



Health Nutrients for Healthy Eyes

Disorders of the eye can be prevented and the eyes can be kept in a healthy condition for a long period of time with a healthy diet containing essential nutrients.

THE wonders of nature reveal themselves through the eyes of the beholder. This essential part of the body, therefore, demands protection and care throughout your life. Even a slight blemish to the eye should not be neglected because over a period of time minor irritants in the eyes can turn into chronic troubles.

For instance, one of the causes of damage to the eye is light-induced lipid peroxidation. Simply put, when light enters the lens, it reacts with lipids present in it generating free radicals that cause damage to the eyes. There are several other eye disorders that arise due to the onslaught of free radicals. And there are several others that are brought on due to the deficiency of essential nutrients in the diet.

Therefore, healthy nutrition with the right amount of vitamins, minerals, lipids, carbohydrates and essential fatty acids can keep your eyes in good working condition over a long period of time. But

how much of these nutrients should we ideally consume in our diet? Let's take a look.

- **Vitamin A:** This acts as antioxidant that can scavenge the free-radicals formed within the eyes. It plays a major role in the cells of the eye that are sensitive to dim light and is also necessary for the health of mucous membranes that line the eyelid. Consumption of vitamin A in the diet should be 15 mg daily.

- **Vitamin B2:** This vitamin acts as coenzyme in various redox reactions including the prevention of free radicals, thus acting as an antioxidant. The consumption of vitamin B2 in the diet should be 0.3-1.0 mg per day.

- **Vitamin E:** It is an antioxidant whose deficiency leads to inflamed eyelids and sensitivity to light. The consumption of this vitamin in the diet should be 400-800 IU every day.

- **Vitamin C:** This also acts as antioxidant that can scavenge the free-radicals in the

eye. The daily intake of vitamin C in the diet should be 2000-3000 mg.

- **Lutein and zeaxanthin:** These pigments act as antioxidants and are found in the eye retina. The daily intake of both the pigments should be 10 mg daily.

- **β -carotene:** This pigment acts as an antioxidant and its consumption in the diet should be 25,000 IU daily.

- **Zinc and selenium:** Zinc along with the enzyme retinal dehydrogenase catalyzes the conversion of inactive retinol into its active form, thus forming active antioxidants. Selenium is essential for the formation of selenoproteins like glutathione peroxidase within the lens of the eye. Glutathione peroxidase acts as an antioxidant that also prevents the formation of free radicals that damage the eye lens. The daily intake of zinc and selenium should be 25 mg respectively.

- **Taurine:** Taurine is an essential amino acid found in the retina of the eyes, thus maintaining the retina and eye health.



Nutrition to the Eyes

Now, how do we get all these essential nutrients that can keep our eyes fighting fit for long? The trick is to consume natural, nutrient-rich products that contain high concentrations of essential

nutrients (vitamins, minerals, omega-3 fatty acids, probiotics and antioxidants).

Let's take a look at some of these food items that can help to keep our eyes healthy.

- **Eggs:** Eggs are a good source of vitamins mainly vitamin A (retinol) and vitamin B2 (riboflavin). They also contain a high amount of the essential pigments lutein and zeaxanthin. Vitamin A and pigments act as antioxidants and prevent the formation of free radicals that can damage the eye. Lutein and zeaxanthin are yellow pigments that provide the yellow colour to egg yolk. They absorb the damaging blue wavelengths of light from sun that enters the eye. These pigments are also found in the macula of the eye. As you age the concentration of these pigments within the macula decreases. Thus, to maintain the eye sight for longer periods of time, these pigments need to be present in higher amounts in the diet. Also, to increase the bioavailability of lutein in the eyes, boiled eggs should be preferred. Thus, intake of eggs in proper amount (maximum two eggs) everyday helps in the treatment of diseases like macular degeneration, cataract and even night blindness.

- **Carrots:** Carrot juice is among the richest sources of vitamin A (thiamine). It also consists of the pigment β -carotene. Presence of β -carotene in the diet gets cleaved by enzymes into β -carotene and retinol. This increases the level of antioxidants which then prevent the formation of free radicals. So, consumption of a glass of carrot juice everyday helps in the prevention of diseases like conjunctivitis and night blindness.

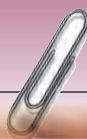
- **Spinach:** Spinach consists of vitamins like vitamin A retinol and vitamin C (ascorbic acid). It has a high amount of β -carotene pigment and also has the pigment lutein. Spinach is also a rich source of antioxidants (vitamin A, vitamin C, β -carotene and lutein). Therefore, its inclusion in the diet helps to prevent macular degeneration which is caused mainly due to formation of free radicals.

- **Fortified cereals:** Cereals like milk powder fortified with vitamins and minerals contain vitamins including vitamin A retinol, vitamin E (tocopherol), vitamin B2 (riboflavin), minerals like zinc and lutein pigment. Vitamin A and E are antioxidants which prevent the formation of free radicals. Vitamin B2 acts as coenzyme in various redox reactions including the prevention of free radicals, thus acting as antioxidant. Therefore, the major role of fortified cereals is in the prevention of cataract.

The Essential Six

10 mg/day	Lutein ^{2,3,4,12}	10 mg/day	Kale Spinach Corn
2 mg/day	Zeaxanthin ^{1,12}	2 mg/day	Green peas Broccoli Green beans Eggs
1,000 mg/day	Omega-3 ^{1,3,5,10,11}	1,000 mg/day	Tuna Salmon Scallops
500 mg/day	Vitamin C ^{1,3,4,11}	500 mg/day	Oranges Citrus juices & Fruits
400 IU/day	Vitamin E ^{1,8,10,13}	400 mg/day	Nuts Fortified cereals Sweet potatoes
25 mg/day	Zinc ^{1,3,11,12}	25 mg/day	Red meats Fortified cereals Milk

Intake of grains in their whole form increases the level of antioxidants (vitamin E and zinc) in eye lens helping in the prevention of diseases like macular degeneration and cataract.



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- **Orange:** Orange in the form of raw fruit is rich in the pigment zeaxanthin, vitamin C (ascorbic acid) and vitamin A. But the juice of orange has high amounts of vitamin C as compared to raw orange. Since orange is a seasonal fruit, intake of orange everyday during the season increases immunity against macular degeneration, night blindness, and conjunctivitis as it contains antioxidants in the form of vitamin A, vitamin C and lutein.

- **Wheat germ:** Wheat germ is high in vitamin E (tocopherol) and minerals mainly selenium. Selenium is essential for the formation of selenoproteins like glutathione peroxidase within the lens of the eye. Glutathione peroxidase acts as an antioxidant preventing the formation of free radicals that damage the eye lens. Thus, consumption of wheat germ can control cataract disorder in the eye as vitamin E and selenium combine with the enzyme in the lens of the eye.

- **Milk and dairy products:** Dairy products like milk, cheese, yogurt, etc. are rich sources of vitamin A, vitamin B2, minerals like zinc and amino acid like taurine. Among buffalo, cow and goat milk, goat milk is the highest source of taurine. Taurine is the free amino acid found in the retina of the eyes, thus maintaining the retina and

eye health. Thus, dairy products help to prevent retinal degeneration which can occur if the diet is poor in taurine. Also, these products can help in prevention of diseases like glaucoma and night blindness.

- **Seafoods:** Seafoods including oysters are rich sources of minerals like selenium and zinc. Zinc along with the enzyme retinal dehydrogenase catalyzes the conversion of inactive retinol into its active form, thus forming active antioxidants. Selenium and zinc, as antioxidants, help in keeping away cataract and night blindness.

- **Broccoli:** Broccoli has high amounts of vitamins mainly vitamin C (ascorbic acid) and vitamin B2 (riboflavin) and also contains the pigment lutein. Consumption of broccoli helps prevent cataract.

- **Nuts:** Nuts and hazelnuts contain a high amount of vitamin E (tocopherol). They also contain vitamin B2 (riboflavin) and minerals like zinc and selenium and thus help prevent cataract and macular degeneration.

- **Kale:** Kale is a vegetable that has high amounts of the pigment lutein. It also contains vitamin A (thiamine). Since it is a good source of antioxidants in the form of vitamin A and lutein, kale helps prevent macular degeneration.

- **Soy foods:** Soy foods like soy milk, soy protein and soy isolates are a good source of minerals like zinc. Since zinc activates the retinol by reacting with the enzyme retinal dehydrogenase, it mainly helps in the prevention of diseases like night blindness.

- **Guava:** Guava is a rich source of vitamin C (ascorbic acid). Consumption of guava

as raw fruit is better than consuming in the form of juice. Since vitamin C acts as an antioxidant, guava balances the level of antioxidants within the eye, thus increasing immunity against macular degeneration.

- **Whole grains:** Consumption of whole grains increases the amount of vitamin E (tocopherol) and minerals like zinc in the diet. In the eyes, the zinc along with the enzyme retinal dehydrogenase catalyzes the conversion of inactive retinol into its active form, thus forming active antioxidants. Therefore, intake of grains in their whole form increases the level of antioxidants (vitamin E and zinc) in eye lens helping in the prevention of diseases like macular degeneration and cataract.

The right blend of nutrients in the diet can not only keep your eyes healthy but also delay the onslaught of eye disorders that strike with advancing age. Eyes are an asset – take care of them.

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