

Herbal Mouthwash for the Management of Oral Diseases: A Review on the Current Literature

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ABSTRACT

Several different varieties of mouthwashes are accessible to us nowadays, including chemical as well as herbal formulations. Appropriate mouthwash can be selected depending on the oral condition, risk, and efficiency of mouthwash. As mentioned in the literature also Mother Nature has provided us abundant medicinal herbs with antibacterial and antimicrobial properties. Though we are having very scarce data on the medicinal properties of these herbal plants, they are still in use in treating various periodontal diseases and other oral diseases. Knowing scientific expression of the actual effects of the herbal medicine is at most important for the beneficiaries. In the course of this bibliographical revision, papers were collected to validate the ancestral uses of herbs and conclude that the use of plants to treat oral conditions should be based on the experimental studies, verifying their suitability for dental treatments. Oral healthcare professionals would find this review helpful for accurate mouthwash selection while dealing with different conditions of the oral cavity.

Keywords: Herbal mouthwash, Oral disease, Review.

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BACKGROUND

Nowadays, oral diseases are known to be a big issue worldwide. Among numerous oral diseases, periodontal disease is one among the significant oral health condition. The quality of life is affected by oral health. Periodontal diseases are known to be chronic inflammatory conditions characterized by loss of connective tissue, alveolar bone resorption, and formation of periodontal pockets as a result of complex interaction between pathogenic bacteria and the host's immune response.

Dental plaque is being one of the primary etiologic factors in periodontal disease.¹ Various plaque control measures are used to prevent or control the progression of periodontal diseases. One among it includes mechanical plaque control measures to maintain proper oral hygiene.² A variety of different chemical plaque control measures are available in the market, which includes mouthwash, dentifrices, chewing gums, and gel. But they have some undesirable side effects, like vomiting, diarrhea, and tooth staining. Mouthwashes may serve as a measure in controlling dental plaque and periodontal disease for mentally or physically handicapped patients who are incapable of brushing their teeth themselves or other individuals who are lacking dexterity, skill, or motivation for mechanical plaque removal.³ Thus, instead of using them solely, mouthwashes should always be used in association with mechanical plaque control measures.

Ideally, it is required that any antimicrobial/antiseptic agents used should be able to modify the oral environment by being specifically effective against the pathogens without altering the normal flora.⁴ There are a number of mouthwashes available in the market today worldwide. Many of these mouthwashes have not been tested adequately, and the information is lacking as to when and how to use these agents for maximum benefit.⁵ Chlorhexidine digluconate has been the agent of choice as an antiplaque agent when compared to others and is considered the gold standard. However, due to its side effects, its acceptance by patients can be limited, especially when a longer period of use is recommended.⁶

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Nowadays, the majority of people are choosing natural herbal products for the prevention or treatment of diseases. Plants being an abundant source should be considered in various pharmacological formulations.⁷ Ayurvedic medicinal plants are used in various treatments, as there are no or minimal side effects. For long-term use of mouthwashes, numerous mouthwashes have been tested *in vitro* and *in vivo*.^{7–13} Ayurvedic medicines give a holistic approach toward entire human beings. It can maintain the balance between general and oral health as well as an environment which is in this era necessary for the well-being of humans.

This review will tend to be helpful for the oral healthcare professionals in the selection of mouthwashes depending on the condition.

REVIEW RESULTS AND DISCUSSION

Triphala

The name “triphala” consists a mixture of amalaki, haritaki, and bahera. Its use in ayurveda is known since ages. By enhancing our body's capacity to form antibodies, it increases immunity.¹⁴

Preparation of Triphala Mouthwash

Add triphala powder (*Terminalia bellirica*, *Terminalia chebula*, and *Emblca officinalis*) (10 mL) to 10 mL of boiling water for preparing 10 mL of mouthwash.

Side Effects

No side effects have been reported.

In one of the reported study, triphala mouthwash has been prepared as follows:

Dissolve 60 grams of triphala churna in 1000 mL of double-deionized water.

Boil it and filter. Then add 2 mL of glycerin and 1 mL of pudina extract. Glycerin works as a sweetening agent and pudina as a flavoring agent.

Cool the mixture, add 50 mL in amber-colored bottles.¹⁷

Herbal Mouth Rinse Containing Tea Tree Oil (TTO), Clove, and Basil

Ingredients include TTO (0.2–0.3%), clove (0.2–0.3%), and basil (0.2–0.3%).

The mouth rinse was formulated by Anchor Health and Beauty Care Pvt. Ltd. (Mumbai, India). Minimum inhibitory concentration (MIC) of the mouth rinse was assessed by a broth macrodilution assay, which showed 25% MIC.¹⁵

HiOra Mouthwash

HiOra is the product of The Himalaya Drug Company, Makali, Bangalore, India.

In 1 g mouthwash solution, it contains 5 mg pilu (*Salvadora persica*), 10 mg Bibhitaka (*Terminalia bellirica*), 10 mg Nagavalli (*Piper betle*), 1.2 mg Gandhapura taila (wintergreen oil), 0.2 mg ela, 1.6 mg peppermint satva, and 0.4 mg Yavani satva.

Rinse the mouth thoroughly by dispensing 15 mL of mouthwash for 30 seconds and expel it twice daily.

Role of Ingredients

Belleric Myrobalan (*Bibhitaki*) is known for its antimicrobial and antifungal properties.

Betel (*Nagavalli*) fights against halitosis and relieves toothache.

Meswak (*S. persica*) is a teeth cleaning agent.

Prevention of tooth decay and elimination of toothache and bad breath is the role of **Pilu**.¹⁶

Garlic Extract Mouthwash

Twenty-five grams of garlic extract powder was added into 1000 mL of deionized water. Boil and filter, then add 10 mL of pudina extract in it. Cool the mixture and dispense in amber-colored bottles.¹⁷

Arimedadi Oil

It consists of Lodhra, Lavang, Gairic, Agar, Padmakashtha, Nagarmotha, Manjishtha, Jeshthamadh, Laksha, Welchi, Wadachi

Paane, Dalchini, Yashti, Jaiphala, Kapoor, Kankol, Kshudra chandan, Dhayati phoole, Khairchaal, Lahan welchi, Nageshar, Til tel.¹⁹

Pomegranate Extract

Pomegranate extract can be prepared from pomegranate peel extract (PPE), pomegranate aril extract, and pomegranate juice.

For preparing pomegranate mouthwash, pomegranate peels were desiccated in sunlight and overnight in a hot air oven at 60°C for 7 days. Then grind it in a powder consistency. Then, the acquired powder was used to prepare an aqueous extract in a Soxhlet extractor. Twenty grams of PPE was achieved at the end of 5 days.

Pomegranate aril extract is prepared by the same procedure but required to keep for 15 days for drying in a hot air oven at 60°C.

Freshly prepared pomegranate juice can be obtained using the sterilized grinder. Four hundred milliliters of pomegranate juice when heated over 1 hour, it provides a heavy concentrate.¹⁸

Salvadora persica L. and Green Tea

In the manufacturing, *Camellia sinensis* var. *assamica* (0.25 mg) is mixed with roots of *S. persica* L. (7.82 mg) extracts in 1 mL of distilled water. It is prescribed as 15 mL twice daily. Patient is asked to rinse for 30 seconds as well as refrain from eating or drinking for 30 minutes.²⁰

Golnar Mouthwash

Mix 10 g of dried golnar powder mixed with 40 mL of vinegar. Dilute the mixture to 1:5 with boiling distilled water, cool it, filter, and fill the preparation in an amber-colored bottle. On examination, the tannic acid content was recorded as 0.52 mg/mL and none of the five main pathogens which were examined for the study (*Staphylococcus aureus*, *Shigella*, *Salmonella*, *Escherichia coli*, and *Candida*) had grown on the related specific media.²¹

Green Tea Mouthwash

Green tea fragments were broken further into small pieces and soaked in 500 mL of ethanol for 48 hours. Filtered leaves were then kept in a hot air oven at 50°C for 3–4 days, and the extract was obtained. This 0.5 g extract is added to 100 mL of distilled water to constitute 5% green tea mouthwash.²⁷

Curry Leaves

Fresh curry leaves which are available were dried under the sun for 3–4 days and thereafter crushed to obtain a fine powder. One hundred thirty-five grams of powder mixed in 4500 mL of distilled water to make the concentration of the solution as 3%. The solution was dispensed in conical flasks and kept in a rotary shaker at 120 revolutions per minute (rpm) for 18 hours and then filtered. Ten milliliters of glycerin and 5 mL of Pudina Hara were added as sweetening and flavoring agents, respectively.²⁹

Neem Mouthwash

Cut 100 g neem sticks into small pieces and blend into a coarse powder. Store the powder at room temperature. Soak the neem powder properly for a period of 2–4 hours and transfer it into a distillation apparatus along with 10 parts of water, and the mixture was constantly heated until 60% of the concentrate was collected. Cool it thoroughly and dissolve in 1000 mL of distilled water to constitute a 2% neem solution.³⁰

Tea Mouthwash

Formulation of tea extract is done by mixing 7 tablespoons of green tea along with four cups of mineral water. The tea was steeped at

Table 1: Previous literature available on herbal mouthwash

Author and year	Title	Target population	Sample size and Study design	Conclusion
Naiktari et al. ¹⁴ (2014)	A randomized clinical trial to evaluate and compare the efficacy of triphala mouthwash with 0.2% chlorhexidine (CHX) in hospitalized patients with periodontal diseases	Patients admitted in three different medical hospitals	One hundred twenty patients double-blinded, randomized, multicenter clinical trial	The triphala mouthwash (herbal) is an effective antiplaque agent, like 0.2% CHX. It is significantly useful in reducing plaque accumulation and gingival inflammation, thereby controlling the periodontal diseases in every patient. It is also cost effective, easily available, and well tolerable with no reported side effects
Kothiwale et al. ¹⁵ (2013)	A comparative study of antiplaque and antigingivitis effects of herbal mouth rinse containing tea tree oil, clove, and basil with commercially available essential oil mouth rinses	Patients coming to the Department of Periodontics male or female, nonsmokers aged between 18 and 35 years with a plaque index (PI; Silness and Loe, 1964) and gingival index (GI; Loe and Silness, 1963) score of >1.5 were included in the study	Fifty randomized, double-blinded, controlled, parallel-group design clinical trial	Newly formulated mouth rinse containing TTO, clove, and basil demonstrates antiplaque, antigingivitis, and antibacterial properties, which may be useful as an adjunctive to mechanical therapy in the prevention and treatment of periodontal diseases
Prasad et al. ¹⁶ (2015)	Antiplaque efficacy of herbal and 0.2% chlorhexidine gluconate (CHXg) mouthwash: a comparative study	Fifty dental students from the Department of Periodontics, MNR Dental College, Sangareddy	A randomized, controlled clinical study	Within the limitations of the study, CHXg and herbal mouthwash (HiOra) showed similar antiplaque activity with the latter showing no side effects
Padiyar et al. ¹⁷ (2018)	Comparative evaluation of effects of triphala, garlic extracts, and CHX mouthwashes on salivary <i>Streptococcus mutans</i> counts and oral hygiene status	Students from a residential ashram located in the campus of Mahatma Gandhi University of Medical Sciences and Technology, Sitapura, Jaipur, in the age-group of 9–12 years	Sixty students were selected by a table of random numbers, a randomized controlled trial (RCT)	All the three mouthwashes containing triphala, CHXg, and garlic were comparably efficient in reducing the salivary <i>S. mutans</i> count as well as in limiting plaque score; however, CHX was the most effective in this aspect. In comparison of the two natural ingredients, triphala is more effective in its antimicrobial effect
Umar et al. ¹⁸ (2016)	The effect of pomegranate mouth rinse on <i>S. mutans</i> count and salivary pH—an <i>in vivo</i> study	Fifty patients aged 15–25 years	The selected patients were randomly divided into two groups of 25 subjects each	PPE mouth rinse possesses a remarkable antimicrobial activity against <i>S. mutans</i> present in the oral cavity as tested <i>in vivo</i> , and may be used as an adjunct to prevent dental caries and maintain good oral hygiene
Mali et al. ¹⁹ (2016)	Comparative evaluation of arimedadi oil with 0.2% CHXg in prevention of plaque and gingivitis—a randomized clinical trial	Forty-five patients aged between 18–21 years, dental students	Randomized, double-blinded, three-group parallel study 21 days	Arimedadi oil is equally effective to CHXg as an adjunct to mechanical plaque control in the prevention of plaque accumulation and gingivitis
Abdulbaqi et al. ²⁰ (2016)	Evaluation of <i>Salvadora persica</i> L. and green tea antiplaque effect—a randomized controlled crossover clinical trial	25–40 years in good general health and with more than 20 teeth	Double-blinded, randomized crossover clinical trial conducted on 14 participants	This study demonstrates that rinsing with 15 mL of 0.25 mg/mL Gt and 7.82 mg/mL Sp aqueous extracts combination twice daily can significantly reduce plaque accumulation after 24 hours regrowth. The anti-plaque effect of this combination was significantly better than 0.12% CHX

Indigenous Herbal Mouthwash

Sedigh-Rahimabadi et al. ²¹ (2017)	A traditional mouthwash (<i>Punica granatum</i> var <i>pleniflora</i>) for controlling gingivitis of diabetic patients—a double-blinded randomized controlled clinical trial	Eighty patients, 20–65 years, diabetic patients	Two-armed, double-blinded randomized comparative clinical trial, using a parallel design	This study showed that the use of traditional herbal <i>P. granatum</i> var <i>pleniflora</i> (Golnar) mouthwash is a safe and effective modality in the treatment of gingivitis in diabetic patients as compared with CHX (0.2%) mouthwash and may be considered a good alternative
Mishra et al. ²² (2016)	Antimicrobial efficacy of probiotic and herbal oral rinses against <i>Candida albicans</i> in children—a randomized clinical trial	Sixty subjects aged between 6 and 14 years attending the pedodontics outpatient unit	A randomized clinical trial	Data obtained from the study demonstrated that probiotic rinse was equally effective as 0.2% chlorhexidine digluconate rinse in reducing <i>C. albicans</i> counts after 1 week of intervention. Herbal oral rinse was least effective
He et al. ²³ (2013)	Short-term microbiological effects of scaling and root planing (SRP) and essential oil mouthwash in Chinese adults	Fifty Chinese adults with chronic periodontitis	Randomly assigned to full-mouth SRP or a 7-day essential oil mouthwash regimen In addition, 22 periodontally healthy adults used essential oil mouthwash for 7 days	SRP and essential oil mouthwash both have an impact on saliva and gingival plaque flora in Chinese periodontitis patients for 7 days, with greater microbiological improvement by SRP
Rezaei et al. ²⁴ (2016)	Comparison of the efficacy of herbal mouthwash with CHX on the GI of intubated patients in intensive care unit (ICU)	Seventy-six patients under mechanical ventilation of three ICUs of Teaching Hospital, Yazd, Iran, from May 2014, to September 2014	Randomized, double-blinded, controlled clinical trial	Combination of <i>S. persica</i> ethanol extract and <i>A. vera</i> gel extract in the mouthwash formula acts better than CHX in reducing the GI of intubated hospitalized patients in ICUs
Tavakoli et al. ²⁵ (2016)	Evaluating the effect of <i>Matricaria recutita</i> and <i>Mentha piperita</i> herbal mouthwash on the management of oral mucositis (OM) in patients undergoing hematopoietic stem cell transplantation (HSCT)—a randomized, double-blinded, placebo-controlled clinical trial	Sixty patients undergoing HSCT were randomly assigned to two groups: placebo ($n = 33$) and herbal mouthwash group ($n = 27$)	Randomized, double-blinded, placebo-controlled trial	This study shows that patients receiving herbal mouthwash experienced less complications and symptoms associated with OM. The use of prepared herbal mouthwash is beneficial for patients undergoing HSCT
Parwani et al. ²⁶ (2013)	Comparative evaluation of antiplaque efficacy of herbal and 0.2% CHXg mouthwash in a 4-day plaque regrowth study	Ninety preclinical dental students	Examiner-blinded, parallel-designed clinical trial	It was concluded that 0.2% CHXg mouthwash remains the best antiplaque agent. However, when socioeconomic factor and/or side effects of CHX need consideration, presently tested herbal mouthwash may be considered as a good alternative
Priya et al. ²⁷ (2015)	Efficacy of CHX and green tea mouthwashes in the management of dental plaque-induced gingivitis—a comparative clinical study	Patients seeking periodontal treatment at Chettinad Dental College in an age-group of 18 and 24 years	Single-blinded, randomized controlled trial	The green tea-containing mouthwash is equally effective in reducing the gingival inflammation and plaque to CHX
Aghili et al. ²⁸ (2014)	Antimicrobial effect of <i>Zataria multiflora</i> extract in comparison with CHX mouthwash on experimentally contaminated orthodontic elastomeric ligatures	In this lab trial study, Iranian and foreign-made elastomeric ligatures were experimentally contaminated in <i>S. mutans</i> , <i>Enterococcus faecalis</i> , and <i>C. albicans</i> suspensions	<i>In vitro</i> study	<i>Zataria multiflora</i> extract has antimicrobial properties and can be used for disinfection of elastomeric ligatures
Varghese et al. ²⁹ (2018)	Comparative evaluation of efficacy of <i>Murraya koenigii</i> and CHXg in the treatment of gingivitis—a randomized controlled clinical trial	Forty-five participants within the age-group of 20–45 years who reported to the outpatient department of periodontics of the institution, from September 2016, to January 2017	Double-blinded, randomized controlled clinical trial	<i>M. koenigii</i> mouthwash is equally effective as CHX, in treating plaque-induced gingivitis

(Contd...)

Table 1: (Contd...)

Author and year	Title	Target population	Sample size and Study design	Conclusion
Balappanavar et al. ³⁰ (2013)	Comparison of the effectiveness of 0.5% tea, 2% neem, and 0.2% CHX mouthwashes on oral health—a randomized controlled trial	Thirty healthy human volunteers of age-group 18–25 years	Triple-blinded, randomized controlled, parallel design trial	The effectiveness of 0.5% tea was more compared to 2% neem and 0.2% CHX mouth rinse
Chatterjee et al. ³¹ (2017)	A comparative evaluation of the efficacy of curcumin and CHX mouth rinses on clinical inflammatory parameters of gingivitis—a double-blinded, randomized controlled clinical study	Subjects of age-group of 20–40, with minimum 20 permanent erupted teeth, mild-to-moderate gingivitis	One hundred fifty double-blinded, randomized controlled clinical trial	Curcumin mouthwash has shown antiplaque and antigingivitis properties comparable to CHX mouthwash. Thus, curcumin mouthwash and CHXg can be effectively used as an adjunct to scaling and root planning
Yadav et al. ³² (2017)	Effect of green coffee bean extract on <i>S. mutans</i> count—a randomized controlled trial	Sample size of 45 subjects, in the age-group, ranging from 18 to 22 years was selected among the students of a dental institute	Randomized, parallel controlled clinical trial	Green coffee bean extract shows a statistical significant reduction in <i>S. mutans</i> count and hence should be considered an alternative mouth rinse due to its herbal and additional health benefits over the human body
Cullinan et al. ³³ (1997)	Efficacy of a dentifrice and oral rinse containing <i>Sanguinaria</i> extract in conjunction with initial periodontal therapy	Thirty-four patients attending the Periodontal Clinic at the University of Queensland Dental School participated	Randomized, double-blinded parallel design clinical trial	There was no significant advantage to the <i>Sanguinaria</i> group. Results demonstrate that initial therapy in the form of oral hygiene instruction and SRP leads to a significant improvement in periodontal status, which is maintained at least in the short term. Further, the use of a dentifrice and oral rinse containing <i>Sanguinaria</i> did not improve the efficacy of initial therapy
Braga et al. ³⁴ (2015)	Use of <i>Chamomilla recutita</i> in the prevention and treatment of OM in patients undergoing HSCT	Forty patients from inpatient unit for adult and pediatric patients undergoing HSCT at a Brazilian Hospital, specializing in cancer	Randomized, controlled, phase II clinical trial (phase II RCT), with parallel groups	In this study, the use of a mouthwash containing the liquid extract of <i>C. recutita</i> at a 1% dosage (equivalent to 0.108 mg of apigenin-7-glucoside per milliliters of product) can be associated with reduced incidence, intensity, and duration of mucositis in adult patients undergoing allogeneic HSCT
Akca et al. ³⁵ (2016)	Comparative evaluation of the antimicrobial effect of propolis with CHX against oral pathogens—an <i>in vitro</i> study	The minimum inhibitory concentration (MIC) and the minimum bactericidal concentration for both antimicrobial agents were determined by conducting agar dilution and broth microdilution test methods	<i>In vitro</i> study	Based on our results, we may conclude that the administration of propolis at appropriate concentrations might be effective on oral microorganisms. Although CHX is still one of the most common oral rinse products against a wide range of microorganisms, ethanolic extract of propolis may serve as an alternative natural and reliable antimicrobial mouth rinse in order to avoid the side effects of CHX
Vangipuram et al. ³⁶ (2016)	Comparative efficacy of aloe vera mouthwash and CHX on periodontal health—a RCT	Three hundred ninety (390) undergraduate and postgraduate dental students among the age-group of 18–40 years, studying in New Horizon Dental College and Research Institute formed the study population	RCT	It can be concluded from the present study that aloe vera mouthwash is equally effective as CHX in reducing plaque and gingivitis

Beheshti-Rouy et al. ³⁷ (2014)	The antibacterial effect of sage extract (<i>Salvia officinalis</i>) mouthwash against <i>S. mutans</i> in dental plaque—a randomized clinical trial	School children of Hamadan, Iran, aged 11–14 years	Double-blinded, randomized clinical trial	The Sage mouthwash effectively reduced the number of <i>S. mutans</i> in dental plaque
Gupta et al. ³⁸ (2018)	Effect of cinnamon extract and CHXg (0.2%) on the clinical level of dental plaque and gingival health—a 4-week, triple-blinded, RCT	One hundred five volunteers from the Department of Public Health Dentistry on male and female university students	Triple-blinded, RCT, a three-group parallel study	Within the limitation of this trial, cinnamon has been shown to demonstrate similar effects on plaque and gingivitis compared to the benchmark control, CHX
Freires et al. ³⁹ (2013)	A randomized clinical trial of <i>Schinus terebinthifolius</i> (ST) mouthwash to treat biofilm-induced gingivitis	Children aged 9–13 years ($n = 27$), presenting with biofilm-induced gingivitis	Randomized, controlled, triple-blinded, and phase II clinical trial	ST mouthwash showed significant anti-inflammatory activity (equivalent to CHX), but it was not able to reduce biofilm accumulation

room temperature at least for 1 hour and then strained the tea with a sieve. Discarded loose tea. Then, 500 mL of strenuous tea was mixed with 1000 mL of distilled water to get a 0.5% solution of tea mouthwash.³⁰

Curcumin Mouthwash

The main ingredient used in this formulation was Curcumin (diferuloylmethane), a polyphenol derived from *Curcuma longa* plant, which contains raw turmeric in the quantity of 0.3–5.4%. Turmeric contains various active ingredients, like flavonoid curcumin and volatile oils including turmerone, atlantone, and zingiberone. It also contains sugars, proteins, and resins.³¹

Green Coffee Bean Extract Mouthwash

A 2% green coffee bean extract was prepared by dissolving 2 g of the powder in 100 mL of distilled water.³²

Chamomilla recutita Mouthwash

Liquid extract of *C. recutita*, sodium benzoate preservative, sodium saccharide sweetener, methylparaben preservative, menthol refresher, mint aroma corrective, polyethylene glycol (PEG) 40 tensoactive, sorbitol co-tensoactive, glycerol co-tensoactive, and purified water quantity sufficient were used as a vehicle to get *C. recutita* mouthwash.³⁴

Propolis Extract Mouthwash

After weighing 20 g of unrefined propolis, it was dissolved in 100 mL of 80% ethanol via ultrasonic bath at 40°C for 2 hours. The solution was strained through Whatman and Protran nitrocellulose membranes. Dried the solution by evaporating through nitrogen flow. Mixed approximately 5 µg of residual material with 75 µL of dry pyridine and 50 µL of bis-trimethylsilyl trifluoroacetamide, which was then heated at 80°C for 20 min. The ultimate supernatant was analyzed by gas chromatography–mass spectrometry.³⁵

Aloe Vera Mouthwash

Aloe vera juice is made up of 99% aloe juice, 0.2% preservative, 0.001% spearmint flavor, and sweetened with sorbitol.³⁶

Sage Extract Mouthwash

Sage mouthwash is prepared from the plant *Salvia officinalis*. Chop the plant leaves to fragment into pieces, soak 50 g of leaves in 1500 mL of ethanol solvent in a shaker apparatus at 90 rpm for 48 hours. Solution passed through a strainer and transferred to a rotary evaporator apparatus to separate the solvent from the

extract. A 5% Sage mouthwash was prepared (0.5 g of extract in 100 mL of distilled water) and poured into bottles, each containing 240 mL of the solution.³⁷

Mixed Herbal Mouthwash

Mixed herbal mouthwash comprises Babool chaal/*Acacia arabica* (20% w/v), darim leaves/*Punica granatum* (10% w/v), chameli leaves/*Jasminum grandiflorum* (10% w/v), mulethi/*Glycyrrhiza glabra* (5% w/v), neem/*Azadirachta indica* (2% w/v). The role of various ingredients is included as follows:

Babool chaal—astrigent, Astrigent—astrigent, chameli leaves—antimicrobial, mulethi—astrigent, and neem—astrigent and an antimicrobial agent.

It consists of other ingredients as well, like alum (1.5% w/v), suhaga (1% w/v), kapoor (0.5% w/v), laung (1% w/v), and menthol (0.5% w/v).²⁶

Cinnamon Extract Mouthwash

Fresh cinnamon bark was ground to a fine powder with the help of a mechanical grinder. Then in 100 mL of deionized water, 10 g of finely powdered cinnamon was added and kept in a water bath in a round-bottomed flask for 5 hours at 55 to 60°C, then filtered through a sterile filter paper (Whatman, UK). The aqueous extract was decanted, clarified by filtration through a muslin cloth, and evaporated in a porcelain dish at 40°C, which resulted in a dried extract. In the end, this dried extract was poised in PEG 400 (20% v/v) and sterile distilled water to give a final concentration of 20% w/v.³⁸

Schinus terebinthifolius Mouthwash

It comprised the stem bark tincture of *S. terebinthifolius* and the lowest concentration required for suppressing the growth of bacteria was seen to be 0.3125%. Phytochemical profile of *S. terebinthifolius* showed triterpenes, flavonoids, steroids, saponins, and tannins. The antimicrobial and anti-inflammatory properties were attributed to the phytoconstituents present in it.³⁹

CONCLUSION

A variety of mouthwashes can be prescribed depending on the oral diseases. Hence, oral healthcare practitioners must have to be cognizant of various etiologic factors and predisposing conditions of the oral cavity. Of course, it goes without saying that chlorhexidine is the gold standard mouthwash. However, when socioeconomic factors, side effects, and/or liking of the population for natural products need consideration, herbal mouthwashes may

be considered as a good alternative. However, further studies can be done to extrapolate the advantages and disadvantages of these herbal products.

CLINICAL SIGNIFICANCE

Augmented bacterial resistance toward antibiotics or side effects of chemical antiplaque agents there is substantial interest in the advancement of other classes of antimicrobial agents for control of infection and better oral health. The use of an indigenous herbal mouthwash can improve the oral health status of an individual.

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