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Assessment of Clinical Efficiency of 0.2% Chlorhexidine, Ozone Water, Tulsi, Triphala Mouth Rinse on Oral Health

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Abstract

The current research assessed the effectiveness of ozone water, tulsi, triphala, and chlorhexidine (CHX) mouthwashes on plaque, gingivitis and halitosis on healthy individuals.The current research was conducted on 40 participants and divided into 4 different mouth rinses: group I-ozone water, Group II- Tulsi mouth rinse, Group III- Triphala mouth rinse and Group IV- 0.2% chlorhexidine mouth rinse. Plaque index (PI), gingival index (GI) and halitosis scoring was recorded at baseline and after 14 days after mouth rinsing with 4 different mouth rinses. The data was statistically evaluated.There was significant decrease in PI, GI in group I, III and IV. But group II for PI and GI was insignificant. There was significant decrease in halitosis after 14 days in all 4 groups ($p<0.001$).The ozone water and triphalamouthwashes are effective in controlling plaque, gingivitis and halitosis and can be used as substitute for chlorhexidine.

Keywords: Gingivitis, halitosis, mouthwash, ozone water, plaque, triphala

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1. Introduction

A major etiological component for gingival and periodontal diseases is dental plaque, a living, organised population of microorganisms [1]. Dental plaque, a microbial biofilm, is commonly recovered from oral surfaces and comprises a diverse array of organisms. Plaque reaches the mature stage after 7‑14 days and becomes relatively stable around the 21st day [2].Plaque control is essential for maintaining periodontal health over time [1].One of the most common oral disorders in the world, gingivitis is brought on by the bacterial biofilm that surrounds the teeth. Halitosis and swollen, bleeding gums are symptoms of gingivitis [3]. Gingivitis is reversible gingival inflammation brought on by dental plaque, and it doesn't involve any obvious bone loss or clinical attachment loss. Plaque buildup on the dental surface has been linked to gingivitis more than any other cause [2].

The ability of a wide range of chemical agents in the form of mouthwashes to lessen plaque buildup has been evaluated. Triclosan, chlorhexidine, and numerous other antimicrobials are examples of common chemotherapeutic drugs [2]. In order to reduce plaque and further avoid periodontal disorders, a number of mechanical aids as well as local and systemic antimicrobials are essential. Mouth rinses are frequently used as an additional tool for maintaining good dental hygiene. One of these, bisbiguanide chlorhexidine, has undergone considerable research for more than 20 years [1].

The gold standard of mouthwashes is cationic bisbiguanide chlorhexidine (CHX)[4]. At low doses, CHX is bacteriostatic, whereas at high concentrations, it is bactericidal[1]. Chlorhexidine comes in biodegradable, topical gel, and mouthwash forms. It is a cationic compound with broad-spectrum antibacterial action that ruptures and lyses bacterial cell walls [3]. However, prolonged use of CHX has some drawbacks, including the discoloration of

teeth, changed taste perception, formation of supragingival calculi, and desquamation of the oral mucosa, which limit its use in the paediatric age group [1]. Hence alternative other herbal mouth rinses with lesser side effects were tried such as, neem, triphala, tulsi, garlic, green tea,clove oil, neem, pudina, and ozone water [1-6].

Although ozonated water is an effective antibacterial against bacteria, protozoa, fungi, and viruses, its antimicrobial action in bacterial biofilms has received less attention. Due to its potent capacity to render bacteria inert, it was initially proposed as a water disinfectant. Ozone does not act directly through traditional drug-receptor interactions [1].Ozone gas becomes highly unstable and reactive when it comes in contact with water, due to this a complex series of chain reactions occur generating a highly reactive hydroxyl (OH−) radical [8].Emblica officinalis (Amalaki), Terminalia chebula (Haritaki), and Terminalia belerica (Bibhitaki) are all components of triphala in similar amounts. The herbaceous perennial plant ela (Elettaria cardamomum), also referred to as green or real cardamom, is indigenous to southern India [3,5]. It rapidly encourages the body's capacity to produce antibodies in order to resist any invasion of antigens, making it a very helpful weapon for enhancing immunity. Triphala's ability to suppress S. Mutans at concentrations as low as 50 g/ml has been used in vitro to demonstrate both its antimicrobial and antioxidant properties. The tannic acid in triphala may be the cause of its antiplaque action [4]. Triphala has wide antimicrobial and antifungal activity [9].

Ocimum sanctum Linn. (also known as *Ocimumtenuiflorum*, tulsi) belonging to genus *Ocimum*and family Labiatae are very important for their therapeutic potentials [2]. Tulsi is the traditional herb, known as "Queen of Herbs or the Mother Medicine of Nature. Ursolic acid and carvacrol are known to be responsible for the anti-microbial activity of tulsi [6].The present study evaluated the efficacy of ozonated water, tulsi, triphala, and CHX mouthwashes on plaque, gingivitis and halitosis on healthy individuals.

2. Materials and Methods

The present study was done after attaining ethical approval from institutional ethics committee and informed consent from the participants. This comparative study on different mouth rinses on plaque, gingivitis and halitosis done after considering the inclusion and exclusion criteria. Total 40 participants were divided equally into 4 groups of mouth rinses as; group I-ozonated water (Ozone Purifier, Eltech Engineers, Mumbai, India), Group II- Tulsi mouth rinse, Group III- Triphala mouth rinse and Group IV- 0.2% chlorhexidine mouth rinse (Hexidine®, ICPA,Mumbai, India).

Plaque index (PI by Turkesky‑Gilmore‑Glickman Modification of Quigley Hein (1970), gingival index (GI- by Loe and Silness (1963) and halitosis scoring was recorded at baseline and after 14 days after mouth rinsing with 4 different mouth rinses. All participants were instructed to rinse their mouth for 60 second with particular mouth rinse twice daily and report to the principal investigator if found any side effect.All the patients were kept on standardized oral hygiene protocol.The data was statistically evaluated using SPSS software version 23.0 with ANOVA test at $p<0.05$.

3. Result

There was significant decrease in PI, GI in group I, III and IV at 14 th day ($p<0.001$). But group II for PI and GI was insignificant (Table 1). There was significant decrease in halitosis in all 4 groups from baseline to after 14 days ($p<0.001$)(Table 2). Group IV showed highly significant in reduction of PI, GI and halitosis as compared to other groups ($p<0.0001$).

4. Discussion

Periodontal disorders seem to develop when a susceptible host is exposed to a pathogenic microbial plaque. Controlling supragingival plaque is essential for the prevention and treatment of periodontal disorders, whether this is done mechanically or with the help of various chemical agents [4].In present study triphala and ozone water mouth rinses had shown effective in reduction of plaque, gingivitis and halitosis and are equally effective compared to chlorhexidine.

Table 1: Intergroup assessment gingival index and plaque index

	Baseline (Mean±SD)	**After 14 days (Mean±SD)**	**p**
Plaque index			
Group I - Ozone	1.48±	1.21±	0.001
Group II- Tulsi	1.47±	1.42±	0.764
Group III- Triphala	1.53±-	1.18±	0.001
Group IV- CHX	1.52±	1.06±	0.0001
Gingival index			
Group I - Ozone	1.26±	1.06±	0.001
Group II- Tulsi	1.25±	1.21±	0.895
Group III- Triphala	1.28±	1.18±	0.001
Group IV- CHX	1.32±	0.78±	0.0001

GI=Gingival index, PI=Plaque index,

Table 2: Halitosis grading at various time intervals

Groups	Baseline (Mean±SD)	After 14 days (Mean±SD)	p
Group I - Ozone	5.32±	2.13±	0.001
Group II- Tulsi	5.28±	2.18±	0.001
Group III- Triphala	5.34±	2.08±	0.001
Group IV- CHX	5.35±	1.45±	0.0001

We discovered that ozonated water significantly decreased plaque and gingivitis. Talasani et al. found results that are similar to ours when comparing the effectiveness of ozonated water mouthwash against chlorhexidine mouthwash against plaque buildup in chronic gingivitis patients. When compared to patients receiving ozonated water, they discovered that there was a drop in the microbial culture at the end of the 15th day [1].The effectiveness of ozonated water and chlorhexidine mouthwash against plaque and gingivitis was compared by Parkar et al. They concluded that, ozonated water was similarly efficient as chlorhexidine in reducing plaque and gingivitis with slight edge over chlorhexidine [8].

We found anti plaque and antigingivits effectiveness of triphala mouth rinse. Our findings are in accordance to Mamgain et al who evaluated antigingivitis, antiplaque and antihalitosis outcome of Triphala and Ela decoction. They came to the conclusion that Triphala and Ela decoction is organic, simple to make, affordable, and just as effective as chlorhexidine mouthwash [3].Inhospitalised periodontal disease patients, Naiktari et al evaluated the effectiveness of triphala mouthwash with 0.2% chlorhexidine; they came to the conclusion that triphala mouthwash (herbal) is an efficient antiplaque agent like 0.2% chlorhexidine [4]. The effectiveness of Triphala extract and chlorhexidine mouthwash against plaque and gingival irritation was assessed by Baratakke et al. They came to the conclusion that using a mouthwash containing Triphala extract was successful in lowering plaque buildup and gingival irritation [5]. Triphala and Hi Ora, according to Narayan et al., have anti-plaque efficacy comparable to that of chlorhexidine and are more effective at preventing plaque formation [9].

There was insignificant effect of tulsi on plaque and gingivitis in present study. Nadar et alassessed the antiplaque and antigingivitis effect of 4% Tulsi leaf extract dentifrice, fluoridated and placebo dentifrice (PD) among school children. They concluded that, antiplaque and antigingivitis efficacy of 4% tulsi and commercially available fluoridated dentifrice remained the same after 21 days [2]. Manjunathappa et al compared of the effectiveness of chlorhexidine (CHX), tulsi extract and probiotic mouthrinses among 12‑15‑year‑old school children. They found that, CHX, tulsi extract and probiotic mouth rinses showed a significant reduction in plaque and gingivitis compared to baseline scores [10].

We found that there was effective reduction of plaque, gingivitis and halitosis with ozonated water, triphala mouth rinse since they have antimicrobial efficacy as proven from previous studies and herbal mouth rinse are easily available and coast effective without side effects like chlorehexidine hence can be used as an alternative mouth rises.

5. Limitation

The study compares only 4 groups of mouth rinses at particular geographic areas on smaller samples size. Further studies are needed on larger scan in wider geographic areas.

6. Conclusion

The ozone water and triphalamouthwashes can be effective in controlling plaque, gingivitis and halitosis and can be used as substitute for chlorhexidine.

7. References

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