

# Lutein Gummies

Mango Madness Flavor

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## INGREDIENTS



Doctor's Best Lutein & Zeaxanthin Gummies contains lutein and the isomer, zeaxanthin, two major nutrients clinically proven to have positive impacts on vision and eye health.\*<sup>1,2</sup> Lutein is a yellow xanthophyll carotenoid found in egg yolks and many fruits and vegetables. The human body does not produce these carotenoids on its own, and because these nutrients levels naturally decline with age, it is very important to replenish their

levels daily through diet or supplementation to maintain overall healthy vision.\*<sup>3-6</sup> Lutein and zeaxanthin are the main pigments found in the macula of the human retina and well-known to protect human eyes from harmful blue light exposure, scavenge harmful reactive oxygen species, and improve visual acuity.\*<sup>1,7-8</sup> Extracted from marigold flowers, lutein and zeaxanthin are provided as the same free-form found in fruits and vegetables making them more easily absorbed by the body.\* Doctor's Best Lutein & Zeaxanthin Gummies has also been formulated to provide a unique antioxidant-rich formula to help fight free radicals in the body, support eye vision, and enhance ocular function.\*

## BENEFITS

- Helps protect against oxidative stress from blue light\*
- Helps promote macular health and support the eyes during aging\*
- Helps enhance ocular function and performance\*

## EXTENDED BENEFITS

**The importance of Lutein and Zeaxanthin in protecting eyes from harmful blue light exposure**

Human visual perception occurs when visible light radiation with a wavelength between 400 and 760 nm reaches the retina. The shorter wavelengths of visible light, also known as blue light, pose the greatest hazard to human ocular health because they contain greater energy, having the greatest potential to damage retinal tissue by inducing free radicals.<sup>9-13</sup>

Unfortunately, in our modern world, we are constantly exposed to blue light. It used to be that the only source of blue light was from sunlight but nowadays, just about every source of light (natural and artificial) radiates blue light -- from LED and fluorescent lighting to digital and electronic devices (computers, smartphones, tablets, television screens, etc.). Human eye health is negatively impacted by blue light exposure. Over time, this could lead to short-term digital eye strain effect (due to the great amount of time spent in front of computers, smartphone screens, etc.) with fatigue and dry eye, irritated eyes and difficulty focusing, but also to long-term blue-light damaged retinal cells.<sup>7-8,14-15</sup>

Lutein and zeaxanthin belong to the xanthophyll family of carotenoids and are the three major components of the macular

pigment (MP) of the retina. This macular pigment is the only protective layer known as the eye's natural defense against the potentially damaging blue light exposure. Several studies demonstrated significant benefits of lutein and zeaxanthin and supplementation on MPOD (macular pigment optical density- the measure of lutein status in the eye), both in subjects with eye problems and healthy subjects.<sup>16-18</sup>

After toxicology studies were conducted, purified crystalline lutein has been established to be "generally recognized as safe" (GRAS), allowing the use of lutein in several food and beverage applications.<sup>19</sup> Furthermore, lutein and zeaxanthin supplements have been safely used in animal and clinical trials.<sup>20-24</sup>

## Helps protect against oxidative stress from blue light\*

The macular pigment is highly concentrated in the fovea, a critical tissue centered in the *macula lutea* of the retina and responsible for sharp central vision. Its components, lutein and zeaxanthin, have been demonstrated to reduce blue-light levels reaching the most delicate of retinal structures.<sup>25-26</sup> These carotenoids play a key role in protecting human eye vision of all ages from the oxidative photo-damage caused by blue light.\*<sup>27-33</sup> Lutein and zeaxanthin have a critical role in ocular health and have been found to act as powerful antioxidants and to filter out high-energy blue light.<sup>25,34-35</sup> Many research studies suggest that the photo-protective effect of lutein and zeaxanthin, is due to their

## Lutein Gummies Supplemental Facts

Supplement Facts		
Serving Size 2 Gummies		
Servings Per Container 30 & 130		
	Amount Per Serving	% Daily Value
Calories	25	
Total Carbohydrate	6g	2%**
Total Sugars	4g	†
Includes 4g Added Sugars		8%**
Sodium	15mg	1%
Lutein	20mg	†
(from Lutemax® 2020 marigold flower ext., ( <i>Tagetes erecta</i> ))		
Zeaxanthin Isomers	4mg	†
(from Lutemax® 2020 marigold flower ext., ( <i>Tagetes erecta</i> ))		

\*\*Percent Daily Values are based on a 2,000 calorie diet.  
†Daily Value not established.

**Other Ingredients:** Raw cane sugar, organic tapioca syrup, water, natural flavor, citric acid, pectin, sodium citrate.

**Suggested Adult Use:** Chew two (2) gummies daily or as recommended by a nutritionally-informed physician. Chew thoroughly before swallowing.

**KEEP OUT OF REACH OF CHILDREN**

Store in a cool dry place.

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antioxidative and photochemical properties.<sup>36,37</sup>

Promotes macular health and supports the eyes during aging\*  
Elderly people are even more affected because of the ageing processes causing biochemical, physiological and physical changes that are directly or indirectly responsible for the onset of many eye problems. It was found that lutein and zeaxanthin are very important to retard the onset of eye problems.<sup>\*38-40</sup> For many decades, research has focused on lutein and zeaxanthin as key nutrients against photo-damage and found that increased intake of these nutrients helps protect the macula from oxidative damage by absorbing light irradiation and quenching free radicals originated from photo-damage.<sup>\*41-44</sup>

### Enhances ocular function and performance\*

Lutein is known to many as “the eye-protective nutrient”. This status is originated from a comprehensive collection of research including studies demonstrating specific tissue deposition and intervention studies showing that lutein supplementation results in increased levels of this nutrient in the eye and even improved visual function and performance in many clinical trials.<sup>\*45</sup>

## CLINICAL STUDIES

An animal study was conducted to evaluate the protective effect of lutein, and two of its isomers, RR-zeaxanthin and RS-zeaxanthin (L-Z), on the retina of *rd10* mice, an animal strain known for its progressive photoreceptor degeneration that eventually leads to deterioration of retinal function. The L-Z treatment group received daily oral gavage of Lutemax®2020 (10mg/kg of body weight) while SFO (placebo) was administered to the placebo group. Based on the experiment results, the study revealed the protective effect on both, rod and cone photoreceptors in the retina, of L-Z. The study also showed that L-Z treatment improved rod and cone functions in *rd10* mice. The authors concluded that the antioxidant activity from lutein, and RR-zeaxanthin and RS-zeaxanthin, neutralized reactive oxygen species to counter oxidative damage in retinal cell of the treated *rd10* mice.<sup>46</sup>

A randomized double-blind placebo-controlled study was conducted to evaluate the bioavailability of Lutein (L) and Zeaxanthin isomers (Zi) concentrations in serum and changes in MPOD (macular pigment optical density). Twenty-eight healthy young male and female volunteers were randomized to receive one of three doses (6 mg L/1 mg Zi, 10 mg L/2 mg Zi or 20 mg L/4 mg Zi) for 12 weeks. Blood samples for serum L/Zi and MPOD were determined every two weeks over the 12-week study period. Results showed MPOD increased significantly from baseline to month 3 for all L/Zi treatments over placebo. No adverse events were observed with any dose of lutein. The study concluded that increasing doses of macular carotenoid supplementation significantly increased the serum bioavailability levels of lutein and zeaxanthin isomers, and doses up to 20 mg were safely administered.<sup>\*47</sup>

The B.L.U.E. study was a 6-month randomized, double-blind, placebo-controlled supplementation trial with 48 healthy young adults who were exposed to a screen time exposure of at least 6 hours daily. Subjects were randomly assigned to either placebo or MC (Macular Carotenoid Supplementation with Lutemax®2020 formulation) supplement. Subjects were evaluated at baseline, 3-months and 6-months for MPOD (Macular Pigment Optical Density). Markers of visual performance (including contrast sensitivity, photostress recovery and disability glare), sleep quality, and physical indicators of excessive screen use were measured. The results showed that supplementing with Lutemax®2020 significantly improved macular pigment optical density, visual

performance and indicators of excessive screen use, including eye strain and fatigue and headache frequency. Sleep quality also improved significantly.<sup>\*48</sup>



The antioxidant effect of lutein was successfully demonstrated in a small pilot study involving 20 healthy term newborns. They received lutein or placebo at 12 and 36-hour after birth. From the results, the researchers concluded that lutein supplementation greatly helped in increasing the biological antioxidant potential (BAP) of the plasma in treated newborns.<sup>\*49</sup>

Two independent clinical trials conducted in premature infants and children were done to study the effect of lutein and zeaxanthin absorption. Both studies concluded on the positive results on supplementing the young with lutein and zeaxanthin. More, the oral dietary supplement of lutein and zeaxanthin is promising in helping with macular development and visual function.<sup>\*50,51</sup>

Two studies found that lutein and zeaxanthin supplementation help protect the eye's lens against sustaining damage from light energy. These studies suggest that higher intakes of lutein and zeaxanthin contribute to maintaining the lens structural integrity.<sup>\*52,53</sup>

The thickness or density of the Retinal Macular Pigment (MP) has been linked to the eye health in later life. A low macular pigment density correlates to an increased risk of developing Age-related Macular Degeneration (AMD). A study of 376 individuals aged 18–75 years found that MP density was significantly correlated with the tissue density of the lens. The researchers concluded that lutein and zeaxanthin intake helps reduce one's risk for AMD and helps improve visual performance.<sup>\*54</sup>

In another study, to determine whether supplementation with lutein and zeaxanthin improves macular pigment and promote macular health, participants aged 50 to 79, were randomly assigned to receive 10 mg/day lutein, 20 mg/day lutein, 10 mg/day lutein plus 10 mg/day zeaxanthin, or placebo for 48 weeks. The results demonstrated that lutein and zeaxanthin supplementation was a safe and effective strategy for helping to elevate macular pigment, which plays a causative role in improving visual function.<sup>\*55</sup>

Lutein antioxidant supplementation trial (LAST) was conducted to determine whether nutritional supplementation with lutein or lutein together with antioxidants, vitamins, and minerals improves visual function. The study was a prospective, 12-month, randomized, double-masked, placebo-controlled trial conducted with 90 participants. The researchers concluded that visual function is improved with lutein alone or lutein together with other nutrients promoting macular health and supporting the eyes during aging.<sup>\*20</sup>

The effect of long-term antioxidant supplementation (lutein and  $\alpha$ -tocopherol) on serum levels and visual performance was investigated. Visual function in participants who received the lutein supplements (15 mg/day) improved, suggesting that a higher intake of lutein, through lutein-rich foods or supplements, may have beneficial effects on the visual health.<sup>\*24</sup>

The CLEAR study investigated the effect of supplementation with

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lutein capsules (10 mg/day) on macular pigment optical density and visual acuity. Based on the results, the researchers suggest that increasing MP, either by food or dietary supplementation of lutein, can be expected to provide the basis for a viable management strategy for early onset of eye problems in the elder population.\*<sup>56</sup>

Supplementing the diet with lutein and zeaxanthin can improve visual performance and help counter challenges such as photostress and glare.\*<sup>57,58</sup> Healthy subjects, aged 17-41, received 10 mg of lutein and 2 mg of zeaxanthin daily, for 6 months. Visual performance under conditions of high glare and photo-stress improved and was significantly correlated with increased macular pigment density.\*<sup>57</sup>

Studies have suggested that the macular pigment may play a role in reducing the effects of "blue haze" when viewing distant objects through the atmosphere because of preferential scattering of short wavelength light.<sup>59</sup> Researchers found that lutein supplementation alone or in combination with zeaxanthin improved contrast acuity. These results suggest that xanthophyll supplementation may improve visual performance during activities such as driving at night.\*<sup>60</sup>

A randomized, double-blind, placebo-controlled, 1-year study was conducted to examine the effect of lutein supplementation on visual function in 120 healthy drivers with long-term light exposure. The researchers concluded that supplementation with 20 mg of lutein daily resulted in improvements in terms of contrast sensitivity and glare disability. Lutein nutritional supplementation may be useful to maximize visual performance.\*<sup>61</sup>

Modern society constantly places demands for long hours of visual task performance. These demands lead to visual fatigue and discomfort in the eyes. A randomized, double-blind, placebo-controlled cross-over study with a 2 week-washout period employed psychophysiological methods to examine whether supplementation with a combination of lutein, zeaxanthin and blackcurrant extract could help reduce symptoms of visual fatigue. Overall, the results suggested that a combination of lutein and zeaxanthin can help recovering from visual fatigue.\*<sup>62</sup>

Findings from the COMPASS study suggest that MP augmentation is beneficial for visual performance under glare conditions. Healthy young subjects who received lutein + zeaxanthin reported better visual performance for daily visual tasks (including night driving against oncoming headlights) and those with the highest MP reported better capacity to deal with sudden changes in illumination.<sup>63</sup>

To test if lutein and zeaxanthin influence the processing of visual lead to increased visual processing speeds, healthy young subjects were randomly assigned to one of three treatment groups: zeaxanthin taken daily, zeaxanthin + lutein + mixed n-3 fatty acids taken daily, and placebo. Supplementation with zeaxanthin and the mixed formulation produced significant increase in visual motor reaction time compared to placebo. In general, increasing macular pigment density through supplementation resulted in significant improvements in visual processing speed.\*<sup>64</sup>

A randomized, double-blind, placebo-controlled study evaluated the visual effects of 1-year supplementing of combination of lutein/zeaxanthin: L+Z (lutein 10 mg/day + zeaxanthin 2 mg/day). One hundred fifteen young, healthy subjects were recruited and randomized into the study (58 subjects received placebo and 57 subjects received L+Z). Several dependent measures were collected at baseline and then once every 3 months: serum

L+Z, MPOD, and photostress recovery were measured and assessed accordingly during the length of the study. Results obtained showed MPOD increased significantly versus placebo. Serum L+Z also increased significantly by the first follow-up visit (at 3 months) and remained elevated throughout the trial. Chromatic contrast and photostress recovery time improved significantly versus placebo. The study concluded that daily supplementation with L+Z resulted in significant increase in serum levels of L+Z and MPOD. There were also improvements in chromatic contrast and recovery from photostress.\*<sup>65</sup>

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A 2-year randomized, double-blinded, and placebo-controlled trial was conducted to determine the effects of lutein/zeaxanthin on serum concentration, MPOD (macular pigment optical density), and visual performances in patients with early signs of eye problems. One hundred-twelve patients (over 50-year old) were randomly given either lutein alone (10 mg), lutein alone (20 mg), a combination of lutein (20 mg) + zeaxanthin (10 mg), or placebo, daily for 2 years. Serum concentration of lutein/zeaxanthin, MPOD, visual functions including best-spectacle corrected visual acuity (BCVA), contrast sensitivity (CS), and vision-related quality of life (VFQ25) were also quantified. Based on the results, this trial demonstrated that 2 years of lutein/zeaxanthin supplementation increased serum lutein/zeaxanthin concentrations, MPOD, and visual performances in patients with early eye problems, without leading to any detectable adverse effect. More interestingly, they found that though body lutein/zeaxanthin concentrations and visual performances increased the most after receiving 20mg lutein within the first 48 weeks, the increases of MPOD and visual functions (BCVA and CS) were similar between the 10mg lutein and the 20mg lutein groups at 2 years.\*<sup>66</sup>

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