



Lutein and Zeaxanthin

AT A GLANCE

Introduction

The carotenoid lutein is, like its sister compound zeaxanthin, a natural colorant or pigment, which appears yellow at low concentrations and orange-red at high concentrations.

As the human body cannot produce lutein and zeaxanthin, they need to be obtained through food. Lutein is present in the eye, blood, skin, brain and breast.

As antioxidants, potentially protecting the body against cell-damaging effects of free radicals, lutein and zeaxanthin have been linked to disease prevention, especially age-related eye diseases.

Health Functions

As antioxidants, a sufficient intake of lutein and zeaxanthin is important as they may help the body to protect against the damaging effects of free radicals, potentially leading to diseases involving the heart or blood vessels (cardiovascular diseases), and cancer.

In addition, lutein and zeaxanthin are thought to protect the eye from harmful ultraviolet light: they filter out blue light, which is not stopped by the cornea and lens, and which can damage the sensitive vision cells in the macula over time.

Disease Risk Reduction

Lung cancer

In a population study, dietary intakes of lutein and zeaxanthin were associated with a decreased lung cancer risk. Other studies did not show such beneficial effects.

Age-related eye disorders

As lutein and zeaxanthin are present in high concentrations in the center of the eye's retina, the macular, where they are efficient absorbers of blue light, they may protect against light-induced damage, which is thought to play a role in the development of age-related macular degeneration (AMD).

Population studies provide some evidence that higher intakes of lutein and zeaxanthin are associated with lower risk of AMD. However, other studies found no such beneficial relationship.

As light absorbers, lutein and zeaxanthin may also prevent clouding of the eye's lens, known as cataracts. Several studies found that men and women with the highest intakes of foods rich in lutein and zeaxanthin were less likely to develop cataracts.

Blood vessel health

One study suggested that high levels of lutein in blood may be linked to less thickening of blood vessel walls, a component of atherosclerosis. More research is needed to clarify this effect.

Other Applications

Age-related eye disorders

Several studies have suggested lutein and zeaxanthin may lower the risk for forming age-related macular degeneration (AMD) and cataracts.

One study in patients with cataracts or AMD found that long-term lutein supplementation slightly improved visual acuity and glare sensitivity.

Visual performance under glare conditions

As lutein and zeaxanthin are thought to block out blue light and to shield from strong light, they may increase the eyes' tolerance for bright lights (e.g. glare from the sun).

A study in healthy subjects suggested that supplementation with lutein and zeaxanthin may help to withstand intense light and decrease the time needed to recover from bright lights.

Intake Recommendations

No dietary intake recommendations have been established for lutein and zeaxanthin.

However, some research suggests an optimal daily intake of 10 mg lutein and 2 mg zeaxanthin to realize its health benefits.

Carotenoids such as lutein and zeaxanthin are fat-soluble substances, and as such require the presence of dietary fat for proper absorption through the digestive tract.

Supply Situation

There are only very limited lutein and zeaxanthin consumption data available.

A diet rich in fruits and vegetables contains about 1–2 mg lutein.

Due to low consumption of fruits and vegetables, some people do not take in enough carotenoids such as lutein and zeaxanthin.

Deficiency

There is no well-established definition of lutein and zeaxanthin deficiency.

Sources

Lutein and zeaxanthin are found in dark green leafy vegetables (e.g., spinach and kale), various fruits and corn, and egg yolks. Animal fats are also sources of lutein.

Safety

No toxicities have been reported for lutein and zeaxanthin.

A study speculated that long-term supplementation of lutein and other antioxidants may be associated with elevated risk of lung cancer. However, experts commented that the study was flawed due to an invalid methodology and questionable statistical evaluations.

Drug interactions

There are no well-known drug interactions with lutein or zeaxanthin.