

Evaluation of Efficacy of Three Commercially Available Herbal Mouthwashes in Treatment of Chronic Gingivitis: A Comparative Clinical Study

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ABSTRACT

AIM: To evaluate the effectiveness of three herbal mouthwashes in the treatment of chronic gingivitis. **MATERIALS AND METHOD:** A total of 40 patients (aged 18-30 years) with chronic marginal gingivitis were selected for the study. After scaling and polishing, patients were randomly divided into 4 groups of 10 patients each. Group A (control): rinsed with normal water, Test group B: Neem mouthwash, Test group C: Allfresh mouthwash and Test group D: HiOra mouthwash twice daily for 21 days. Clinical parameters such as Oral Hygiene Index-Simplified (OHI-S), Gingival Index (GI) and Approximal Plaque Index (API), were assessed at baseline, 7 days and 21 days. **RESULTS:** At the end of study (21st day), all groups showed significant improvement in all clinical parameters while group D (HiOra) showed statistically highly significant improvement in OHI-S, Gingival index and API as compared to all other groups (A,B and C). **CONCLUSION:** Herbal mouthrinse was found to be a potent plaque inhibitor as compared to control and can serve as an adjunct in treating chronic gingivitis.

KEYWORDS: Allfresh mouthwash; gingivitis; HiOra mouthwash; Neem mouthwash; plaque inhibitor.

INTRODUCTION

Dental plaque formed on the gum margin and adjacent tooth surface causes inflammation of gums. The bacteria in the plaque release toxins which cause swelling, redness and bleeding of gums. Periodontitis is a more severe and destructive gum disease which may progress irreversibly in breaking down supporting periodontal structures. Bacteria in dental plaque are one of the main factors causing periodontal inflammation; therefore, careful plaque control is very important. As it is impossible to eliminate oral bacteria causing dental plaque, it is important to achieve plaque control by limiting growth of harmful bacteria. Bacterial flora in plaque is variable according to the site such as – sub gingival / supra gingival, and tooth / gingiva

associated. Complex oral flora makes it difficult for the antimicrobial agent to be targeted at a particular organism in the plaque. However, mechanical plaque removal is inadequately performed by most members of the population.¹

The need for additional help in controlling bacterial plaque provides the rationale for patients to use antimicrobial mouthrinses in addition to their mechanical oral hygiene regimens. Thus a non specific plaque removal or inhibition has been accepted as the practical approach to control dental plaque formation.² Various products such as toothpastes, gels, pastes for application, mouthwash, lozenges, etc. have been available for years. However, in the recent years, use of mouthwash has

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been on the increase as it is relatively easy to use for maintaining oral hygiene. Commercially available mouthwashes containing synthetic and semi synthetic active agents have several disadvantages like staining on the teeth, irritation during use, high degree of alcohol content etc. To overcome the above disadvantages naturally occurring antimicrobial herbs can be used individually or in combination. The herbal medicines are normally considered safer than the non-herbal medicines because the natural active ingredients present in herbal medicines are in combination with other components¹. For thousands of years, humans have sought to fortify their health and cure various ailments with herbal remedies. Many herbal extracts are commercially available. *Azadirachta indica* also known as neem has been used in India and South Asia for thousands of years as a perfect tool for maintaining healthy periodontium. Neem has been long considered to have an astringent, antiseptic, insecticidal, antiulcer and for medical properties.^{3,4}

Today's dentists are practicing in an era where the patients are more concerned about both their oral health and their overall medical wellbeing. Thus, in the midst of growing evidence of the connection between oral health and whole body health, herbal medicines with their 'naturally occurring' active ingredients offer a gentle and enduring way for restoration of health by the most trustworthy and least harmful way.⁵ Herbal medicine is both promotive and preventive in its approach.⁶ It is a comprehensive system, which uses various remedies derived from plants and their extracts to treat disorders and to maintain good health. Natural herbs like triphala, tulsi patra, jyestiamadh, neem, clove oil, pudina, ajwain and many more used either as whole single herb or in combination have been scientifically proven to be safe and effective medicine against various oral health problems like bleeding gums, halitosis, mouth ulcers and preventing tooth decay. The major strength of these natural herbs is that their use has not been reported with any side-effects till date. Apart from this, all herbal mouthrinses do not contain alcohol and/or sugar, two of the most common ingredients found in most other over-the-counter products. The problem of these ingredients is that the microorganisms that

cause bad breath and halitosis love to feed on these ingredients, and release byproducts that cause halitosis.^{5,6}

Neem mouthwash used in the study contains *Azadirachta indica* (neem extracts), *cinnamomum zeylanicum* (cinnamon), *mentha viridis* (mint), *syzygium aromaticum* (clove), *eucalyptus globulus* (eucalyptus), *stevia rebusiana* (stevia) and aqua (water). Neem has been long considered to have an astringent, antiseptic, insecticidal, antiulcer and for medical properties. It is used for periodontitis and other dental diseases. The antibacterial activity of neem has been evaluated and known from ancient times. Neem leaves have been used in the treatment of gingivitis and periodontitis. The possible mechanism of anti inflammatory action of neem is by inhibiting prostaglandin E and 5 HT and thus reducing the inflammation.^{3,6} The antibacterial action can be explained by "Azadiachtin" that is known to destroy bacterial cell wall and thus inevitably inhibit the growth of bacteria, also the breakdown of cell wall disturb osmotic pressure and leads to cell death.⁷ But still, its use of treatment for gingivitis and periodontitis is not very clear.³

All fresh mouthwash used in the study contains aloe, glycerin, spearmint, tea tree, fennel, clove, cardamom, basil, peppermint and purified water. It has Soothing antibacterial action, promotes healthy teeth and gums. Aloe vera has numerous anti-inflammatory agents. Fujita et al (1976), stated that carboxypeptidase in Aloe vera inactivates bradykinin by about 67% and relieves pain.⁸ Rocio Bautista (2004)⁹ showed that carboxypeptidase in Aloe vera had good anti-prostaglandin synthesis properties and compounds inhibiting oxidation of arachidonic acid, which might decrease inflammation.¹⁰

HiOra mouthwash used in the study contains Miswak (*salvadora persica*), bibhitaka (*terminalia bellerica*), gandhapura taila, nagavalli (piper betle), ela. HiOra mouthwash has antiplaque, analgesic, antimicrobial, antiseptic, and refreshing properties. It has active herbal ingredient that act against common strains of oral bacteria and fungi and prevent gum and tooth disease. It helps in the

prevention and treatment of gum disease. Silica in Miswak acts as an abrasive material to remove stains giving the teeth whiteness. Tannins also inhibit the action of glucosyl transferase thus reducing plaque and gingivitis. The alkaloid present in *Salvadora persica* is Salvadorine, which yields trimethylamine on hydrolytical cleavage. It exerts a bacteriocidal effect and stimulatory action on the gingiva. The mild bitter taste stimulates the flow of saliva, which is antiseptic. The sulfur compounds present in Miswak as shown by their pungent taste and smell have a bactericidal effect.^{11,12}

Thus, by use of a herbal mouthrinse, we can avoid these ingredients, which itself is one step forward towards better oral hygiene and better health. So, aim of the present study was to comparatively evaluate the efficacy of three herbal mouthwashes in treatment of chronic gingivitis.

MATERIALS AND METHODS

Patients were selected from the out-patient Department. Total 40 subjects were enrolled in this study design. Patients were informed about the study and written consent was obtained. **Inclusion criteria:** subjects between the age group of 18-30 years, minimum of 10 teeth were present, signs of gingival inflammation. **Exclusion criteria:** subjects with advanced periodontal inflammation, known hypersensitivity to the mouthrinses and pregnant females and nursing mothers, patients unwilling to complete the treatment protocol.

Eligible subjects were randomly assigned into four groups. Group I subjects received normal water and were asked to rinse twice daily for 1 min. Group II subjects were received neem mouthwash and were asked to rinse 15 ml of mouthrinse twice daily for 1 min. Group III subjects were received Allfresh mouthwash and were asked to rinse 15 ml of mouthrinse twice daily for 1 min. Group IV subjects were received HiOra mouthwash and were asked to rinse 15 ml of mouthrinse twice daily for 1 min. Subjects were asked not to refrain from oral hygiene procedures.

Following indices were recorded²

- Oral hygiene index-Simplified (Greene and

Vermillion, 1964)

- Approximal plaque index (Lange and Plagmann, 1977)
- Gingival index (Loe & Sillness, 1963)

Recordings were made at 7th day and 21st day for all the subjects and were compared to baseline.

RESULTS

Figure 1 shows Oral hygiene index scores at baseline as well as 7th and 21st day after treatment. Within subjects data demonstrated a statistically significant decrease in mean oral hygiene index, for all groups at 7th and 21st day as compared to baseline but more decrease occurred in case of HiOra mouthwash.

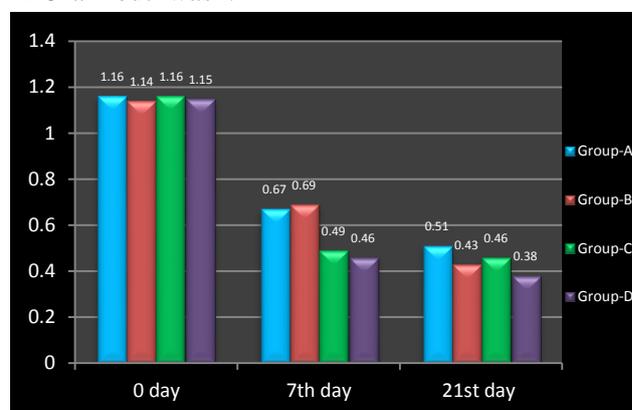


Figure 1: Bar graph showing mean of OHI-S index in all 4 groups

Figure 2 shows gingival index scores at baseline as well as 7th and 21st day after treatment and the data demonstrated a significant decrease in mean gingival index as compared to base line but more decrease occurred in case of HiOra mouthwash.

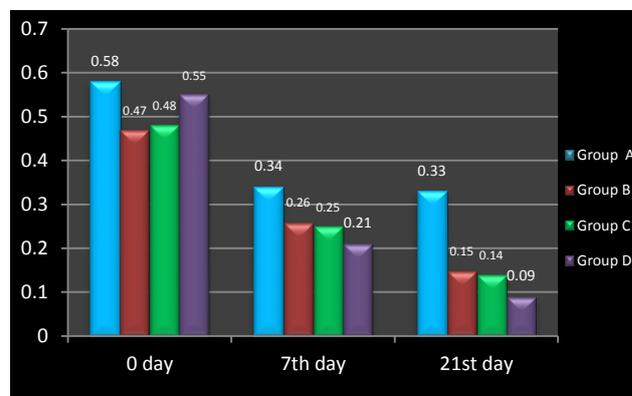


Figure 2: Bar graph showing mean of Gingival index in all 4 groups

baseline, as well as 7th and 21st day after treatment and data demonstrated same decrease in mean

plaque index as compared to baseline but more decrease occurred in case of HiOra mouthwash. At the end of study (21st day), all groups showed significant improvement in all clinical parameters. Group D (HiOra) showed statistically highly significant improvement in OHI-S ($P<0.01$), Gingival index ($P<0.003$) and API ($P<0.001$) as compared to all other groups (A,B and C) over a period of 21 days. Group B and C also showed statistically significant improvement in all clinical parameters than control (Group-A) but statistically non-significant difference between Group-B and C.

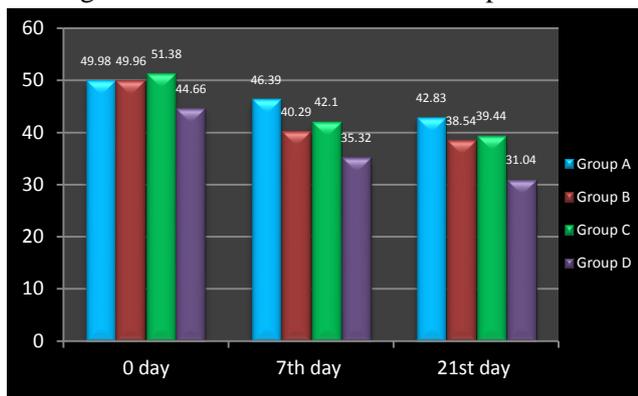


Figure 3: Bar graph showing mean of API index in all 4 groups.

DISCUSSION

All the herbal mouthrinses tested in this study performed significantly better than water. The results of this study indicate that all 3 herbal mouthrinses used improved oral hygiene with regard to gingivitis and gingival bleeding after 21 day of use but more statistically significant decrease occurred in case of HiOra mouthwash.

The results demonstrated a significant reduction of gingival bleeding, and plaque indices in neem mouthwash over a period of 21 day as compared to water. The results of our study are consistent with the study done by Botelho et al. (2008)¹³ reported that A. indica-based mouth rinse is highly efficacious and that it may be used as an alternative therapy in the treatment of periodontal disease. Patel and Ventakrishna (1988)¹⁴ reported a significant reduction in probing depth and gain in clinical attachment level by using neem.

As Hiora mouthwash showed statistically significant

reduction in plaque accumulation as compared to water. This is in accordance with the study conducted by Sofrata et al. (2007)¹⁵ and Fouad Hussein Al-Bayaty et al (2010)¹⁶ in which *Salvadora persica* based mouthwash inhibited plaque formation and yielded to mean PLI score lower than that of placebo in most part of dentition.

Allfresh mouthwash containing aloe vera also showed a statistically significant reduction in plaque index, gingival index. Hegggers and Robson (1983)¹⁷ showed that barbolin and aloe emodin in aloe vera block prostaglandin (PG) synthesis. The decrease in gingival index can be attributed to presence of sterols as anti-inflammatory agents and lupeol as an antiseptic analgesic. Vazquez et al (1996)¹⁸, stated Aloe vera decreases edema and number of neutrophils and also prevents migration of Poly morphonuclear leucocytes (PMNL). Barrantes and Guinea (2003)¹⁹ stated Aloe vera inhibits the stimulated granulocyte Matrix metallo proteinases (MMPs) inhibiting cyclo-oxygenase and lipo-oxygenase pathways. Aloe vera is also shown to provide relief in swelling, bleeding gums and is an antiseptic for pockets and antifungal for thrush.¹⁰

Thus, the herbal mouthrinses may provide oral health benefits, and provide a natural alternative for those consumers who wish to avoid artificial sweeteners, chemicals and alcohol contained in either over-the-counter or prescription mouthrinse products.

CONCLUSION

Herbal mouthrinses was found to be a potent plaque inhibitor, and were preferred by the patients for its taste, convenience of use and taste duration (aftertaste) in their mouth after rinsing. Moreover, it can serve as a good alternative for patients with special needs as in case of Diabetics, Xerostomics, etc. Thus, these can be used as an adjunct to mechanical therapy for treating plaque induced gingivitis. Present study has an important impact in order to create an effective and inexpensive oral health intervention for low socio-economic communities. However, this study was a short-term study so long-term studies are required with larger

sample size. More research on their antibacterial, anti-inflammatory properties and releasing pattern as a local drug delivery system is required.

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