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### Tomato-A Natural Medicine and Its Health Benefits

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Tomatoes can make people healthier and decrease the risk of conditions such as cancer, osteoporosis and cardiovascular disease. People who ate tomatoes regularly have a reduced risk of contracting cancer diseases such as lung, prostate, stomach, cervical, breast, oral, colorectal, esophageal, pancreatic, and many other types of cancer. Some studies show that tomatoes and garlic should be taken together at the same time to have its cancer preventive effects. Whatever it is, we really do not know how or why tomatoes work against cancers. We believe that lycopene and the newly discovered bioflavonoids in tomatoes are responsible as cancer fighting agents. Not only raw tomatoes but also cooked or processed tomato products such as ketchup, sauce, and paste, are counted as good sources of cancer prevention. Tomato is also good for liver health. Tomato has detoxification effect in the body. Probably it is due to the presence of chlorine and sulfur in tomatoes. According to some studies, 51 mg of chlorine and 11 mg of sulfur in 100 grams size of tomato have a vital role in detoxification process. We know that natural chlorine works in stimulating the liver and its function for filtering and detoxifying body wastes. Sulfur in tomatoes protects the liver from cirrhosis, too. Tomato juice is known as good energy drink and for rejuvenating the health of patients on dialysis. Herbalists knew that taking tomatoes and tomato products could reduce the risk of cardiovascular diseases because of lycopene in it. What is your worry when you take too much food that contains animal fat, Butter, cheese, pork, egg, beef, and other fried foods. Take tomato, it will prevent hardening of the arteries. Therefore, tomato can reduce high blood pressure, too. Red ripened tomato is a powerful antioxidant. Vitamin E and lycopene in tomato prevents LDL oxidation effectively. Bean sprouts, cabbage or barley malt contain vitamin E. Tomato is an excellent fruit or vegetable for rapid skin cell replacement. Tomato juice can be used for healing sunburn because of its unique vitamin C. You can also name tomato juice as a good sports drink to restore yourself from fatigue and sleepiness.

*Keyword:* Tomato, cancer, osteoporosis and cardiovascular disease

#### 1. Introduction

Tomatoes are a member of the deadly nightshade family, and as such were considered toxic, causing many conditions like appendicitis, "brain fever" and cancer. In fact, they may have just the opposite effect. Tomatoes were not even eaten in the US until the early 1800s, when an eccentric New Jersey gentleman Colonel Robert Gibbon Johnson brought them back from a trip overseas. Always one to take advantage of a dramatic opportunity, he announced an amazing display of courage would take place on September 26, 1820.

He shocked his hometown of Salem by consuming an entire basket of tomatoes in front of a crowd of spectators, expecting him to keel over any second. Obviously, he didn't and since then tomatoes have been a staple of the American diet and with good reason. Starting with the basics, tomatoes contain large amounts of vitamin C, providing 40 percent of the daily value (DV). They also contain 15 percent DV of vitamin A, 8 percent DV of potassium, and 7 percent of the recommended dietary allowance (RDA) of iron for women and 10 percent RDA for men. The red

pigment contained in tomatoes is called lycopene. This compound appears to act as an antioxidant, neutralizing free radicals that can damage cells in the body. Only recently, studies have revealed that lycopene may have twice the punch of another well-known antioxidant beta-carotene. Studies conducted by Harvard researchers have discovered that men who consumed 10 servings of tomatoes a week, or the equivalent to 10 slices of pizza, can cut the risk of developing prostate cancer by a formidable 45 percent. However, its benefits are not limited to the prostate. Italian researchers have found that those who consume more than 7 servings of raw tomatoes lower the risk of developing rectal colon or stomach cancers by 60 percent. Israeli researchers have found that lycopene is a powerful inhibitor of lung, breast, and endometrial cancer cells. Research has also indicated that the lycopene in tomatoes can help older people stay active longer. New research is beginning to indicate that tomatoes may be used to help prevent lung cancer. Two powerful compounds found in tomatoes-coumaric acid and chlorogenic acid-are thought to block the effects of nitrosamines. These are compounds that not only are formed naturally in the body, but also are the strongest carcinogen in tobacco smoke. By blocking the effects of these nitrosamines, the chances of lung cancer are reduced significantly. When choosing your tomatoes, be sure to pick those with the most brilliant shades of red. These indicate the highest amounts of betacarotene and lycopene. Though raw tomatoes are great for you, cooking them releases even more of the benefits. Lycopene is located in the cell wall of the tomato, so by cooking in a bit of oil, this healing compound is more fully released. In addition cooking the tomato in olive oil allows your body to absorb the lycopene better. Don't worry about the availability of fresh tomatoes. Tomatoes don't lose any of their nutritional value in the high heat processing, making canned tomatoes and tomato sauce are both just as viable and beneficial as fresh tomatoes. The researchers found that tomatoes are the biggest source of dietary

lycopene; a powerful antioxidant that, unlike nutrients in most fresh fruits and vegetables, has even greater bioavailability after cooking and processing. Tomatoes also contain other protective mechanisms, such as antithrombotic and anti-inflammatory functions. Research has additionally found a relationship between eating tomatoes and a lower risk of certain cancers as well as other conditions, including cardiovascular disease, osteoporosis, ultraviolet light-induced skin damage, and cognitive dysfunction. Tomatoes are widely available, people of all ages and cultures like them, they are cost-effective, and are available in many forms. "Leveraging emerging science about tomatoes and tomato products may be one simple and effective strategy to help individuals increase vegetable intake, leading to improved overall eating patterns, and ultimately, better health. Tomatoes are the most important non-starchy vegetable in the American diet. Research underscores the relationship between consuming tomatoes and reduced risk of cancer, heart disease, and other conditions," the authors conclude. "The evidence also suggests that consumption of tomatoes should be recommended because of the nutritional benefits and because it may be a simple and effective strategy for increasing overall vegetable intake.

### 1.1 Chemical Composition of *Solanum lycopersicum*

There are known different varieties of tomato, round, oval, "cherry", but all have the same nutritional characteristics, being an important source of: - potassium, phosphorus, magnesium, iron, so necessary to the normal activity of nerves and muscles;

- vitamins as A, B and C - tomatoes is the third source of vitamin C in our diet and the fourth for vitamin A, through its content in beta-carotene or pro vitamin A;
- phytosterols, compounds that help to keep cholesterol under control
- folic acid, which helps eliminate homocysteine, an amino acid whose metabolism is dependent on the metabolism of vitamins from B complex, especially that of folic acid.

**Tomato**



Cross-section and full view of a hothouse (greenhouse-grown) tomato.

**Scientific classification**

Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Asterids
Order:	Solanales
Family:	Solanaceae
Genus:	<i>Solanum</i>
Species:	<i>S. lycopersicum</i>

**Binomial name**

*Solanum lycopersicum* L.

**Synonyms**

*Lycopersicon lycopersicum*  
*Lycopersicon esculentum*

**1.2 Health Benefits**

Tomatoes, which are actually a fruit and not a vegetable, are loaded with all kinds of health benefits for the body. They are in fact, a highly versatile health product and due to their equally versatile preparation options, there's really no reason to neglect the tomato as part of a healthy diet. One of the most well-known tomato eating benefit is its' Lycopene content. Lycopene is a vital anti-oxidant that helps in the fight against cancerous cell formation as well as other kinds of health complications and diseases. Free radicals in the body can be flushed out with high levels of Lycopene, and the tomato is so amply loaded with this vital anti-oxidant that it actually derives its rich redness from the nutrient. Lycopene is not

a naturally produced element within the body and the human body requires sources of Lycopene in order to make use of this powerful anti-oxidant. While other fruits and vegetables do contain this necessary health ingredient, no other fruit or vegetable has the high concentration of Lycopene that the tomato takes pride in. Studies involving the tomato have cropped up all over the world of medical science. There are more health benefits derived from eating a tomato than the scientific community is able to print, at least yet. These studies have proven not only the benefits in preventing cancer; heart disease as well as high cholesterol is also in the tomato's sights. This is really exciting information. The health benefits of tomatoes are becoming more and more documented every day as we learn new uses of this amazing fruit. Cancers such as prostate cancer, cervical cancer, colon cancer, rectal cancer, and cancers of the stomach, mouth, pharynx, and esophagus have all been proven to be staved off by high levels of Lycopene. Researchers introduced Lycopene into pre-existing cancer cell cultures and the Lycopene prevented the continued growth of these cultures. This is pretty powerful evidence that the health benefits of eating a tomato are really quite phenomenal. It takes as little as 540 milliliters of liquid tomato product to get the full benefits of Lycopene. This means that a daily glass of tomato juice has the potential to keep a person healthy for life. Tomatoes are equally as nutritious fresh as they are in other variable forms. When tomato products are heat processed the bioavailability of the Lycopene actually increases rather than the anticipated decrease. Even with all the plentiful research that has gone into the health benefits of tomatoes, there is still more research being conducted as the medical science community understands that we have not fully tapped into the potential presented by a tomato just yet. Research is now slowly proving that there is a high likelihood that the consumption of tomatoes and tomato based products actually may prevent serum lipid oxidation and reduce the risk of macular degenerative disease. Tomatoes are by far the healthiest of the fruits and vegetables with the

power to ward off some of the worst known diseases to man. With the vast variety of tomato products on the market, it really shouldn't be difficult to get the full health benefit of tomatoes but, if you would like to get the full health benefits of tomatoes and have some fun at the same time, consider raising your own organic tomatoes. It would be a lot of fun, get you outside for some vitamin D and best of all reward you with great taste and vibrant health.

### 1.3 Home Remedy of *Solanum lycopersicum*

Eating lots of tomatoes, any way you can, is a great thing. This fruit that acts like a vegetable is loaded with health properties.

Here are 10 reasons why you should have tomatoes in your kitchen and pantry:

1. Tomatoes contain all four major carotenoids: alpha- and beta-carotene, lutein, and lycopene. These carotenoids may have individual benefits, but also have synergy as a group (that is, they interact to provide health benefits).
2. In particular, tomatoes contain awesome amounts of lycopene, thought to have the highest antioxidant activity of all the carotenoids.
3. Tomatoes and broccoli have synergy that may help reduce the risk of prostate cancer. One study showed that prostate tumors grew much more slowly in rats that were fed both tomato and broccoli powder than in rats given lycopene as a supplement or fed just the broccoli or tomato powder alone.
4. A diet rich in tomato-based products may help reduce the risk of pancreatic cancer, according to a study from The University of Montreal. The researchers found that lycopene (provided mainly by tomatoes) was linked to a 31% reduction in pancreatic cancer risk between men with the highest and lowest intakes of this carotenoid.
5. Tomatoes contain all three high-powered antioxidants: beta-carotene (which has vitamin A activity in the body), vitamin E, and vitamin C. A U.S. Department of Agriculture report, *What We Eat in America*, noted that a third of us get too little vitamin C and almost half get too little vitamin A.
6. Tomatoes are rich in potassium, a mineral most of us don't get enough of. A cup of tomato juice contains 534 milligrams of potassium, and 1/2 cup of tomato sauce has 454 milligrams.
7. When tomatoes are eaten along with healthier fats, like avocado or olive oil, the body's absorption of the carotenoid phytochemicals in tomatoes can increase by two to 15 times, according to a study from Ohio State University.
8. Tomatoes are a big part of the famously healthy Mediterranean diet. Many Mediterranean dishes and recipes call for tomatoes or tomato paste or sauce. Some recent studies, including one from The University of Athens Medical School, have found that people who most closely follow the Mediterranean diet have lower death rates from heart disease and cancer. Researchers from the Harvard School of Public Health, who followed more than 39,000 women for seven years, found that consumption of oil- and tomato-based products -- particularly tomato and pizza sauce -- was associated with cardiovascular benefits.
9. When breastfeeding moms eat tomato products, it increases the concentration of lycopene in their breast milk. In this case, cooked is best. The researchers also found that eating tomato products like tomato sauce increased concentrations of lycopene in breast milk more than eating fresh tomatoes did.
10. Tomato peels contribute a high concentration of the carotenoids found in tomatoes. The amount of carotenoids absorbed by human intestinal cells was much greater with tomato paste enriched with tomato peels compared to tomato paste without peels, according to a study from Marseille, France. The tomato skin also holds most of the flavonols (another

family of phytochemicals that includes quercetin and kaempferol) as well. So to maximize the health properties of tomatoes, don't peel them if you can help it!

#### 1.4 Medicinal Uses of *Solanum lycopersicum*

##### 1. Tomatoes are good for your skin.

Tomatoes contain a high level of lycopene, which is a substance that is used in some of the more pricy facial cleansers that are available for purchase over-the-counter.

If you want to try tomatoes for skin care, you need to start with about eight to twelve tomatoes. Peel the tomatoes and then place the skin on your face with inside of the tomato touching your skin.

Leave the tomatoes on your face for a minimum of ten minutes, then wash. Your face will feel clean and shiny. Some redness may occur, but should fade with time.

##### 2. Tomatoes help prevent several types of cancer.

A number of studies have been conducted that indicate that the high levels of lycopene in tomatoes works to reduce your chances of developing prostate, colorectal and stomach cancer.

Lycopene is a natural antioxidant that works effectively to slow the growth of cancerous cells. Cooked tomatoes produce even more lycopene, so go ahead and cook up a batch of your mom's famous tomato soup.

##### 3. Tomatoes help maintain strong bones.

Tomatoes contain a considerable amount of calcium and Vitamin K. Both of these nutrients are essential in strengthening and performing minor repairs on the bones as well as the bone tissue.

##### 4. Tomatoes help repair damage caused by smoking.

No, eating tomatoes is not the most recent fad to help you quit smoking. However, tomatoes can reduce the amount of damaged done to your body by smoking cigarettes.

Tomatoes contain coumaric acid and chlorogenic acid that work to protect the body

from carcinogens that are produced from cigarette smoke.

##### 5. Tomatoes provide essential antioxidants.

Tomatoes contain a great deal of Vitamin A and Vitamin C. This is primarily because these vitamins and beta-carotene work as antioxidants to neutralize harmful free radicals in the blood.

Free radicals in the blood stream are dangerous because it may lead to cell damage. Remember, the redder the tomato you eat is, the more beta-carotene it contains. In addition, you also want to keep in mind that cooking destroys the Vitamin C, so for these benefits, the tomatoes need to be eaten raw.

##### 6. Tomatoes are good for your heart.

Because of the Vitamin B and potassium in tomatoes, they are effective in reducing cholesterol levels and lowering blood pressure. Therefore, by including tomatoes in your regular balanced diet you can effectively prevent heart attacks, strokes as well as many other heart related problems that may threaten your life.

##### 7. Tomatoes are good for your hair.

The Vitamin A in tomatoes works perfectly to keep your hair shiny and strong. In addition, it also does wonders for your eyes, skin, bones and teeth.

##### 8. Tomatoes are good for your kidneys.

Adding tomatoes without seeds to your diet has been proven in some studies to reduce the risk of kidney stones.

##### 9. Tomatoes are good for your eyes.

The Vitamin A found in tomatoes is fantastic for improving your vision. In addition, eating tomatoes is one of the best foods to eat to prevent the development of night blindness.

##### 10. Tomatoes are good for diabetics.

Tomatoes are packed full of the valuable mineral known as chromium. It works effectively to help diabetics keep their blood sugar levels under better control.

#### 1.5 Effect of Homocysteine on Health

Increased levels of homocysteine increase the risk of cardiovascular disease, particularly myocardial infarction and brain and vascular accidents or

hands and legs vascular disease. Homocysteine is also involved in the evolution of arteriosclerosis, a process which produces agglomerations of fat and minerals in the arteries, which gradually acquire a distinct hardness and cause damage to blood vessel flexibility. People with high blood levels of homocysteine present other associated risk factors such as hypertension or raised cholesterol levels that cause thrombosis. A medium size tomato has 11 calories, 95 percent of its weight is water and 4 percent carbohydrate. These features, along with its diuretic power and low in sodium content, makes it an important ally in weight-loss diets and weight control. Surveys suggest that some compounds of the tomatoes, such as lycopene, influence the biological defense mechanisms such as the immune and antioxidant function of the body. The DNA damage is an important step in the appearance of cancer. Experimental administration, for 2 weeks, of tomato juice significantly reduced levels of affected DNA of the lymphocyte cells (defense cells) in peripheral blood, and in combination with tomato puree increased DNA protection against free radicals.

### **1.6 Lycopene, a Compound with Exceptional Properties**

The tomato is a food very rich in lycopene, a vegetal pigment from carotenoid family, a compound discovered in 1873, which gives color to the vegetable, but also has exceptional properties as lycopene is a powerful antioxidant. Numerous studies have shown that by regular consumption of tomatoes, the resistance to cancer of the prostate, lung, digestive, but also heart disease is increased. Also, tomatoes help to fight against atherosclerosis syndrome and muscle degeneration, the main causes of discomfort in people over 65 years. Studies on the health beneficial effects of tomatoes and their derivatives have focused mainly on lycopene, however, the administration only of lycopene for 12 weeks had no effect on the damaged DNA in human lymphocytes. These observations show that is more efficient the combination of:

-carotenoids (a class of natural liposoluble pigments found

especially in plants, interfering in the photosynthesis);  
-tocopherol (vitamin E, soluble);  
-phenolic acid and flavonoids (natural compounds found in plants).

This combination of different carotenoids or the association of carotenoids with tocopherol (vitamin E) or phenolic acid has simultaneous effects on blocking the pathological reactions, which generates free radicals, able to affect the DNA. It was also found that the supplementation of a diet containing a small quantity of carotenoids with tomato juice can increase cellular immunity, involved in reducing the risk of cancer.

### **1.7 Thermally Treated Tomatoes are more efficient**

Unlike fruits and vegetables which reduce their nutritional content when are thermally treated, such as vitamin C, thermally treated tomatoes increase the concentration of lycopene and the antioxidant properties are not lost. Moreover, studies have confirmed that the body absorbs better the lycopene from tomatoes when they are thermally treated.

Fresh tomato provides 4 times less the amount of bioavailable lycopene to the while the juice or sauce of a tomato is a source of lycopene easier to use. Besides tomatoes, there are other red fruits and vegetables rich in lycopene, such as watermelon, but the content is lower. Over 80 percent of the lycopene in our diet comes from tomatoes and tomato-derived products, and combination with olive oil increases its absorption.

### **1.8 Antioxidants**

Antioxidants are substances (vitamins, minerals, natural coloring) that protect body cells from the harmful effects of free radicals, molecules that form in the body through contact with oxygen. Free radicals are partly responsible for the processes of aging, cardiovascular diseases and cancer and act by attacking the cell membranes and the cellular DNA.

Cellular oxidation is a normal process that affects all tissues, is inevitable, but some factors such as

environmental contamination, smoking, diets high in saturated fats, excessive sun exposure and excess physical activity contribute to increased production of free radicals. Most antioxidants are found in plants, which is why it is so necessary to eat more fruits and vegetables as they protect us from free radicals naturally.

The three main representatives of antioxidants are vitamins C, E and pro vitamin A. Citrus, nuts, peanuts, almonds, spinach, onion, especially the red one, berries, cabbage, carrots, grapes, pumpkins, melon, kiwi and of course, tomatoes have the highest antioxidant power. It is recommended a weekly consumption of 7 servings of tomato derivatives, (one serving = one glass of tomato juice of 250 ml or 125 ml of tomato sauce for other dishes). Tomatoes are mostly used in the Mediterranean diet, and in Spanish cuisine is the main component of a typical preparation called gazpacho.

### 1.9 Contraindications for Tomatoes

It should also be remembered the moderately content in oxalic acid of tomatoes (5.3 mg / 100 g), substances which form insoluble calcium salts (calcium oxalate) which can precipitate in the form of kidney stones. Also, due to its acidity, a moderate consumption is encourage and in the case of gastro duodenal diseases, the consumption should be stopped. When buying tomatoes, you have to choose the freshest ones, with smooth, soft skin, of medium consistency (neither too strong nor too soft) or too green, but not too mature. Tomatoes can be stored for longer periods in their natural state by placing them on their tail or the green area corresponding to the tail and separated between them. The fridge can maintain them in good condition between 6 to 8 days, if kept whole and no more than 2 days if they are preserved in the form of fresh juice.

### 1.10 Health Properties of *Solanum lycopersicum*

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but also have synergy as a group (that is, they interact to provide health benefits).

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from the Harvard School of Public Health, who followed more than 39,000 women for seven years, found that consumption of oil- and tomato-based products -- particularly tomato and pizza sauce -- was associated with cardiovascular benefits.

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### 1.11 Recent Research Going on Tomato

There are many health benefits of tomatoes and there is one more that could possibly be added to the list -- tomatoes lower cholesterol. While there is considerable debate over whether or not they are considered to be a fruit or a vegetable, tomatoes offer a delicious compliment to any dish -- from salads to main courses. However, there is considerable evidence that tomatoes can provide a variety of health benefits, too. Tomatoes contain many antioxidants, including a chemical called lycopene. There has been a lot of research investigating tomatoes and the chemicals contained in them like lycopene. From these studies, tomatoes have been shown to possess a vast array of healthy benefits, including macular degeneration and certain cancers. Studies have also proven that tomatoes may provide health effects on your cholesterol. The studies examining the effects of tomato products on cholesterol are small and looked at raw tomatoes,

or a combination of tomato paste and tomato juice. One of the chemicals in tomatoes, lycopene, has had the most research associated with it and it is thought to be a major contributor to the health benefits provided by tomatoes. From these studies seen in both animals and humans, it has been found that HDL cholesterol levels were increased by at least 15%. The studies examining the effects of tomatoes on LDL cholesterol and triglycerides vary -- some studies indicate a slight decrease in these lipids (by an average of 8%), whereas other studies did not detect a significant drop in LDL or triglycerides. Another surprising finding was that the lycopene in the tomatoes -- as well as probably other antioxidants in tomatoes -- reduced the presence of oxidized LDL. When LDL becomes oxidized, it can contribute to the formation of plaque on the walls of arteries. The studies that examined the effects of tomatoes and/or lycopene didn't require too many tomatoes to achieve this effect. In fact, these studies suggest that you would need two medium sized tomatoes or a combination of 14 ounces of tomato juice and two tablespoons of ketchup to affect your cholesterol. Tomatoes are a healthy food that contains a variety of vitamins, minerals and antioxidants. While a small number of studies suggest that tomatoes lower cholesterol levels, this should not be the only thing you rely on in your plan to lower cholesterol.

### 1.12 Benefits of Tomato

- **Lower Cholesterol**

A Tomato- cholesterol free and a good source for diet; it won't add cholesterol to the diet. A cup of tomato provides 9% of fiber that helps you to lower the high cholesterol levels. Tomatoes also contains niacin (vitamin B<sub>3</sub>), which has been used as a safe way to lower cholesterol levels.

- **Reduce Heart Disease**

Tomatoes are good source of potassium that have been shown to lower high blood pressure and reduce risk of heart disease. Vitamin B<sub>6</sub> and folate, present in tomatoes, are needed to the body to convert a dangerous chemical called

homocysteine into other, benign molecules. High levels of homocysteine can directly damage blood vessel walls and are associated with an increased risk of heart attack and stroke.

- **Lower Blood Pressure**

The tomatoes provide significant drop in blood pressure. After 8 weeks, ongoing tracking of daily tomato ingestion (in the form of lycopene complex – a tomato extract) showed a drop in both the blood pressure top number (systolic) by 10 points and the bottom number (diastolic) by 4 points.

- **Protection from cell Damage**

The tomatoes are excellent source of antioxidant lycopene. Antioxidants travel through the body, neutralizing dangerous free radicals that otherwise damage cells and cell membranes. Free radicals escalate the progression or severity of atherosclerosis, diabetic complications, asthma, and colon cancer. High intakes of lycopene have been shown to help reduce the risk or severity of all of these illnesses.

- **Regulates Blood Sugar**

Tomatoes are an outstanding source of chromium that has been shown to help diabetic patients keep their blood sugar levels under control.

- **Counteract Acidosis**

Acidosis, is a main cause of calcium loss, fatigue, headaches, sleeplessness, muscle aches, acne, eczema, arteriosclerosis, sexual dysfunction, hormone imbalance, depression, and degenerative conditions. Our bodies are designed to maintain an alkaline balance with a pH of 7.365. By including plenty of alkaline minerals in our diets – calcium, magnesium, potassium and sodium – we help our body maintain its alkaline balance naturally. Tomatoes are excellent sources of

calcium, magnesium, and potassium and can aid in preventing acidosis.

- **Reduce Migraines**

Tomatoes are an outstanding source of riboflavin, which helps for reducing the migraine attacks.

- **Boost Immunity**

Due to consumption of tomatoes helps to avoid flu and colds, especially for males. These common illnesses are widely believed to be rooted in carotenoid deficiencies, including low amounts of lycopene and beta carotene in our body. Drinking tomato juices assists in building defenses against colds and flu.

- **Natural Sunscreen**

It has been showing that lycopene in tomatoes works as a natural sunscreen and provide protection against UV rays.

- **Strengthen Bones**

A serving of tomatoes provide 18% the daily value of vitamin K, which promotes bone health. Vitamin K activates osteocalcin, the major non-collagen protein in bone. Osteocalcin mineralizes calcium molecules inside of the bone.

- **Treatment of Vasodilation**

Vitamin C has effectively resulted in proper dilation of blood vessels in the cases of atherosclerosis, congestive heart failure, high cholesterol, angina pectoris, and high blood pressure. It has been found that supplements of vitamin C improve blood vessel dilation.

- **Lead Toxicity**

Lead Toxicity is a severe health problem found in children, especially in the urban areas. Abnormal development and growth has been found in children who are exposed to lead. They develop behavioral problems, learning disabilities and have

low IQ. It may damage the kidney and increase blood pressure in adults. Vitamin C supplements reduce the blood lead level. Hence by intake of tomato lead toxicity can be reduced among the children. Hence tomato has rich in vitamin c due to this it can able to lower this risk factor.

- **Eye Disorder**

Cataracts are the most common causes of visual problems. Decrease in the level of vitamin C in the lens of the human eye leads to increased number of cataracts. Increase of vitamin C in tomato intake increases the blood supply to the visual zones of the body and helps to cure this eye disorder.

- **Cancer**

It has been found that high consumption of fresh vegetables and fruits have a linkage with a minimized risk for the various types of cancer. The increased consumption of vitamin C is connected with the decreased possibilities of cancers of lung, mouth, vocal chords, throat, colon-rectum, stomach, and esophagus the fruits such as tomato, orange, pomegranate are highly rich in vitamin c.

- **Combating Stroke**

Vitamin C in tomato or Ascorbic Acid helps in reducing the risk of stroke, a kind of cardiovascular disease. A diet full of vegetables and fruits produces good quantity of vitamin C which maintains the appropriate blood pressure level. It also protects the body from free radicals which could be the reason for the stroke.

- **Mood**

Vitamin C present in the tomato plays a key role in the production of neurotransmitters, norepinephrine. If vitamin c is less than they can affect the mood of a person and are critical to the proper functioning of the brain.

- **Wound Repair**

Due to intake correct amount of tomato per day the Vitamin C present in it helps to repair wounds in the body. It facilitates the growth of the connective tissues that helps in the process of healing of wounds from our body.

- **Diabetes**

One of the main reasons for diabetes is the deficiency of vitamin C in our body. Supplements of vitamin C are beneficial to cure the diabetes as they help in processing of insulin and glucose. It can be cured by regular intake of vitamin c.

### 1.13 Uses of Tomatoes

Several medical books and journals have described medicinal uses of tomato. These are enumerated as under for ready reference:

- Tomato juice keeps the blood stream alkaline and thus maintain a high resistance to disease. It is very rich in iron and potash salts.
- Half-ripe tomatoes offer an excellent remedy in all sorts of liver troubles. Tomatoes stimulate torpid liver and are very good for dyspepsia, diarrhea and dysentery.
- Being a rich source of vitamin A, it is a dependable preventive against eye troubles.
- Tomato is a nervine tonic. It is very useful in all sorts of nervous disorders.
- As it is a rich source of vitamin C, it is very valuable in scurvy.
- Half ripe tomatoes are very valuable in summer diarrhea. But it should be taken with musumbi (lime) juice.
- It is also very effective in dysentery. But it should be taken with garlic and musumbi (lime) juice.
- Half-ripe tomatoes are very useful in hot summer months as it prevents sun-stroke or heat-stroke.
- Tomatoes are usually effective in heartburn, flatulence or indigestion.

- Half-ripe tomatoes are usually given in dyspepsia.

## 2. Conclusion

Tomato (*Lycopersicon esculentum* Mill.) is termed as "the most popular vegetable fruit". Tomato is cooked as vegetable alone or in combination with potato besides eaten raw when ripe. It is a fruit of good nutritive value as it is fairly rich in vitamins (vitamin C), and other minerals like calcium, phosphorus and iron. Considering its low cost, it qualifies for inclusion in the daily diet of young and growing children. There are several misbeliefs associated with tomato consumption. It is believed that tomato causes hypertension. However, there are no scientific evidences available to correlate the intake of tomatoes with hypertension. In fact, tomatoes are high in gamma-amino butyric acid (GABA), a compound that can help bring down blood pressure. A recent study has confirmed that tomato and tomato sauce lower blood pressure and the risk of heart disease. Effectiveness of tomatoes in lowering blood pressure is attributed to lycopene, a chemical present in tomato. Tomato extract contains carotenoids such as lycopene, beta carotene, and vitamin E, (known as effective antioxidants) to inactivate free radicals, and to slow the progression of atherosclerosis. Consumption of tomato may lead formation of gall bladder stones due to presence of purine and oxalic acid in the fruit. Chemical analysis of tomato shows that it contains less purine (11 mg/100 g) than carrots (17 mg), potatoes (16 mg), cabbages (32 mg) and other vegetables. Oxalic acid content of tomato is relatively less than beets, potatoes, cucumber and lettuce. Experts now recommend inclusion of tomatoes in the diets of gall bladder patients. It may aggravate gout problems and uric acid diseases. In fact, tomato is included in the diet as it has uric acid lowering effect.

## 3. Reference

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