

All Your Ingredients In One Magazine

# Ingredients

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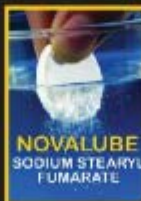
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# Antioxidants & their importance in general life

DR SANJAY AGRAWAL

**A**NTIOXIDANTS come up frequently in discussions about good health and preventing diseases. These powerful substances, which mostly come from the fresh fruits, and vegetables we eat, prohibit (and in some cases even prevent), the oxidation of other molecules in the body. The benefits of antioxidants are very important to good health, because if free radicals are left unchallenged, they can cause a wide range of illnesses and chronic diseases.

The human body naturally produces free radicals and the antioxidants to counteract their damaging effects. However, in most cases, free radicals far outnumber the naturally occurring antioxidants. In order to maintain the balance, a continual supply of external sources of antioxidants is necessary in order to obtain the maximum benefits of antioxidants. Antioxidants benefit the body by neutralising and removing the free radicals from the bloodstream.

## Different Antioxidants Benefit Different Parts of the Body

There are a wide range of antioxidants found in nature, and because they are so varied, different antioxidants provide benefits to different parts of the body. For example, beta-carotene (and other carotenoids) is very beneficial to eye health; lycopene is beneficial for helping maintain prostate health; flavonoids are especially beneficial for heart health; and proanthocyanidins are beneficial for urinary tract health.

## Antioxidants and Skin Health Benefits

When skin is exposed to high levels of ultraviolet light, photo-oxidative damage is induced by the formation of different types of reactive species of oxygen, including singlet oxygen, superoxide radicals, and peroxide radicals. These forms of reactive oxygen damage cellular lipids, proteins, and DNA, and they are considered to be the primary contributors to erythema (sunburn), premature aging of the skin, photodermatoses, and skin cancers.

Astaxanthin, followed by beta-carotene combined with vitamin E has been shown to be one of the most powerful antioxidant combinations for helping protect the skin from reactive species of oxygen.

## Antioxidants and Immune System Support

Singlet oxygen can compromise the immune system, because it has the ability to catalyze production of free radicals. Astaxanthin and Spirulina have been shown to enhance both the non-specific and specific immune system, and to protect cell membranes and cellular DNA from mutation. Astaxanthin is the single most powerful quencher of singlet oxygen, and is up to ten

times stronger than other carotenoids (including beta-carotene), and up to 500 times stronger than alpha tocopherol (Vitamin E), while Spirulina has a variety of antioxidants and other substances that are beneficial in boosting immunity.

Parkinson's disease (PD), is one of the major progressive neurological disorders for which no preventative or long-term effective treatment strategies are available. Epidemiologic studies have failed to identify specific environmental, dietary or lifestyle risk factors for PD except for toxic exposure to manganese, meperidine (Demerol), the "designer drug" version of which often contains a toxic byproduct of the synthesis, 1-methyl-4-phenyl 1,2,3,6 tetrahydropyridine (MPTP), and some herbicides and pesticides.

The search for genetic risk factors such as mutation, overexpression or under expression of



nuclear genes in DA neurons in idiopathic PD has not been successful as yet. Polymorphism in certain genes appears to be a risk factor, but there is no direct evidence for the causal relationship between polymorphism and increased risk of PD. In familial PD, mutation in the  $\alpha$ -synuclein gene is associated with the disease, but a direct role of this gene in degeneration of DA neurons remains to be established.

Although mutations in the Parkin gene has been associated with autosomal recessive juvenile Parkinson's disease, the role of this gene mutation in causing degeneration of DA neurons has not been defined. We have reported that in hereditary PD, a mutation in the  $\alpha$ -synuclein gene may increase the sensitivity of DA neurons to neurotoxins. We hypothesize that, in idiopathic PD, epigenetic (mitochondria, membranes, protein modifications), rather than genetic events are primary targets which, when impaired, initiate degeneration in DA neurons, eventually leading to cell death.

Although the nature of neurotoxins that cause degeneration in DA neurons in PD is not well understood, oxidative stress is one of the intermediary risk factors that could initiate and/or promote degeneration of DA neurons. Therefore, supplementation with antioxidants may prevent or reduce the rate of progression of this

disease. Supplementation with multiple antioxidants at appropriate doses is essential because various types of free radicals are produced, antioxidants vary in their ability to quench different free radicals and cellular environments vary with respect to their lipid and aqueous phases. L-dihydroxyphenylalanine (L-dopa) is one of the agents used in the treatment of PD. Since L-dopa is known to produce free radicals during its normal metabolism, the combination of L-dopa with high levels of multiple antioxidants may improve the efficacy of L-dopa therapy.

Lycopene is a naturally occurring chemical that gives fruits and vegetables a red color. It is one of a number of pigments called carotenoids. Lycopene is found in watermelons, pink grapefruits, apricots, and pink guavas. It is found in particularly high amounts in tomatoes and tomato products. People take lycopene for preventing heart disease, "hardening of the arteries" (atherosclerosis); and cancer of the prostate, breast, lung, bladder, ovaries, colon, and pancreas. Lycopene is also used for treating human papilloma virus (HPV) infection, which is a major cause of uterine cancer. Some people also use lycopene for cataracts and asthma.

When it comes to fat, there's one type you don't want to cut back on: omega-3 fatty acids. Two crucial ones – EPA and DHA – are primarily found in certain fish. ALA (alpha-linolenic acid), another omega-3 fatty acid, is found in plant sources such as nuts and seeds. Blood fat (triglycerides). Fish oil supplements can lower elevated triglyceride levels. Having high levels of this blood fat puts you at risk for heart disease. In Rheumatoid arthritis Fish oil supplements (EPA+DHA) can curb stiffness and joint pain. Omega-3 supplements also seem to boost the effectiveness of anti-inflammatory drugs. Blood fat (triglycerides).

Fish oil supplements can lower elevated triglyceride levels. Having high levels of this blood fat puts you at risk for heart disease. (Depression) Some researchers have found that cultures that eat foods with high levels of omega-3s have lower levels of depression. Fish oil also seems to boost the effects of antidepressants and may help the depressive symptoms of bipolar disorder. (Baby development) DHA appears to be important for visual and neurological development in infants. (Asthma) A diet high in omega-3s lowers inflammation, a key component in asthma. But more studies are needed to show if fish oil supplements improve lung function or cut the amount of medication a person needs to control the condition (ADHD).

Some studies show that fish oil can reduce the symptoms of ADHD in some children and improve their mental skills, like thinking, remembering, and learning. But more research is

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# Lutein is called carotenoid vitamin

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needed in this area, and omega-3 supplements should not be used as a primary treatment. (Alzheimer's disease and dementia) Some research suggests that omega-3s may help protect against Alzheimer's disease and dementia, and have a positive effect on gradual memory loss linked to aging. But that's not certain yet.

Coenzyme Q10 (CoQ10) is a substance similar to a vitamin. It is found in every cell of the body. Your body makes CoQ10, and your cells use it to produce energy your body needs for cell growth and maintenance. It also functions as an antioxidant, which protects the body from damage caused by harmful molecules. CoQ10 is naturally present in small amounts in a wide variety of foods, but levels are particularly high in organ meats such as heart, liver, and kidney, as well as beef, soy oil, sardines, mackerel, and peanuts.

Astaxanthin is a red-pink pigment found in various seafood, and also in the feathers of flamingos and quails. It is structurally similar to beta-carotene (pro-vitamin A) but has some chemical differences which may be safer. It seems to be able to improve many blood parameters that could be beneficial to heart disease. At doses of 6-8mg daily, it can decrease the oxidation of LDL cholesterol and prevent it from

becoming atherogenic (artery clogging). It can increase general blood flow and reduce blood sugar in diabetics and blood pressure in spontaneously hypertensive rats (humans not studied yet) with no effect on these measures in normal healthy persons. Additionally, it is also a potent anti-inflammatory and has more anti-oxidant capabilities than vitamin A itself.

Biotin is used for preventing and treating biotin deficiency associated with pregnancy, long-term tube feeding, malnutrition, and rapid weight loss. It is also used orally for hair loss, brittle nails, skin rash in infants (seborrheic dermatitis), diabetes, and mild depression.

Lutein is called a carotenoid vitamin. It is related to beta-carotene and vitamin A. Foods rich in lutein include broccoli, spinach, kale, corn, orange pepper, kiwi fruit, grapes, orange juice, zucchini, and squash. Lutein is absorbed best when it is taken with a high-fat meal.

Many people think of lutein as 'the eye vitamin'. They use it to prevent eye diseases including age-related macular degeneration (AMD), cataracts, and retinitis pigmentosa.

Ginkgo leaf is often taken by mouth for memory disorders including Alzheimer's disease. It is also used for conditions that seem to be due to reduced blood flow in the brain, especially in

Ginkgo leaf is often taken by mouth for memory disorders including Alzheimer's disease

older people. These conditions include memory loss, headache, ringing in the ears, vertigo, dizziness, difficulty concentrating, mood disturbances, and hearing disorders. Some people use it for other problems related to poor blood flow in the body, including leg pain when walking (claudication), and Raynaud's syndrome (a painful response to cold, especially in the fingers and toes).

Increasing one's antioxidant intake is essential for optimum health, especially in today's polluted world. Because the body just can't keep up with antioxidant production, a good amount of these vitamins, minerals, phytochemicals, and enzymes must come from one's daily diet. Q

(The author is a pharmaceutical consultant)

# Suppliers working on sustainable alternatives

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## Glass

Glass containers for food and beverages are 100% recyclable, but not with other types of glass. Glass and food and expensive cosmetic bottles of various sizes and jars are the only types of glass accepted in the Stanford Recycling Program including the Stanford Recycling Drop-Off Centre.

## Green plastics

Green plastics are the focus of an emerging industry focused on making convenient living consistent with environmental stability. One reason to make a shift toward the use of green plastics is the availability of raw materials. Green plastics can be made using polymers that come from agricultural and marine feedstocks. These are abundant natural resources that are constantly being replenished. This, in turn could revitalize rural economy, both agricultural and marine, by providing additional demand for currently underutilized land or low-valued biomass commodities. Another favourable property of green plastics is their biodegradability, making them a natural material for use in such applications as compostable collection bags, such as for food or yard waste. But bioplastics have to possess adequate physical properties. Their properties have to be

managed and controlled with technological means through the development of adequate formulations and plastics processing.

## Advantages of Biodegradable Packing Sources

Chitosan, starch and other biodegradable packaging materials are best suited, because of their availability in native and chemically modified forms for preparing biodegradable packaging films. These films can be useful for shelf life extension of pharmaceutical products as well as several processed foods. Their total biodegradation make them eco-friendly products which have needs to be capitalized on to conserve ecology for Eco Friendly Pharmaceutical Packaging Material for future generations.

## Hurdles

According to cosmetics design Europe.com, packaging suppliers have been working on sustainable alternatives along with the advancement in the production of eco-friendly cosmetics, consumers anticipate receiving sustainable packaging that would match their expectations of product substance, its type, and its properties. Eco-friendly bags and containers offer a long-term benefit for the well-being of the Earth as they are recyclable, reusable and/or biodegradable. Further, introducing a

bio beauty product of the highest quality into plastic container is illogical and unreasonable, as it not ruins the basic concept of sustainable cosmetics but might be harmful.

## Conclusions

Cosmetic packaging is hardly collected and recycled, thus the use of sustainable compostable or environmentally biodegradable materials for cosmetic packaging is an important challenge and an opportunity for sustainability. Innovative bio-based and compostable materials are already developed and suitable for production of cosmetic packaging while others are under development with very promising properties and perspective. Consumer and policy awareness is important to support the development of sustainable cosmetic packaging, which represent an important step versus the saving of our environment. The Green earth initiative is of utmost importance not only for us but for the future of humanity. Q

(Ashish Kumar Pal is a scientist, Compendial Development Laboratory, United States Pharmacopoeia (USP), Shamirpet, Hyderabad. Bir Bahadur is a professor, Department of Botany, Kakatiya University, Warangal)