LYCOPENE IS WONDER DRUG

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ABSTRACT

Lycopene is most abundant carotenoid in tomatoes, followed by beta-carotene, gamma carotene, phytoene, and other minor carotenoids. Tomatoes are a part of diet, consumed in large level in all over the world. Tomatoes contain numbers of phytochemical, such as a lycopene, carotenoid etc. The present work investigated that lycopene extract from tomato have antimicrobial activity against some pathogens and comparison its activity with commercial antibiotics and mouthwash. The research work shows that lycopene was effective against pathogens klebsiella, bacillus and aspergillusniger, lycopene have better activity than commercial antibiotic and mouthwash.

KEYWORDS: Antimicrobial activity, Antibiotics, Lycopene, Carotenoid, Phytochemical.

INTRODUCTION

Lycopene is a carotenoid, a natural pigment made by plants, which helps to protect plants from stress and it also transfers light energy during photosynthesis. Lycopene is a vegetable and fruit are rich sources of a variety of nutrients, including vitamins, trace minerals, and dietary fiber, and many other classes of biologically active phytochemical compounds. Epidemiologic data support the association between high intake of vegetable and fruits and low risk of different. Chronic diseases as several common cancers and Cardiovascular disease and microbial infections.

Lycopene is considered as one of the phytochemical, synthesized by plants and microorganisms but not by animals. Human can not produce lycopene, so they must take it in their food.

Found in a number of fruits and vegetable, including apricots, Guava, and watermelon, but the majority of lycopene consumed in the United States is from tomato-based products.
bioavailability of lycopene is greater in processed tomato products, such as tomato paste and tomato puree, than it is in raw tomatoes. The most abundant carotenoid in tomato is lycopene, followed by phytoene, phytofluen, B-carotene, neurosporene, and lutein. Lycopene a red carotenoid pigment in tomatoes and tomato-based roducts, is an acyclic form of beta-carotene without provitamin A activity. It has attracted substantial interest during recent times for its beneficial in reducing oxidative stressing coronary heart diseases and other chronic diseases.

MATERIALS AND METHOD

Extraction of lycopene from tomato
Take 50 gm tomato paste in 3 litre wide mouth bottle and Dehydrated by adding 65ml methanol. Mixture is immediately shaken vigorously to prevent formation of hard lumps. A small sample of suspension is tested by hand, if it has a Glutinous consistency, add more amount of methanol in to Main portion to avoid possible clogging of filters. The mixture is allowed to stand for 2 hrs& is then shaken. The thick suspension is filtered by Buchner funnel. The yellow filtrate is discarded. The dark red cake is returned to bottle & shaken with Mixture of 35 ml methanol & 35 ml carbon tetrachloride. The stopper of the bottle must fit well & should be lifted For a moment after the mixing, to release built a pressure, brief Shaking followed by opening of bottle as repeated until no More excess pressure is noticed. The suspension is shaken for 10-15 minutes & separate By filtration on large Buchner funnel. The filtration consists of a lower dark red carbon Tetrachloride phase & orange aqueous methanolic layer. (Fig.3) The carbon tetrachloride phase was transferred to a Separatory funnel; added one volume of water and shaked well.

Crystallization
The solvent is removed completely in vacuum leaving a Dark oily residue which is diluted with 2 ml of benzene and Evaporated again to remove carbon tetrachloride completely.
1. The partly crystalline dark residue is transferred with 1 Ml benzene to a 25 ml of flask.
2. The flask is immersed in hot water.
3. Boiling methanol is added in portion using dropper to Benzene solution with stirring until 1 ml methanol has been Introduced.
4. The crystals of crude lycopene begin to appear.
5. The crystallization is completed by keeping the liquid at Room temperature and then in ice water after 1 to 2 hrs.
6. The crystals are collected on small funnel and washed With 2ml boiling methanol.
7. The crystals were washed 10 times using benzene and Boiling methanol.
8. Long, red lycopene prisms were observed under the Microscope.

**Identification**
Identification test were performed using colour chemical Reactions.
1. In order to identify the lycopene, a few crystal of Extracted Lycopene was dissolved in concentrated sulfuric Acid, imparting an indigo blue color to the solution.
2. In another test, by adding a solution of antimony Trichloride in chloroform to a solution of lycopene in Chloroform, an intense unstable blue colour appeared. These Tests proved the presence of lycopene in the extract.

**Antibacterial activity**
1. Prepare Muller Hinton Agar sterilized it by autoclaving And cool it upto 45°C.
2. Then dispense the media into each of the petridish and Allow it to solidify.
3. Transfer 1 ml of 24 hrs bacterial broth culture onto Solidified plate and spread it with the help of sterile glass rod.
4. After seeding with bacterial culture make the well at the Centre of the media with the help of cork and borer.
5. Then transfer lycopene to each of the well.
6. Incubate the plates at 37°C for 24 hrs and observed plates For zone of inhibition, compare with the control and measure Their diameter.

**Antifungal activity**
1. Prepare Potato Dextrose Agar sterilized it by autoclaving and cool it upto 45°C.
2. Then dispense the media into each of the petridish and Allow it to solidify.
3. Transfer 1 ml of fungalbroth culture onto solidified plate and spread it with the help of sterile glass rod.
4. After seeding with fungal culture make the well at the Centre of the media with the help of cork and borer.
5. Then transfer lycopene to each of the well.
6. Incubate the plates at room temperature for 2 to 4 days and observed plates for zone of inhibition, compare with the Control and measure their diameter.

**EXPERIMENTAL AND RESULT**
Antimicrobial activity of lycopene was tested against klebsiella, Bacillus and Aspergillusniger standard antibiotics. Cephalosporine, ciprofloxacin and fluconazole. Antimicrobial activity of lycopene and standard antibiotics by well diffusion method.

<table>
<thead>
<tr>
<th>Organisms</th>
<th>Zone inhibition</th>
<th>Zone of inhibition of Antibiotic (cephalosporine ciprofloxacin, fluconazole)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klebsiella</td>
<td>22mm</td>
<td>21mm</td>
</tr>
<tr>
<td>Bacillus</td>
<td>26mm</td>
<td>24mm</td>
</tr>
<tr>
<td>Aspergillusniger</td>
<td>11mm</td>
<td>36mm</td>
</tr>
</tbody>
</table>

Antimicrobial activity of lycopene and mouth wash by microbial count method.

<table>
<thead>
<tr>
<th>Test</th>
<th>Microbial count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swab</td>
<td>30</td>
</tr>
<tr>
<td>Mouth wash</td>
<td>25</td>
</tr>
<tr>
<td>Lycopene containing mouth wash</td>
<td>10</td>
</tr>
</tbody>
</table>

In this study we found that lycopene were effective against Klebsiella, Bacillus and Aspergillusniger compared to tested antibiotic (Cephalosporine, Ciprofloxacin, Fluconazole) because zone of inhibition of antibiotic were less as compared to zone of inhibition of lycopene.

**DISCUSSION**

The major component of tomato is lycopene which show antimicrobial and antifungal activity. Lycopene was extracted from tomato paste by simple liquid-liquid extraction using as minimum organic solvent as possible. The main problem was purification of the extract. Simple and easy to use purification method namely recrystallization, was used. Crystals obtained by this method, was first observed under microscope. Presence of colorless substances indicated the extent of impurity. Recrystallization method gave completely pure lycopene crystals as no colorless substances was seen. The amount of pure lycopene was also (2.313 mg per 100 g tomato paste) compare to those obtained from other studies. This study show that lycopene showed antimicrobial effect against Klebsiella, bacillus and Aspergillusniger it may used as an antimicrobial agents against infection of pathogens.

Lycopene interfere with the cell wall biosynthesis of Klebsiella, Bacillus hence destruction of cell wall occurs which ultimately leads to the cell death. Hence when lycopene is applied to the bacterial lawn of Klebsiella, Bacillus it show clear zone.
From this result we concluded that, lycopene has considerable antifungal activity against Aspergillus niger. Lycopene exerted potent antifungal activity on Aspergillus niger by causing significant damage to the cell membranes of the yeast hence clear zone was observed.

CONCLUSION

From the present investigation it was concluded that the lycopene which was extracted from tomato was effective against pathogens like Klebsiella, bacillus and Aspergillus niger. I compare lycopene to mouth wash and found that antimicrobial activity of lycopene was better than available mouth wash. Further experiments could be done to understand the effect of lycopene on human being, to find out how much concentration of the lycopene was used as antimicrobial agent.

From this study it can be concluded that lycopene shows antimicrobial action against pathogens so. We can used lycopene in the preparation of natural mouth wash as an ideal mouth wash and they were found to be harmless and economic.

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REFERENCES