutritional providers begin to inform and educate younger consumers on the benefits micronutrient supplementation has to offer and the ways in which intake of nutritional ingredients can help mitigate future eye health concerns.

**Uncovering glare disability**

Many people are unsure as to the causes and effects of glare disability. In simple terms, glare refers to a condition where individuals are exposed to a light source, be it direct or indirect that is in excess of their adaptive state. Such conditions can cause temporary discomfort and disability, impacting on the individual’s ability to see clearly. A good example of this is when a person is driving a car and suddenly encounters glare from the sun that shines directly through the windshield. Another case is when a person is...
skiing and the sun shines straight through their protective glasses, causing momentary loss of sight.

New research is exploring how nutritional ingredients, such as lutein and zeaxanthin, can support and enhance visual performance in glare conditions. Of the 600-plus carotenoids found in nature, only lutein and zeaxanthin, together with meso-zeaxanth, a metabolite of lutein, are located in the eye. This is where they are found in the highest concentration within the body, suggesting an important biological role for these molecules. The two yellow pigments cannot be synthesized by the human body, however can be consumed either in green, leafy vegetables or through nutritional supplementation.

Both are found concentrated across the macula, a characteristic yellow spot over a section of the retina that is responsible for high acuity central vision. Higher macular pigment density (MPOD) is associated with functional improvements in visual performance, meaning that optimizing macular concentrations through lutein and zeaxanthin supplementation is an important goal for many. The yellow spot in the macula, also called the macula lutea, forms an internal yellow filter that screens cones and central rods from blue light, reducing the effects of glare disability, while speeding up photostress recovery time, extending visual range and improving chromatic contrast.

Lutein and zeaxanthin, therefore, function as a pair of internal sunglasses, creating a filter over the retina that enhances detailed vision. This filter, otherwise referred to as macular pigment, blocks out blue light and haze from strong light to increase visual tolerance, while shortening the time needed to recover from flashes of intense light.

**Essentiality of lutein and zeaxanthin**

There is a large body of scientific literature that has examined the idea that yellow filters within the eye, such as lutein or yellow intraocular lenses (IOLs), can improve vision in a myriad of ways. Scientists are building upon well-established research to further understand the role of nutritional status in...
Eye health

eye performance. The results of the new GLARE2 study sponsored by DSM and Kemin show how lutein and zeaxanthin supplementation can improve the ability to see under glare conditions and have recently been published in Investigative Ophthalmology & Visual Science. This randomized, double-blind, placebo-controlled study took place at the University of Georgia in Athens and analysed lutein and zeaxanthin supplementation over the course of 12 months. The results of the study indicate that the regular intake of lutein and zeaxanthin can be beneficial for improving visual performance and comfort in young, healthy people. With eye health supplements typically aimed at older consumers, the new research highlights the importance of acting early.

During the GLARE2 study period, approximately 100 young, healthy subjects were assessed and received dosage levels of 10 mg lutein and 2 mg zeaxanthin or a placebo over a one year supplementation period. During this time, MPOD and serum levels of lutein and zeaxanthin increased significantly in the supplemented group, while no changes were noted in the placebo group. The results of the study, therefore, confirm to scientists, manufacturers and consumers from across the globe that increasing macular pigment density can boost visual function by reducing glare sensitivity, enhancing chromatic contrast and improving photostress recovery times. Additionally, showing that lutein and zeaxanthin can improve visual function in normal, healthy individuals widens its applications and acts as a stimulus for further research into the role of nutrition in supporting both eye health and visual performance.

Younger populations and growing markets
Emerging research highlights the importance of ‘acting before it’s too late’ and the focus of the eye health industry is no longer on age-related macular degeneration alone. It is a well-known fact that nutritional providers tend to target older consumers as opposed to the younger, healthier generation. With studies now placing focus on younger subjects, new markets are opening up for supplements manufacturers worldwide. Eye health isn’t only concerning in old age and there is clearly scope to target health-conscious, active consumers who are attempting to optimize their visual function, while simultaneously reducing the progression of degeneration. Lutein and zeaxanthin deliver just that. With more and more individuals now seeking to protect and enhance their vision earlier on in life, there are new
opportunities to address the concerns of health-conscious subjects and offer adequate nutrition to help support eye function.

**Addressing different needs**
A leading supplier of nutritional solutions, DSM works closely alongside Kemin to carry out ongoing research into the benefits of lutein and zeaxanthin on visual performance and comfort in younger consumers. As an innovator of nutritional ingredients, DSM is well positioned to guide the needs of various audiences to promote and support better eye health industry-wide. FloraGLO® Lutein and OPTISHARP® Zeaxanthin, which are marketed by DSM and manufactured by Kemin, are available in naturally-sourced forms for all food, beverage and dietary supplement applications and can be used to help products stand out on the shelf and attract health-conscious consumers.

DSM recently held a webinar to present new research on how lutein and zeaxanthin supplementation can improve the ability to see under glare conditions. DSM was joined by Professor Billy R. Hammond Jr. to explain the findings of the GLARE2 study while engaging in a live Q&A style discussion with an online audience.

**References**
8. Ibid.