



## A REACTIVE PROBE OF VARIOUS FRUITS AS A SOURCE OF LYCOPENE

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### ABSTRACT

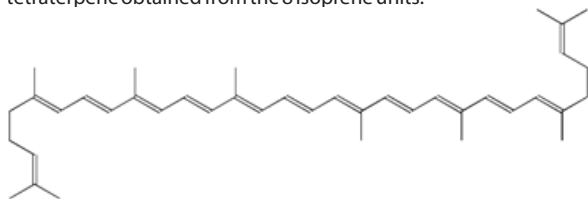
The research involves extraction and isolation of Lycopene and finding out its concentration from the different fruits and vegetables. Lycopene is a carotenoid pigment with potent antioxidant activity present in various fruits and vegetables and it is responsible to impart red color to them. [1] It shows good anticancer activity along with inhibit low density lipoprotein (LDL) oxidation in combination with Vitamin E. [2] Although lycopene is chemically a carotene, it has no vitamin A activity. [3] This study includes the quantity analysis of different fruits and vegetables like Tomato, Papaya and Watermelon and there dehydrated forms for their isolation of lycopene content per 100gm of the product. Extraction and isolation of lycopene was done by taking benzene as a solvent and recrystallization done by organic ether.

**KEYWORDS** : Lycopene, antioxidant, tomato, papaya, watermelon.

### Introduction:

Lycopene is a natural pigment which belongs to carotenoid group and it consists only carbon and hydrogen so it is also a carotene. [4] It shows antioxidant property which protects body from destructive effect and harmful free radicals. [5] The role of dietary antioxidants, including vitamin C, vitamin E, carotenoids and polyphenols, in disease prevention has received much attention in recent years. [6] [7] [8] Lycopene is also found to concentrate in the adrenal gland, testes, liver and prostate gland, where it is the most prominent carotenoid and these anti-oxidants reduce risk of cancer and heart diseases [3] [9] and also provide various health benefits. [10] It is one of the efficient carotenoid which neutralizes the oxidants. Carotenoid are a family of compounds over 600 fat- soluble plant pigments which provide various colors we see in nature. [11] Lycopene is good soluble in different fats and synthesized by plants and few microorganism.

It has the molecular formula C<sub>40</sub>H<sub>56</sub> and molecular weight 536.88. It is highly unsaturated hydrocarbon with 13 double bonds from which 11 bonds are conjugated. Antioxidant activity is present in those conjugated bonds. Lycopene has the longest chain among all carotenoids along with open end rings. It is symmetrical tetraterpene obtained from the 8 isoprene units.



### LYCOPENE

Molecular weight = 536.89

Exact mass = 536

Molecular formula = C<sub>40</sub>H<sub>56</sub>

Molecular compositions = C = 89.49% H = 10.51%

### CHEMICAL STRUCTURE OF LYCOPENE

It shows good anticancer activity along with inhibit low density lipoprotein (LDL) oxidation in combination with Vitamin E. [2] Lycopene is transported in the blood with the help of lipoproteins and gets stored initially in the blood, adipose tissue and also can be present in different tissues.

In vitro studies have shown that Lycopene is able to protect lipids, DNA and proteins from oxidative damage. [12] Lycopene containing fruits are tomato (*Lycopersicon esculentum* Miller), papaya (*Carica papaya*), watermelon (*Citrullus lanatus*), etc. and are responsible for red color of vegetables and fruits. It was observed that watermelon had the highest lycopene content than tomato and then the ripe papaya, Papaya has the lowest lycopene content.

Tomato, Watermelon and Papaya are prove to be the rich source of lycopene in our day to day life. Tomatoes not only provide lycopene, but are also rich sources of some essential nutrients such as vitamin C, folic acid as well as b-carotene. Along with lycopene Papaya and watermelon provides vitamins C and A with some essential soluble fibers which are essential for digestion purpose.

### ISOLATION PROCEDURE:

Watermelon, tomato, papaya, dehydrated papaya and tomato were taken separately. Wash all the fruits and vegetables properly and cut into pieces. All these pieces were subjected for grinding separately till the fine paste is been obtained. 100gm paste of each fruit was weighed and transferred into the suitable beaker.



Then 100gm of sample of tomato was taken in a 250 ml beaker. Then warm the paste and transfer the paste into the separating funnel. Add about 20 ml of warm (40 °C) benzene to it. Stir well and decant the benzene layer and transfer the benzene layer in a petri dish. Again add another 20 ml warm benzene, stir well and decant the benzene layer in same petri dish. This step is been repeated for about 5 times. The all benzene was collected in a petri dish. Petri dish was allowed to evaporate all the benzene so that lycopene residue was left behind. Then this lycopene residue was recrystallized using ether. Crystals of lycopene were obtained and weighed properly. [9] [13]

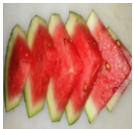


The above isolation procedure of tomato was done similar with the other samples like watermelon, papaya, dehydrated tomato and dehydrated papaya.

Observations were recorded and identification test of the isolated Lycopene were performed using chemical tests and the crystals of lycopene were observed under electronic microscope.

Fruits and vegetables which were used for extraction of Lycopene are as follows –

**Table 1: Fruits and vegetables used for isolation.**

Sr. No.	Fruit/vegetable name	Part used	Common name	Biological name	Family	Image
1	Tomato	Fruit	Tomato	Lycopersicon esculentum Miller.	Solanaceae	
2	Dehydrated tomato	Fruit	Tomato	Lycopersicon esculentum Miller.	Solanaceae	

3	Water melon	Fruit	Tarbooj	Citrullus lanatus	Cucurbitaceae	
4	Papaya	Fruit	Papita	Carica papaya	Caricaceae	
5	Dehydrated papaya	Fruit	Papita	Carica papaya	Caricaceae	

**Result and Discussion-**

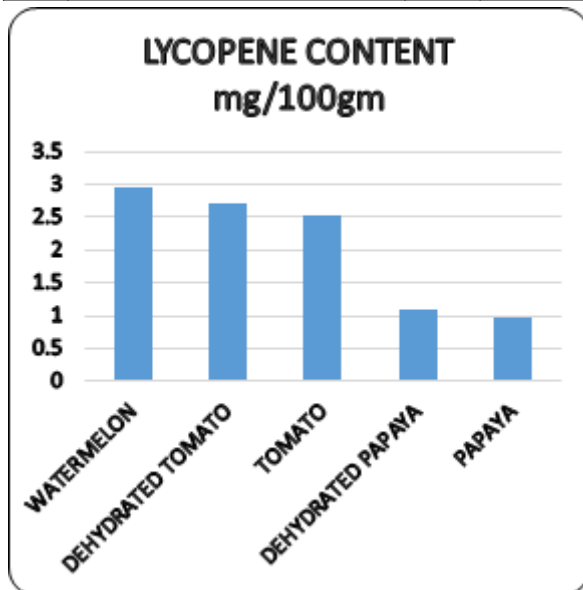
Extraction of lycopene was carried out using benzene as an organic solvent. Isolation was done using ether and the crystals of lycopene were obtained after evaporation of ether.

Yield of lycopene was highest in watermelon then in tomato and papaya. Dehydrated forms of tomato and papaya showed more lycopene content than in those of the fresh paste obtained from the fruits.

Watermelon showed the highest lycopene content 2.95 mg/100gm obtained from fresh paste. Tomato showed the second highest lycopene content 2.53 mg/100gm but the dehydrated form of tomato showed more lycopene content then the fresh paste that is 2.71 mg/100gm. Lowest lycopene content was found in papaya, dehydrated form of papaya showed 1.08 mg/100gm of lycopene where fresh papaya paste showed 0.96 mg/100gm of lycopene content in it.

**TABLE 2: LYCOPENE CONTENT IN DIFFERENT FRUITS (per 100gm)**

Sr. No.	Fruit name	Weight	mg/100gm
1	Watermelon	100gm	2.95
2	Dehydrated tomato	100gm	2.71
	Tomato	100gm	2.53
3	Dehydrated papaya	100gm	1.08
	Papaya	100gm	0.96



**Chart 1: Lycopene content per 100 gm**

**CONCLUSION:**

From the above result and discussion it was concluded that isolation of lycopene from different sources of fruits and vegetables was done with efficient technique. It was found that there is highest lycopene yield in case of watermelon as compared to other. Watermelon, tomato, papaya can be used as a good source of lycopene in the day to day life.

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