EFFECT OF VARIOUS HERBAL TOOTHPASTES IN REDUCING THE STREPTOCOCCUS MUTANTS COUNT

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INTRODUCTION

Over 400 species of both aerobic and anaerobic bacteria colonise our oral cavity. Anaerobic bacteria outnumber their aerobic counterparts by a ratio of 10:1 to 100:1. These organisms inhabit the teeth, the gingival crevice, the mucous membranes, the dorsum of the tongue and saliva [1]. At birth the oral cavity is sterile but rapidly becomes colonized from the environment, particularly from the mother in the first feeding [2]. Dental caries is a disease, in which microbial fermentation of dietary carbohydrates forms lactic and other acids that leads to localized demineralization and destruction of the teeth. A cariogenic biofilm at a single tooth site may contain one-half-billion bacteria, of which species of mutansstreptococci are critical components. The characteristics contributing their cariogenicity are; ability to transport sugar, produces acid, tolerates acid's and produce extracellular and intracellular polysaccharides[3].Various measures proposed for the prevention of dental diseases include antibacterial measures, dietary measures, modification in plaque metabolism and increasing resistance to tooth attack[2]. Mechanical plaque control measures, such as toothbrushes, dental floss, toothpicks and interdental brushes used in conjunction with chemical plaque control aids, e.g. mouthrinses and medicated toothpastes are very popular in aiding oral hygiene [4]. But in most people, brushing alone is inadequate to remove the biofilm completely which may leads to the dental caries and periodontal diseases. Hence herbal toothpastes with antimicrobial activity can be used to maintain good oral hygiene. The main purpose of this study is to analyse the effects of various herbal toothpastes in reducing the streptococcus mutants count which colonise to form dental caries.

MATERIALS AND METHODS

Before starting this study, various brands of commercially available herbal toothpastes were obtained. Five toothpastes...
with different ingredients (Table 1) were chosen due to the constraints pertaining to available time and expenditure. Pure cultures of streptococcus mutants were obtained which was isolated using selective media Mutans - Sanguis agar [Hi media M977], and maintained in nutrient agar slope at 4°C in department of Microbiology, Saveetha Dental College.

Table 1 Various ingredients of each toothpastes

<table>
<thead>
<tr>
<th>Toothpaste number</th>
<th>Ingredients</th>
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<tbody>
<tr>
<td>1</td>
<td>Calcium carbonate, Sorbitol, water, silica, sodium laurel sulfate, flavour, miswak extract, cellulose gum, carrageenan, sodium silicate, sodium saccharin, formaldehyde, Maricha (Piper nigrum), pipali (Piper longum), Shunfha (Zingiber officinalis), Tomar (Zanthoxylum armatum), Lavanga (Syzygium aromaticum), Karpura (Cinnamomum camphora), Pudina (Mentha species), gairc powder, Indian almond, common jujube, currant, Sarsaparilla, Cinnamon, Sappan wood, Persian walnut, Rose apple, Medlar, Barleria prinotis, Prickly ash, Asian Holly Oak, Bedda Nur, Bengal Madder, Bishop's Weed, Catechu, Mayweed, Geranium, menthol, thymol, oils of clove, eucalyptus, peppermint</td>
</tr>
<tr>
<td>2</td>
<td>Dried ginger, black pepper, long pepper, harra, Amla, karpoor, clove, liquorice</td>
</tr>
<tr>
<td>3</td>
<td>Zanthoxyllum alatum fruit extract, Acacia arabica stem bark extract, Terminalia chebula fruit extract, Terminalia Bellicina fruit extract, Emblica officinalis fruit extract, Embelia ribes extract, Azadirachta indica bark extract, Vitex negundo extract, thymol, Punica Granatum pericarp extract, Acacia famesiana stem extract etc.</td>
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</tbody>
</table>

Culture was carried out using agar well diffusion method. Broth culture of the bacterial culture of the bacterial strain was adjusted to 0.5 McFarland turbidity standard. Lawn culture of the test organism was made on the Muller Hinton agar plates using sterile cotton swab and the plates were dried for 15 minutes. A sterile cotton swab was used to make wells measuring 6mm diameter and samples were introduced directly on the wells. The zones of incubation were measured in mm diameter after the period of 24 hrs. The results were analysed and noted.

RESULTS AND DISCUSSION

Nowadays, most of the people use toothbrush and toothpastes for maintaining oral hygiene. So the mechanical and chemical form of oral hygiene aids help in preventing oral diseases like dental caries and periodontal diseases. Many of the toothpastes are well marketed with their highlighted benefits. Many of the products claims to have antimicrobial activity resulting in the dilemma of the consumers. Hence this research is carried out to evaluate the invitro antibacterial activity of commercially available herbal toothpastes.

The antibacterial activity of the toothpastes was screened by using modified well diffusion technique and the zone of inhibition was measured in mm diameter. The results were analysed and tabulated (Table 2 and Graph 1).

Table 2 Zone of inhibition formed by each toothpastes

<table>
<thead>
<tr>
<th>Zone of inhibition (mm)</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorhexidine mouthwash</td>
<td>39</td>
<td>22</td>
<td>19</td>
<td>22</td>
<td>19</td>
</tr>
</tbody>
</table>

From the results, it is clear that the toothpaste with miswak content (toothpaste 1) shows the highest zone of inhibition measuring 39mm diameter. It has the greater effect than the chlorexidine control which forms the zone of incubation of 27mm.

The least antibacterial activity was exhibited by the toothpaste 3 and toothpaste 5. This may be due to the ingredients present which may have least antibacterial activity against streptococcus mutants.

CONCLUSION

From this study, it is clear that folk medicine is can be effective as the modern medicine against pathogens. The use of herbal medicine is both economic and safe alternative to treat diseases. Normal toothpaste contains chemicals like fluoride, saccharin etc., Excess use of these contents could damage the tooth surface and causes the teeth to become mottled. Since herbal toothpastes are devoid of these contents and effective in reducing mutants count, use of these should be encouraged.

References


