



Lycopene: A Review on Biological Properties

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ABSTRACT

It is a plant chemical fat-soluble organic pigment known as carotenoid. It is a red color pigment. It is a tetraterpene $C_{40}H_{56}$. It has non-provitamin A activity. Due to the presence of 11 conjugated double bonds it absorbs light in the UV region. Carotenoids are present in human blood and tissues. It is found in tomatoes and tomatoes product. It is the most potent antioxidant in nature. Its bioavailability depends on food processing or the ingestion of fat.

Keywords: *Bioavailability, Carotenoid, Tetraterpene, Tomato, Lycopene*

INTRODUCTION

It is a bright red colored carotenoid pigment. It is found in tomatoes and other red vegetables and fruits¹. The human body unable to produce lycopene. Lycopene is the most dominant carotenoid in human blood. It is present naturally in greater amounts than beta-carotene and other

dietary carotenoids². It accumulates in our organs such as the skin, liver, lungs, and prostate. In test tube studies, lycopene has been shown to be a powerful antioxidant³.

LITERATURE REVIEW

Sources of Lycopene

We can get lycopene from various types of fruits and vegetables i.e. watermelon, tomatoes, grapefruit, papaya, and mangoes, berries, carrots, pumpkin, red bell peppers. Lycopene is also available in the form of dietary supplements in tablet, capsule, and gelcap form in the market. Lycopene is particularly found in tomato products, sauce, ketchup, and juice.

Strong Antioxidant Property

Lycopene has a strong antioxidant property. Antioxidants protect our body against damage which is caused by free radicals. When free radical levels exceed an antioxidant level, oxidative stress can be created in the body⁴. Oxidative stress is linked to certain chronic diseases, such as cancer, diabetes, heart disease, and

Alzheimer's disease. Lycopene can protect our bodies from pesticides, herbicides, and monosodium glutamate (MSG)⁵.

Health Functions

Sufficient intake of lycopene as an antioxidant is important. It helps the body to protect against the damaging effects of free radicals⁶. Which cause diseases that involve the heart or blood vessels and cancer.

Lycopene Intake

Recommendations

We can take lycopene with the doctor's recommendation. We should take about 10 milligrams per day in a healthy diet⁷.

Lycopene supplements

Lycopene supplements are also available in the market.

Supplement Forms

There are different types of lycopene supplements in the market. Lycopene may be in a "synthetic" form. It has the antioxidants vitamin E (tocopherol) and vitamin A⁷.

Effect of lycopene supplements on our body

High quantities of lycopene-rich foods reduce the risk of cancer in our bodies. Intake of lycopene can reduce elevated blood pressure and lycopene-rich foods may slightly reduce elevated levels of cholesterol⁸. Lycopene provides protection to the skin from UV light damage. Lycopene also helps in cases of male infertility⁹.

Dosage quantity of lycopene

Pills strengths should be 5 mg to 30 mg. Lycopene used by adults in doses of 15-45 mg by orally daily for up to 6 months¹⁰. The best way to use lycopene supplements is a softgel or capsule.

Storage of Lycopene

Lycopene should be stored at room temperature and keep away from direct sunlight. Mostly containers block ultraviolet (UV) light to protect this supplement from damage¹¹.

Side effects of lycopene

Till date there is no known side effects of taking excess quantity of lycopene¹². If we use long-term lycopene supplementation formation of benign skin lycopopenemia it cause skin pigmentation i.e yellow or orange skin tone it can be treat by reducing lycopene quantity in diet¹³.

Interactions

Antiplatelets: Lycopene can inhibit blood clotting during the surgery which increase the risk of excess bleeding. We must take care when using lycopene with other medicines, herbal preparations and plant-based medicines¹³.

Anorectic drugs: Drugs that decrease food consumption (anorectic drugs) overall may decrease lycopene intake.

Lipase inhibitors: Lipase inhibitors decrease fat absorption may also impact our body's ability to absorb lycopene¹⁴.

Health Benefits

Lycopene has **antioxidant** function in human body. Antioxidants are molecules that fight against free

radicals in our bodies. Free radicals formed naturally in response to aging. But free radicals increase in body due to environmental and behavioral changes i.e pollution and smoking¹⁵.

Free radicals cause cell damage — in high levels, including cancer, diabetes, and heart disease.

By stabilizing the free radicals, lycopene may reduce the risk of chronic diseases. Lycopene also contribute to promote the good oral health, bone health, and blood pressure¹⁶.

Bone Health

Lycopene has the ability to maintain bone strength. It affects bone metabolism (the constant production and breakdown of bone tissue). It supports bone density¹⁷.

Reduced Cancer Risk

Lycopene is an antioxidant. Antioxidants provide protection against cancer. It prevents DNA from damage and cell structures¹⁸. Lycopene intake prevent from various types of cancer in the human body— particularly bone, lung, and prostate cancers. Lycopene slows or stops the growth of cancer cells.

Bladder cancer

People who eat more lycopene in their diet don't have a lower risk for bladder cancer.

Heart and Vascular Health

Lycopene reduced bad cholesterol (LDL) while increasing good cholesterol (HDL) levels. It is important to balance in our body because high cholesterol develops fat

deposition in our blood vessels and the formation of blood clot. This results in a heart attack or stroke. Lycopene maintains good blood pressure in the body and reduces the risk of heart disease.

Skin Health

The long-term lycopene consumption prevents skin cancer¹⁸. By including tomato paste in diet daily can reduce up to 40% less ultraviolet (UV) skin damage from sunlight¹⁷.

Improved Fertility in Men

By consuming 14 milligrams per day of lycopene can improve fertility in young men about 40 percent.

In Diabetes

People who eat more lycopene in their diet don't have a lower risk of developing diabetes²⁰.

In eyesight

Lycopene may prevent or delay the formation of cataracts and reduce risk of macular degeneration. Which cause of blindness in adults.

Brain Protection

Lycopene's antioxidant properties prevent seizures and memory loss in age-related diseases, such as Alzheimer's¹⁹.

Side Effects of Lycopene

Lycopene has health benefits, it can still cause undesirable effects in our body. Long-term use of lycopene creates a condition called lycopopenia. Lycopopenia results in skin pigmentation an orange or red discoloration of the skin. If we feel irritation after taking

lycopene we should stop the use of supplements.

Excretion of lycopene

Excretion of lycopene occurs through the feces and through urine some lycopene can also be excreted via sebaceous glands.

CONCLUSIONS

By consumption of tomato and tomato products containing lycopene has significant of health benefit. Lycopene act as potent anticancer, antioxidant, anti-inflammatory, and anti-diabetic agent in our body. It protects our body against diseases i.e. heart, liver, bone, skin, nervous, and reproductive systems. Future cardiovascular disease prevention strategies might include lycopene-

enriched products, lycopene supplementation, and new combinations including lycopene. Future studies focused on dietary lycopene and its synergistic effects with other dietary components in different study populations, with elevated cardiovascular risk, are highly warranted and might enable the development of functional foods useful in the prevention and complementary treatment of cardiovascular disorders.

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