Natural Lutein
About Luteinox

🌟 Lutein
🌟 Carotenoids
🌟 Biological function of lutein
What is Lutein

- Lutein is a xanthophyll and one of naturally occurring carotenoids.
- Found in a wide variety of plant foods, especially in dark-green leafy vegetables, such as kale, spinach, turnip greens, and collards.
- The human retina accumulates lutein and its sister compound zeaxanthin.
Lutein in the Foods

![Foods That Give You Lutein](image)
What is Lutein

- Humans do not synthesize lutein and zeaxanthin, our body depends entirely on dietary sources.
- Scientist found that lutein protects against photodamage of the retina by filtering out the blue light.
Carotenoids

- The carotenoids are a huge family of more than six hundred yellow to red pigments, of which beta-carotene is the most famous.

- Fat soluble, colorful pigments play a variety of roles in cellular biology.

- β-Carotene contributes to the orange color of many different fruits, vegetables, plants, algae, and some microorganisms.
Carotenoids

🌟 Health benefits:
- Provitamin A activity, antioxidant
- Improvement of immunity
- Protection of eyes from ultraviolet damage (macula).

🌟 Representative types of carotenoids:
- Lutein, zeaxanthin, α-carotene, β-carotene, lycopene, zeaxanthin, anthocyanins, anthoxanthin.
Subclass of Carotenoids

🌟 hydrocarbons containing no oxygen — Carotene

Example: α-carotene, β-carotene, lycopene, cryptoxanthine.

🌟 containing oxygenated functional groups — Xanthophyll

Example: Xanthophyll, Lutein, Zeaxanthine.
Structure of Lutein and Zeaxanthin

Lutein (Ester form)

Lutein (Free form)

Zeaxanthin
Biological Function of Lutein / Zeaxantin
The Role of Lutein / Zeaxanthin

Research performed in cell cultures, animal models, and human studies shows the potential role of lutein and zeaxanthin in

- Eye Health
  - Protect retina
  - Prevent age-related macular degeneration (AMD)
  - Slow the progression of the cataracts
  - Prevent vision loss
  - Protective against damage to human retinal pigment epithelium

- Cancer prevention by scavenging or neutralizing free radicals
- Protection against chronic diseases
- Powerful antioxidants
Lutein Research: Eye Health Benefits

**Study history**

- **Foods with high carotenoids, led to a high level of Carotenoids in the blood and a lower incidence of macular degeneration is established.** (1992, Archives of Ophthalmology 110:1701-8, Eye Disease Control Study Group)

- **Eating green vegetables which have high level of lutein and zeaxanthin decrease the risk of cataract.** (1992, British Medical Journal 305:335-9, Hankinson et al.)

- **Eating high lutein food could reduced the risk of macular degeneration.** (1994, Journal of American Medical Association 272:1420, JM Seddon et al.)
Lutein: Act as Antioxidants in Eyes

- **Lutein accumulate in macular and retina**
  - The only two carotenoid antioxidants found in the lens and retina is Lutein and Zeaxanthin. (1995, Investigative Ophthalmology & Visual Science 36:2756-61, KJ Yeum et al.)
  - Lutein and Zeaxanthin are in the macular area of retina, they protect photoreceptor cells against light-induced damage. (1998, Ophthalintol)
How Lutein Works


- blue light is defined as light within the wavelength range of 400-480 nm, because over 88% of the risk of photo-oxidative damage to the retina from fluorescent lamps (cool white or "broad spectrum") is due to light wavelengths in the range of 400-480nm.
  (http://www.sunnexbiotech.com/therapist/blue%20light%20damage.html)

🌟 Lutein absorbs the harmful blue light from sunlight and protects the eye from light-caused oxidative damage. (2001, Arch. Of Biochem and Biophysics 385: 28-40.)

🌟 Lutein and zeaxanthin found in highest concentration in the macular region of the eyes.
# Eye Disorder

<table>
<thead>
<tr>
<th>Eye disease</th>
<th>Description</th>
<th>What causes eye disease?</th>
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</table>
| AMD (Age-related Macular Degeneration) | causes severe vision loss                 | ✴ Aging  
✴ Diabetes mellitus  
✴ Smoking  
✴ Sun exposure  
✴ Antioxidants deficiency |
| Cataracts                            | a cloudy area in the lens of the eye.     | ✴ Aging  
✴ Sun exposure  
✴ Antioxidants deficiency |

![Diagram showing normal and disorder eye structures](image-url)

**Normal**

- **Macula**
- **Optic nerve**
- **Retinal blood vessels**
- **Retina**

**Disorder**

- Yellow spot in their visual center, the macula.
Vision Disorder Statistics in US

Lutein / Zeaxanthin as dietary supplement
Eyes

**Lutein as dietary supplement reference**

- Lutein improves visual function in some patients with retinal degeneration: a pilot study via the Internet. (Optometry. 2000 Mar;71(3):147-64.)


**Serving as an antioxidant function in eyes**

Cancer

**Breast Cancer**

**Colon Carcinogenesis**

**Lung Cancer**
Antioxidant Potential

**In erythrocytes**

**In hepatocyte**
- Carotenoid lutein protects rats from paracetamol-, carbon tetrachloride- and ethanol-induced hepatic damage. (J Pharm Pharmacol. 2010 Aug;62(8):1054-60.)

**and more....**
Cardiovascular Health

