**ABSTRACT**

**Background:** The inflammatory diseases of the supporting structures of the teeth are amongst the most common chronic diseases to affect adult human beings. Oxidative stress plays a key role in affecting the pathophysiology of both the diseases and adjunctive systemic antioxidant therapy may have beneficial effect on the treatment outcome. Among the antioxidants, lycopene is an effective natural antioxidant and exhibits the highest physical quenching rate with singlet oxygen.

**Aim:** To evaluate, clinical efficacy of orally administered Lycopene as an adjunct to scaling & root planing in plaque induced moderate to severe chronic gingivitis subjects.

**Materials and methods:** 40 systemically healthy in age range of 18-35 years, showing clinical signs of gingivitis and probing depth of $< 4$ mm with no evidence of clinical attachment loss were divided into two groups: experimental group (orally administered Lycopene along with scaling and root planing) and control group (only scaling and root planing) . Plaque Index, Gingival Index, Sulcus Bleeding Index were recorded at baseline and after 2 weeks

**Results:** Significant mean reduction with plaque index scores, gingival index score, sulcus bleeding index score were observed after 2 weeks for experimental and control group ($p$ value $< 0.01$).

**KEYWORDS**

Antioxidants are regarded as those substances which when present in lower concentration compared to those of an oxidisable substrate will significantly delay or inhibit oxidation of that substrate. Oxidative stress is a state of altered physiological equilibrium within a cell or tissue/organ. It is defined as a condition arising when there is a serious imbalance between the level of free radical in a cell and its antioxidant defence in favour of the latter (Chapple IL, 2007). Oxidative stress is implicated in the pathogenesis of several chronic inflammatory conditions of which periodontal disease is no exception.

Antioxidants neutralize free radical by replacing one of their electron ending the electron stealing reaction. Lycopene exhibits the highest physical quenching rate with singlet oxygen. In vitro studies have shown lycopene to be twice as potent as β-carotene and ten times that of α-tocopherol in terms of its singlet oxygen quenching ability.

Hence, the present study was conducted to evaluate, clinical efficacy of orally administered lycopene as an adjunct to scaling & root planing in plaque induced moderate to severe chronic gingivitis subjects.

**MATERIALS & METHODS:** 40 systemically healthy and cooperative subjects in age range of 18-35 years, showing clinical signs of gingivitis and probing depth of $< 4$ mm with no evidence of clinical attachment loss and with history of no periodontal treatment in last 6 months, were included in the study.

Medically compromised subjects, pregnant females, smokers, subjects with history of medications such as antibiotics and analgesics within past 6 weeks, subjects with history of over the counter anti-oxidants such as Vitamin C, Vitamin E or β-Carotene within the past 3 months were excluded from study.

A detailed case history of subjects was obtained. An informed consent was practiced during the study period (Modiﬁed Bass Technique). Also to refrain from diet containing processed tomatoes (tomato juice, sauce, supplements).
40 subjects were selected for study and divided into two groups (table no. 1):

Table 1:

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 subjects (8 Females/ 12 Males):</td>
<td>20 subjects (13 Females/ 7 Males):</td>
</tr>
<tr>
<td>Orally administered Lycopene along with scaling and root planing.</td>
<td>Only scaling and root planing.</td>
</tr>
</tbody>
</table>

CLINICAL PARAMETERS ASSESSED: at baseline and 2 weeks

1. Plaque Index (Silness & Löe, 1964)8
2. Gingival Index (Loe & Silness, 1963)9
3. Sulcus Bleeding Index (Muhlemann & Son, 1971)9
4. Russell’s Periodontal Index (1956)10 was recorded only to exclude subjects with underlying periodontal disease.

The commercially available antioxidant used in the study (Starmune TM, Akumentis Healthcare Ltd, Mumbai, India fig.1) contained natural lycopene with added phytonutrients (table no.2) for synergistic action.

Table 2: composition of lycopene soft gel used in the study

<table>
<thead>
<tr>
<th>Lycopene</th>
<th>5 mg</th>
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<tbody>
<tr>
<td>Taurine</td>
<td>50 mg</td>
</tr>
<tr>
<td>Astaxanthin</td>
<td>1.8 mg</td>
</tr>
<tr>
<td>Betin</td>
<td>30 mg</td>
</tr>
<tr>
<td>Green Tea Extract</td>
<td>10 mg</td>
</tr>
<tr>
<td>Grape Fruit Seed Extract</td>
<td>15 mg</td>
</tr>
<tr>
<td>Ginsago Bibba Extract</td>
<td>25 mg</td>
</tr>
<tr>
<td>Ginseng Extract</td>
<td>7.5 mg</td>
</tr>
<tr>
<td>Zinc</td>
<td>7.5 mg</td>
</tr>
<tr>
<td>Selenium</td>
<td>100 mg</td>
</tr>
<tr>
<td>Magnesium</td>
<td>50 mg</td>
</tr>
<tr>
<td>Chromium</td>
<td>75 mg</td>
</tr>
</tbody>
</table>

On comparison with baseline significant mean reduction in plaque index scores, gingival index score, sulcus bleeding index score were observed after 2 weeks for experimental and control group (p value <0.01)(table 3)

DISCUSSION:

The results of the study were in agreement with the work done by Chandra et al 2007.14 Shetti NA et al 201215 who evaluated the effect of systemically administered lycopene as monotherapy and as an adjunct to scaling and root planing in gingivitis patients & found statistically significant reductions in gingivitis and gingival bleeding.

Arora N et al, 201316 conducted a study to evaluate the efficacy of systemic lycopene along with routine scaling and root planing in terms of changes in clinical parameters and levels of circulating tumor necrosis factor alpha (TNF-α), salivary interleukin 1beta (IL-1β), and uric acid in chronic periodontitis whereas in present study only the clinical parameters of gingival inflammation were assessed.

Modest approach with Lycopene may be a more effective approach than supplementation with antioxidants such as Vitamin C and Vitamin E, which stoichiometrically scavenge a very small fraction of total oxidant production17.

As per the results in the present study we can suggest that lycopene shows great promise as a treatment modality in gingivitis. We can thus ascertain the possibility of obtaining an additive effect by combining routine oral prophylaxis with lycopene.

SUMMARY & CONCLUSION

A statistically significant reduction in gingival index score and sulcus bleeding index score after two weeks was observed in experimental group when compared with control group. Within the limitations of the study it can be concluded that lycopene supplements can be used as an effective adjunct to oral prophylaxis in the treatment of gingivitis. To further evaluate long term effects of lycopene on gingival inflammation expanded longitudinal studies can be done.

REFERENCES: