

## ISOLATION AND ESTIMATION OF LYCOPENE FROM TOMATO WITH VARIOUS TREATMENT OF FERTILIZERS FROM DEULGAON RAJA REGION.

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### ARTICLE INFO

### ABSTRACT

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The aim of this research was to evaluate the color, content in tomatoes that is lycopene. Lycopene is a carotenoid that has antioxidant properties and imparts the red pigment in some fruits and vegetables. It is a pigment principally responsible for the characteristic deep-red color of ripe tomato fruits and products. In this research desi variety and hybrid variety of tomato plants were treated with various fertilizers and effect of fertilizers on content of tomato was estimated. Tomato paste prepared from tomato cultivated from Deulgaon Raja region was dehydrated with methanol, then lycopene was extracted with methanol-carbon tetrachloride mixture. Pure lycopene was obtained by twice crystallization of crude product from benzene through addition of boiling methanol. Further purification was achieved using column chromatography with alumina as the adsorbent. Average quantity of extracted pure lycopene was calculated as in desi variety, Lycopene content values for treatment of various fertilizers are Urea(5.2), Super phosphate(6.5), Potash(7.2), Cowdung(10.5), Polutry manure(12.5), Control(1.1) and in hybrid variety Lycopene content values are Urea(5.3), Super phosphate(5.5), Potash(6.3), Cowdung(8.7), Polutry manure(11.5), Control(1.0). mg per 100 g tomato. It was observed that lycopene content in tomatoes treated with polutry manure, cowdung have higher values and treatment with chemical fertilizers have lower values

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*Keywords:* Tomato; Lycopene, Antioxidant, Fertilizers.

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### Introduction:-

Recent epidemiological studies have suggested that the consumption of tomatoes and tomato-based food products reduce the risk of cancer (oral cavity, pharynx, esophagus, stomach, rectum, colon, urinary bladder, prostate and breast) in humans (1-3). This protective effect has been attributed to carotenoids, which are one of the major classes of phytochemicals in this fruit (4). Carotenoids are a family of compounds of over 600 fat-soluble plant pigments that provide much of the color we see in nature. They are important nutritious for the human body owing to their provitamin A and antioxidant activities (5). The most abundant carotenoid in tomato is lycopene, followed by phytoene, phytofluene, -carotene, -carotene,  $\beta$ -

carotene, neurosporene, and lutein. Lycopene, a red carotenoid pigment in tomatoes and tomato-based products, is an acyclic form of beta-carotene without pro-vitamin A activity. It has attracted substantial interest during recent times for its beneficial in reducing oxidative stressing coronary heart diseases and other chronic diseases (6-9). Carotenoids, such as beta-carotene and lycopene, are important components of antioxidant defense against lipid peroxidation in living cells [10]. Lycopene, an aliphatic hydrocarbon, has received particular attention as a result of studies indicating that it has highly efficient antioxidant and free radical scavenging capacity [11]. This is the main reason that the development of tomato varieties with increased lycopene content requires efficient selection and the ability to measure lycopene in thousands of samples.

## **Materials and methods:-**

### **Plant material:-**

Tomato fruits were collected from Deulgaon Raja farm, Maharashtra, India during Winter season. It was identified as *Lycopersicon esculentum* Mill (Solanaceae).

### **Isolation Procedure:-**

Ten grams tomato paste was dehydrated by adding 20 ml methanol. This mixture was immediately shaken vigorously to prevent the formation of hard lumps. After 2 hr, the thick suspension was filtered; the dark red cake was shaken for another 15 min with 50 ml mixture of equal volume of methanol and carbon tetrachloride and separated by filtration. The carbon tetrachloride phase was transferred to a separatory funnel; added one volume of water and shaken well. After phase separation, the carbon tetrachloride phase was evaporated and the residue was diluted with about 2ml of benzene. Using a dropper, 1 ml of boiling methanol was added in portion, then crystals of crude lycopene were appeared immediately and the crystallization was completed by keeping the liquid at room temperature and ice bath, respectively. The crystals were washed 10 times using benzene and boiling methanol. Long, red lycopene prisms were observed under the microscope with some colorless impurity substances. For more purification, column chromatography on active acidic alumina using toluene as eluent was done. The deep red zone was collected. After complete evaporation of solvent, the residue was dissolved in 2 ml benzene. After recrystallization using boiling methanol, no colorless substances observed. Crystalline lycopene is not isomerized but has a tendency to autoxidation (or air oxidation), especially in light, so it was kept in dark evacuated glass tubes prior to use. Primary identification test were performed using color chemical reactions. Estimation of lycopene was done using spectrophotometer.

## **Results and discussion:-**

Sr.No.	Treatment of Fertilizers	Lycopene content (mg/100 g)	
		Desi Variety	Hybrid Variety
1	Urea	5.2	5.3
2	Super phosphate	6.5	5.5
3	Potash	7.2	6.3
4	Cow dung	10.5	8.7
5	Poultry Manure	12.5	11.5
6	Control	1.1	1.0

The yield of lycopene after recrystallization was shown in the table. All the samples give a significant difference in the lycopene content. The treatment of various fertilizers affect the lycopene content in tomato. The yield of lycopene crystals for various fertilizers treatment can be given as In desi variety Urea(5.2), Super phosphate(6.5), Potash(7.2), Cowdung(10.5), Polutry manure(12.5), Control(1.1) and In hybrid variety Lycopene content (mg/100 g) values are Urea(5.3), Super phosphate(5.5), Potash(6.3), Cowdung(8.7), Polutry manure(11.5), Control(1.0) mg per 100 g tomato paste.

#### **Conclusions :-**

To our knowledge, it was the first report on isolation and estimation of lycopene from Desi and Hybrid tomato. This tomato can be a good natural source of lycopene. More simple, new, and environment friendly sorbent such as nano and bio materials can be used in the isolation and purification of lycopene from tomato treated with various fertilizers .

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