



OCULOXIN[®]
by Greenvit[®]

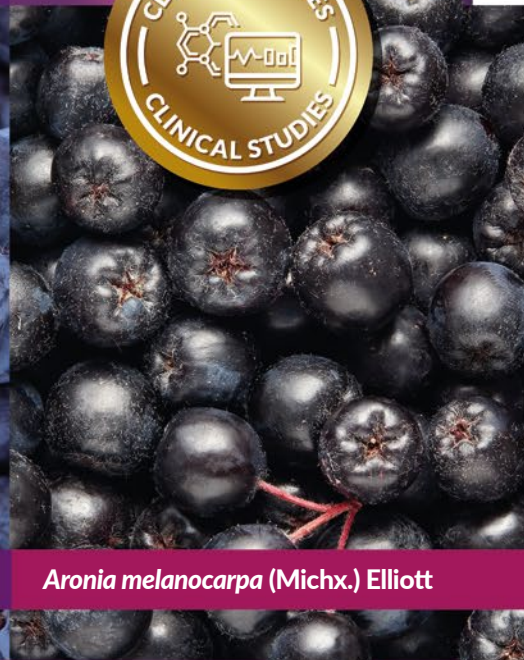
Visual health support



Vaccinium myrtillus L.



Lonicera caerulea L.



Aronia melanocarpa (Michx.) Elliott

**DIGITAL EYE STRAIN
VISUAL SUPPORT AND EYE FATIGUE
AGE RELATED EYE DISORDERS**



oculoxin.com



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What is OCULOXIN[®]

OCULOXIN[®] is a complex of standardized extracts from the fruits of *Vaccinium myrtillus* L. + *Aronia melanocarpa* (Michx.) Elliott + *Lonicera caerulea* L. It is an innovative complex of extracts with an extended and synergistic range of active ingredients indicated for the **regulation and improvement of various aspects of vision.**

Berries in this complex are widely used and recognized on the market as “superfruits”, mainly because of their powerful antioxidant activity which is due to the high content of (health-) promoting polyphenolic compounds.

Analytical tests (HPLC)* of **OCULOXIN[®]** complex have shown that the bilberry extract features an extremely rich composition of anthocyanins. **Aronia berry extract** is also a rich source of anthocyanins and phenolic acids, and the **haskap berry extract** has a high content of iridoids, which are absent in bilberry and aronia berry.

The composition contains different but mutually complementary and synergistic fractions of polyphenols (including anthocyanins) and iridoids; their range has been optimally designed to obtain the beneficial ocular effect, therefore making OCULOXIN[®] formulation unique on the market.

*[A.Kucharska, Wrocław University of Life Sciences, Wrocław 2022]

Recommended use and dosage

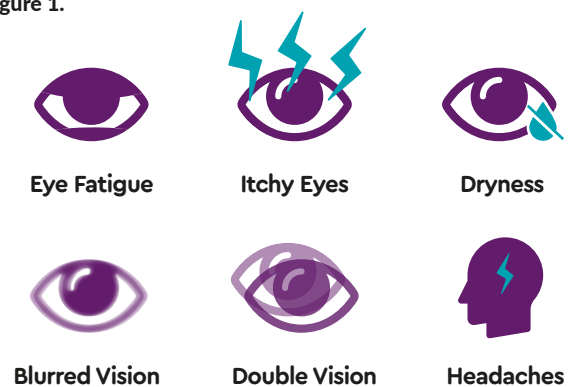
OCULOXIN[®] is a fine black powder that is easy to formulate and suitable for use in capsules, tablets, and liquid forms. The suggested daily intake is **300 mg a day.**

What makes OCULOXIN[®] unique?

The composition of **OCULOXIN[®]** supports the body’s natural defenses and its sight-related regenerative functions. According to the reviewed literature, the high content of polyphenols, including anthocyanins, present in **OCULOXIN[®]** may have a stabilizing effect on the smallest blood vessels (capillaries) and reduces vascular permeability. Therefore, it may improve retinal and choroidal microcirculation and accelerate the regeneration of rhodopsin (retinal pigment). In addition to polyphenols, **OCULOXIN[®]** also contains iridoids – compounds with well-documented anti-inflammatory and antioxidant properties. In other words, anthocyanins and iridoids act on the metabolic level by regulating blood flow, as well as on the immunological (inflammatory) and biochemical levels.¹

Target group

Figure 1.



OCULOXIN[®] complex is recommended for use by anyone strained by prolonged work in front of screens (computer, TV, smartphone), by individuals with developing presbyopia, as well as people with early diabetic retinopathy and individuals who suffer from asthenopia (“eye fatigue”), including digital eye strain.

Specification

Thanks to contracted, local sourcing of fruit used for extract production, **GREENVIT[®]** ensures full control over the identity and quality of the final composition. Aronia berry and haskap berry fruits are sourced from selected Polish plantations. Bilberry (European blueberry) fruits come from sites whose geographical location ensures the highest content of antioxidant rich anthocyanins.

- Our own production of **OCULOXIN[®]** an extract standardized for the content of anthocyanins (HPLC), polyphenols (UV), and iridoids.
- **OCULOXIN[®]** contains a standardized amount of anthocyanins of no less than 25% and iridoids of no less than 2%. Additionally, the polyphenol content is also analyzed.

OCULOXIN® trademark and formulation

The registered trademark **OCULOXIN®** is the property of **GREENVIT®**. It can only be used in relation to the purchased complex of extracts. The use of **OCULOXIN®** trademark in finished products featuring the complex mixed with other ingredients of the same botanical family is prohibited.

OCULOXIN® own scientific studies

At the Medical University of Wrocław (Ophthalmology Clinic) we have launched the study based on **OCULOXIN®** complex: **The effect of the orally administered extract of haskap berry, aronia berry and bilberry (European blueberry) on condition of the eye.** This dietary intervention study will assess the group of subjects strained with prolonged work in front of screen monitors and individuals with developing presbyopia.

The study had evaluated the impact of **OCULOXIN®** on visual acuity, contrast perception, conjunctival hydration, vascular flow, field of vision, and visual evoked potentials. It had been conducted as a randomized, double-blind, cross-over study. The duration had included 6 weeks (42 days), followed by a 3–4 week wash-out period, and then another 6 weeks (42 days).

By the end of the study, researchers had observed improvements in both distance and near visual acuity, as well as in contrast perception. A reduction in intraocular pressure had been achieved. Eye hydration had improved, particularly during prolonged computer screen use. Additionally, the study had assessed the effects on ocular blood flow, field of vision, and visual evoked potentials (VEP).

Research

Thanks to advances in analytical methods it has been possible to study thoroughly the composition in terms of plant impact on the organ of sight. One of the first plants to be used in ophthalmology has been bilberry which, upon oral administration, resulted in better sense of contrast in patients.

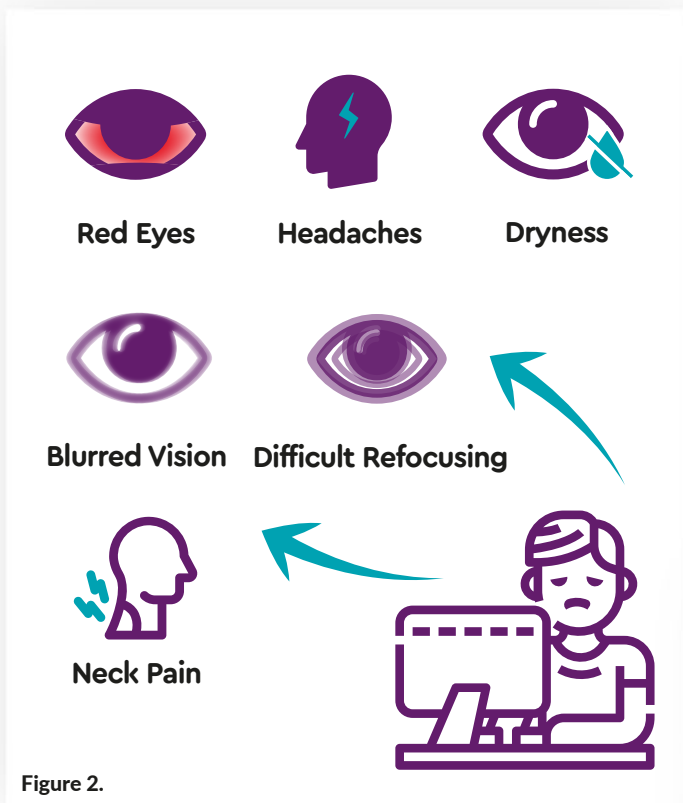
The eye is known to be particularly vulnerable to oxidative stress caused by light exposure, a substantial level of mitochondria, and high photoreceptor metabolic rates. A disrupted balance between the production and neutralization of reactive oxygen species (ROS) causes the oxidation of cellular components and ultimately leads to the malfunction and degeneration of retinal tissues.²

Oxidative stress and inflammation play a key role in the initiation and progression of age-related eye disorders such as cataracts, glaucoma, diabetic retinopathy and macular degeneration. Therefore, plant ingredients with proven antioxidant and anti-inflammatory properties, for instance polyphenols, may have a positive effect in these diseases.³

An overview of laboratory and clinical findings shows that dry eye could be considered as chronic inflammatory disease and may be triggered by a number of intrinsic and extrinsic factors which induce an unstable and hyperosmolar tear film.⁴

Some environmental factors are also involved in the development of dry eye disease, including exposure to chemical and physical pollution, ultraviolet (UV) radiation and ozone, and chronic use of eye drops with preservatives (e.g. in glaucoma treatment). These factors increase the potential of oxidative stress and aggravate the inflammation of ocular surface. Fruits with antioxidant and/or anti-inflammatory properties may be used as an alternative solution in the prevention and treatment of the disease.⁵

Therefore, to treat ocular disorders induced by oxidative stress, as part of a reasonable therapeutic approach, it is recommended to mitigate the ROS negative effect with either separate or combined use of *Vaccinium myrtillus* L., *Aronia melanocarpa* (Michx.) Elliott, *Lonicera caerulea* L.



The resulting effect of anthocyanin supplementation is the metabolic regulation of blood flow and flow-dependent vasodilation thanks to its effects on vascular endothelium. Moreover, anthocyanins boost the expression of endothelial nitric oxide (NO) synthase – an enzyme which generates a potent endogenous NO vasodilator. Anthocyanins regulate several complex immune and inflammatory signaling pathways involved in maintaining the functional activity of blood vessels.

Anthocyanins improve twilight vision and dark adaptation – an effect most likely related to a higher rate of rhodopsin regeneration. Moreover, it has been proven that anthocyanins protect the retina against damage by modifying the activity of some enzymes, and that thanks to the collagen stabilizing effect they reduce the development of glaucoma. An adverse change in the activity of those enzymes may lead to retinal damage.^{6,7} Digital eye strain (DES), also known as computer vision syndrome, is a collection of ocular and visual problems that affects 50 percent or more of computer users, according to estimates.

Computer vision syndrome is a catch-all phrase for a variety of eye and environment-related illnesses that develop when job-related viewing demands exceed user's visual capabilities. It is defined by visual symptoms that originate from working with a computer monitor and its settings. Itching, burning, eye dryness, blurred vision, double vision, and headache can arise during or immediately after a three- to

four-hour computer session, and CVS can be prominent with symptoms of itching, burning, eye dryness, blurred vision, double vision, and headache.⁸

The positive effects of polyphenols and anthocyanins on the alleviation of such eye symptoms, are widely discussed in the research literature.^{9,10} Our own research on OCULOXIN[®] composition is intended to identify and confirm its positive influence on the said symptoms. For the sake of a summary overview of health-promoting effects of compounds included in fruits present in the formulation, it is important to highlight the most recent studies on the bio-disponibility of anthocyanins and flavanones. Published research findings reveal that anthocyanins and flavanones are significantly more biodisponible than expected, which is yet another proof of their well-known protective and regenerative properties in diet and in supplements.

Figure 3.



Rhodopsin – the key photosensitive pigment in the rod cells of the retina.

Rhodopsin, also called visual purple or visual red, is an organic chemical compound and a photosensitive dye present in the human eye. It is the most important photosensitive element in the eye rod cells. Rhodopsin enables twilight vision.



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How Blue Light Can Damage Eye Cells

Blue light sources

Natural Sources: Sunlight

Artificial Sources:

LED and CFL Lighting: Modern energy-efficient lighting, such as LED (light-emitting diodes) and compact fluorescent lamps (CFLs).¹¹

Screens and Devices with digital screens, including:

- Smartphones
- Tablets
- Computer monitors
- Televisions

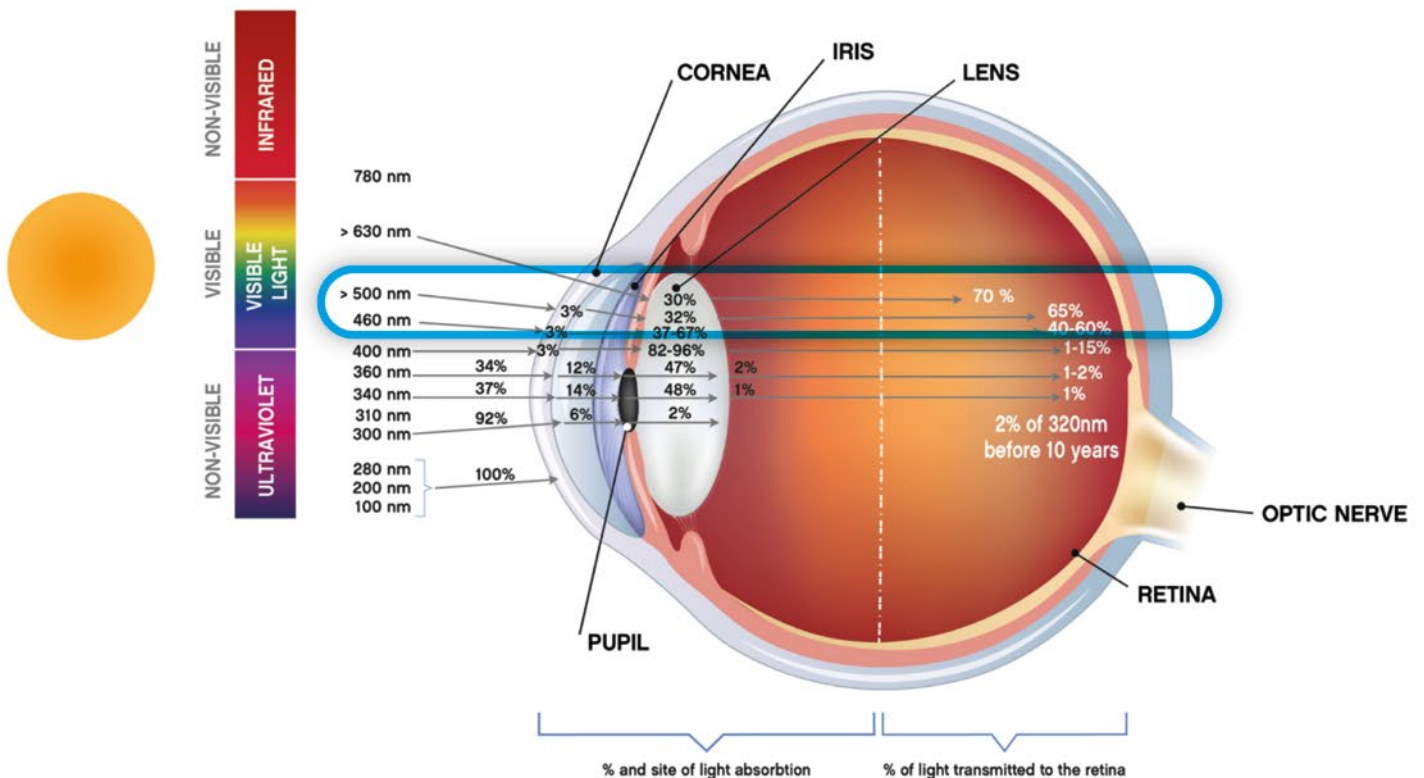


Figure 4.

OCULOXIN[®] antioxidant properties

Excessive **free radical generation** or dysfunction of the antioxidant system can disturb **redox homeostasis**. The retina's intense oxygen metabolism promotes reactive oxygen species generation, which can damage the eyes' very delicate blood vessels.¹²

OCULOXIN[®] decreases the level of iNOS (inducible nitric oxide synthase) and increases catalase in ARPE-19 retinal epithelial cells treated with H₂O₂.

The results suggest that **OCULOXIN[®] may have a protective effect against oxidative stress by modulating the expression of oxidative stress-related enzymes**, potentially helping to counteract the detrimental effects of reactive oxygen species on eye tissues.

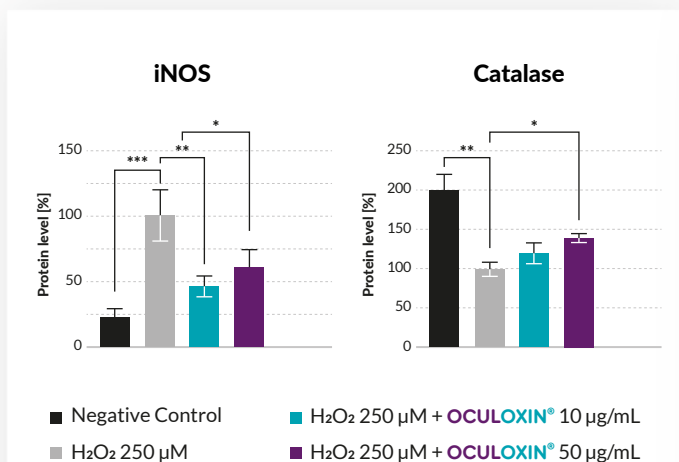


Figure 5. The effect of **OCULOXIN[®]** (10 and 50 μg/mL) on catalase and iNOS protein levels in H₂O₂ (250 μM) stimulated ARPE-19. After 4 hours of preincubation with **OCULOXIN[®]**, the cells were stimulated with H₂O₂ for the next 20 hours. The results are the mean of three independent replicates. Statistical analysis was performed using the two-way ANOVA and * P ≤ 0.05; ** P ≤ 0.01; *** P ≤ 0.001.

OCULOXIN[®] anti-inflammatory properties

The inflammatory state plays a crucial role in the initiation and progression of age-related diseases, including vision disorders such as cataracts, glaucoma, diabetic retinopathy, and macular degeneration. Intensified inflammation on the eye's surface is also observed in dry eye disease.

OCULOXIN[®] demonstrated a reduction in the activation of NF-κB and IL-6 production in ARPE-19 retinal epithelial cells.

The results suggest that **OCULOXIN[®] may exert anti-inflammatory effects**, potentially mitigating the inflammatory processes implicated in various eye diseases, including those associated with aging and dry eye syndrome.

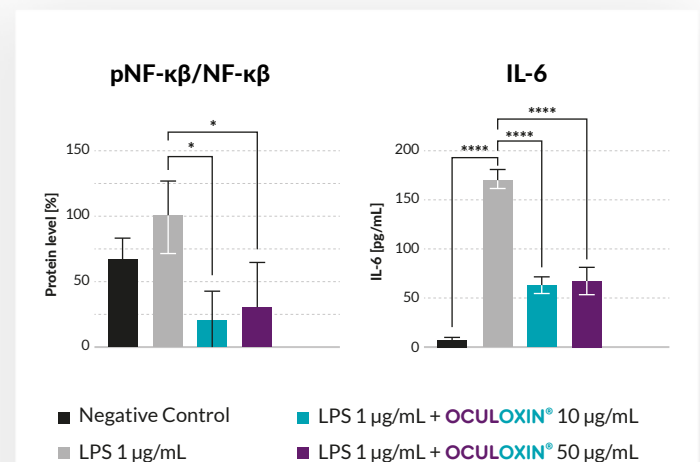


Figure 6. The effect of **OCULOXIN[®]** (10 and 50 μg/mL) on NF-κB protein phosphorylation level and IL-6 production in LPS (1 μg/mL) stimulated ARPE-19. After 4 hours of preincubation with **OCULOXIN[®]**, the cells were stimulated with LPS for the next 20 hours. The results are the mean of three independent replicates. Statistical analysis was performed using the one-way ANOVA and * P ≤ 0.05; **** P ≤ 0.0001.

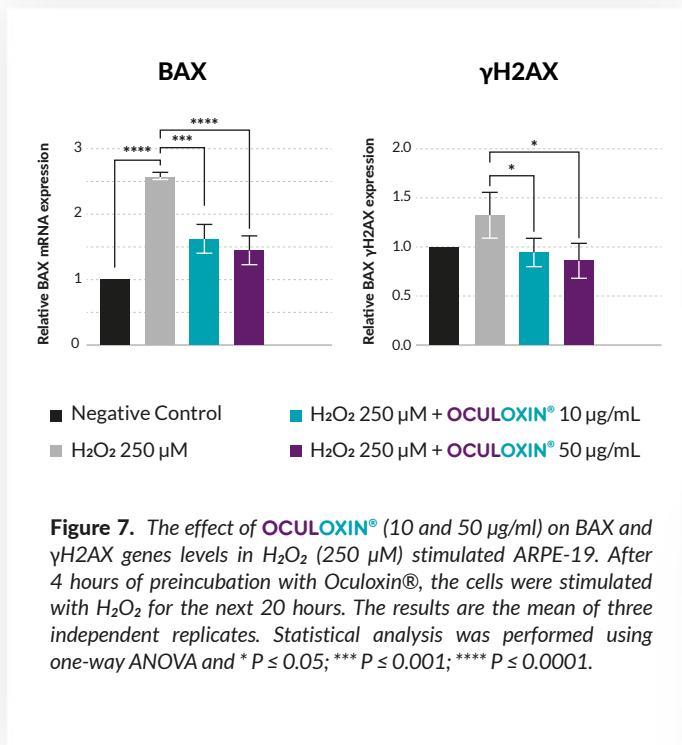
OCULOXIN® cytoprotective properties

In the context of eye cell damage caused by blue light exposure, the activation of apoptotic pathways may lead to retinal cell apoptosis.

OCULOXIN® exhibits cytoprotective properties by reducing the expression levels of the BAX and γ H2AX genes in ARPE-19 retinal epithelial cells.

The **BAX** protein is known for its proapoptotic effects, which lead to cell death, while the **γ H2AX** marker is associated with DNA damage.

Decreasing the production of these proteins may be beneficial in preventing eye cell damage, particularly in the context of harmful blue light exposure.



Retico® Clinical trial results



Studies on the Effectiveness of RETICO® based on OCULOXIN®

After conducting a study involving Retico® supplementation, good results were observed in terms of eye moisture (the median for the right eye was 27.5 mm, and for the left eye 25 mm) compared to the period before supplementation (the median for the right eye was 20 mm, and for the left eye 23 mm).

However, it's worth noting that Schirmer's test was below the normal range (typically 15 mm or higher) for the right or left eye in only six people before supplementation.

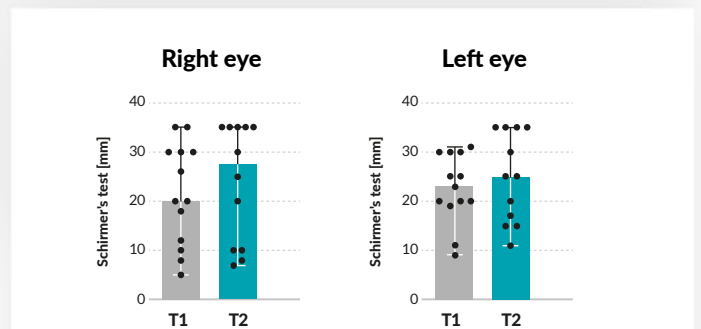
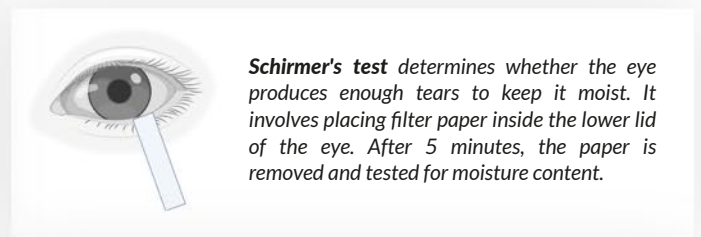


Figure 8. Schirmer's test results. T1 stands for pre-treatment measures and T2 measures the eye moisture after Retico® supplementation.

DEQS (Dry Eye-Related Quality-of-Life Score) questionnaire primarily assesses the impact of **DED (Dry Eye Disease)** on a **patients' quality of life**. It consists of items that evaluate both DED symptoms and how these symptoms affect various aspects of the patient's daily life over a specific period, such as the past week.

All items in the DEQS questionnaire were divided into two sections regarding:

- bothersome ocular symptoms,
- the impact of DED on daily life.

Retico® supplementation resulted in decreasing the overall frequency and severity of symptoms associated with DED.

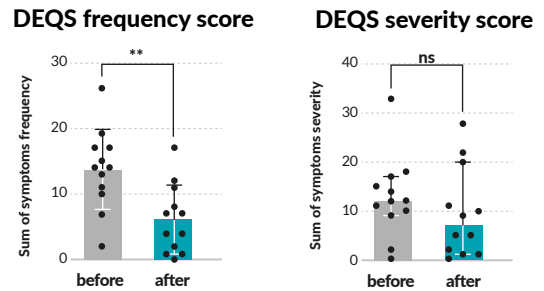


Figure 9. Columns A and B present the frequency and severity of each question, respectively. The frequency and severity of each symptom were scored on a scale of 0 to 4. Frequency was scored as follows: 0, never; 1, occasionally; 2, sometimes; 3, often; or 4, always. Severity was scored as follows: 1, hardly bothered; 2, bothered a little; 3, bothered; and 4, bothered very much.

Sum of frequency and severity for each patient is shown before and after **Retico®** supplementation.

Retico® supplementation resulted in decreasing the overall intensity score for analyzed DED symptoms.

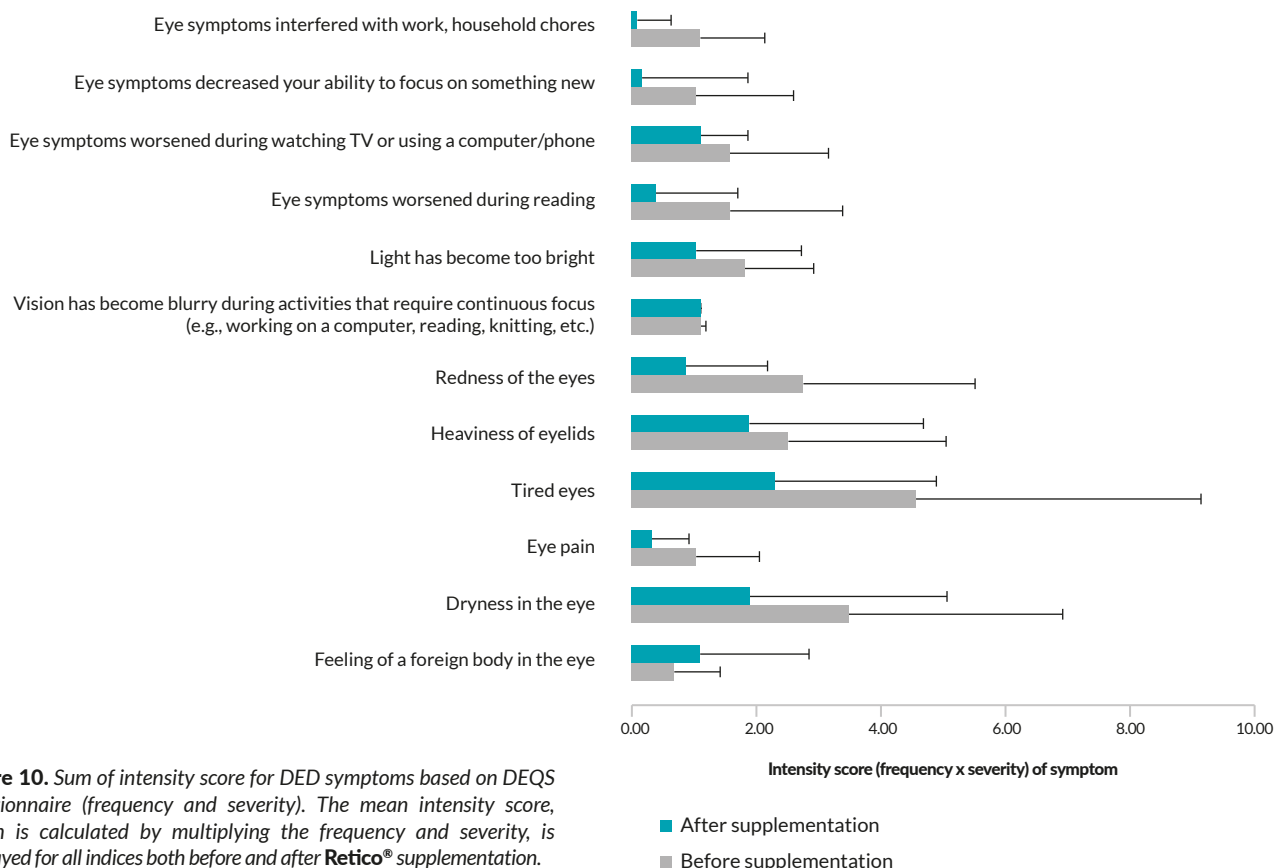


Figure 10. Sum of intensity score for DED symptoms based on DEQS questionnaire (frequency and severity). The mean intensity score, which is calculated by multiplying the frequency and severity, is displayed for all indices both before and after **Retico®** supplementation.

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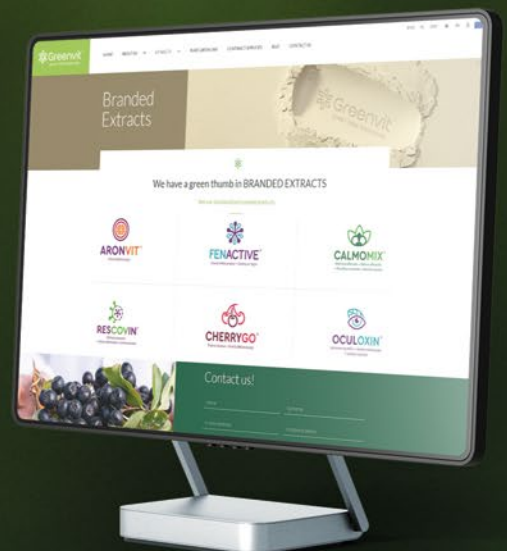
Discover more from the branded botanical extracts of Greenvit[®]

Curious about what else nature has to offer? Explore our full range of high-quality, standardized extracts – carefully developed to support modern health needs. From metabolic balance and immune support to cognitive focus and eye health – each of our ingredients blends tradition with science, delivering effective clean-label solutions.



discover more...

Turn the page on innovation.
Discover extracts that go beyond expectations.





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