"Review on Herbal Mouthwash: An Alternative to Chemical Mouthwashes"

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ABSTRACT

Herbal mouthwashes are gaining significant popularity as safe, effective, and natural alternatives to conventional chemical mouthrinses. They contain bioactive phytoconstituents with antimicrobial, anti-inflammatory, antioxidant, and wound-healing properties that promote oral hygiene and prevent common dental problems such as plaque, gingivitis, halitosis, and dental caries. This review highlights the composition, mechanism of action, therapeutic benefits, formulation aspects, evaluation parameters, and recent research on herbal mouthwashes.

INTRODUCTION

Mouthwashes are liquids with anti inflammatory, antimicrobial, and analgesic properties. Mouthwash is a remedy that is frequently used for its antiseptic, deodorizing, and refreshing qualities as well as for plaque control. It must include ingredients like glycerin, artificial sweeteners, surface-active agents, flavorings, and colors Nu.merous studies have been conducted on the versatility of these rinses to affect plaque formation and alter the progression of gingival inflammation Over 50% of the fad drugs come from natural sources, and naturally occurring substances play a really significant role in drug development. The advantages of herbal mouthwash versus chemical mouthwash will be thoroughly covered in this review. It is believed that the first artistic drawings with emphasis date back to the ancient Egyptians. The significance of cleanliness and beauty. An unclean body was considered impure. Pedanius, Dioscorides was a Greek surgeon and physician who lived between 40 and 90 AD using a mouthwash mixture of the following was advised in the textbook to treat bad breath. There are two types of mouthwash chemical and herbal. Herbal mouthwash contains natural ingredients called phytochemicals that contains desired anti-microbial and anti-inflammatory effects. Herbal mouthwash becomes more popular they work without alcohol, artificial preservatives, flavours and colors. As it contains natural herbs that have natural cleansing and healing property to teeth and gums. Many herbal mouthwashes contain herbs with anti-microbial property such as neem, yavani satva, nagavali, gandhapurataila, pilu, bibhitaka, ocimum, Echinacea, chameli leaves, etc. some of the herbs that are used in mouthwashes are clove, which is traditionally used for oral health because of their antiseptic, antibacterial and antiviral property, peppermint which gives cooling effect to the mouth. Natural Herbs such as Triphala, Tulsi, Neem, Clove oil, Pudina and many others are used as single or in combination have been Scientifically Proven to be Safe and Effective Medicine against Oral Health Problems such as Bleeding Gums, Mouth Ulcers, and Preventing Tooth Decay without side effects [1]

TYPES OF MOUTHWASH

- Fluoride mouthwash: Fluoride in mouthwashes contains salt which helps protect the teeth from cavities and cavity. Since fluoride could also be found in toothpaste and water, it's advisable to require care when using this type of mouthwash since intake of an excessive amount of fluoride isn't good for your overall health.

- Antiseptic mouthwash: This is the foremost common mouthwash. This mouthwash usually contains alcohol and is typically utilized by people with mouth infection to stop bacterial growth. This is often also helpful for people that have halitosis or bad breath. This is often used alongside the proper brushing of teeth and flossing to help forbid bacteria that cause mouth infections and stinky breath.

- Cosmetic mouthwash: A mouthwash that doesn't really do anything to your overall oral care but is just how to freshen your breath or to mask bad breath.

- Natural mouthwash: Natural mouthwash could also be a mouthwash that does what other sorts of mouthwash do except the ingredients are natural. It is also a popular option as an alcohol-free mouthwash. Their ingredients are safer to use as compared to other sorts of mouthwash [6].

HISTORY OF MOUTH WASH

- The importance of mouth and teeth cleanliness has been recognized from the earliest days of civilization to the 21st century.
- As far as we have come in creating dental solutions that are effectively treat and prevent various types of oral diseases, the mouthwash rinses our ancestor used to maintain a healthy smile were just as widely used as some of the around today.
- The first known references to mouth rinsing are in Ayurveda and Chinese medicine around 2700 BC. Mouthwash is a chemotherapeutic agent used as effective home care system by the patient to oral hygiene.
- In the Greek and Roman periods, mouth rinsing following mechanical cleansing became common among the upper classes and Hippocrates recommended a mixture of salt, alum and vinegar. Ancient Egyptians are known to be responsible for the first artistic drawing that emphasizes the importance of beauty and hygiene. An unclean body was thought to be impure. Pedanius Dioscorides, A Greek physician and surgeon (40-90) whose writings served as a medical textbook, suggested for treatment of bad breath a mouthwash mixture of the following.
- Greek physician Pedanius Dioscorides, formulated a mouthwash mixture of decot extracted from the olive tree leaves, milk, wine and oil, pomegranate peelings, nutgalls and vinegar, this was how ancient mouth washes were prepared using traditional methods and herbs.
- The Romans included a secret ingredient in their mouthwash: human urine. They imported urine from Portuguese people because they thought it had more strength.
- It is observed that in 18th century urine served as a key active ingredient due to the presence of ammonia that rendered the oral cavity free from oral pathogens especially sulphur producing organisms(4).
- Before Europeans came to Americas, Native North American and Mesomerican cultures used mouthwashes, often made from plants such as Coptis trifolia.
- In 1892, German Richard Seifert invented mouthwash product Odol, which was produced by company founder Karl August Lingner (1861-1916) in Dresden [5].

- Ancient Use (Around 2700 BCE): The earliest known use of mouth rinses dates back to ancient Chinese and Indian civilizations, where herbal mixtures were used for oral hygiene.(5)
- Greco-Roman Era: The Greeks and Romans used mouth rinses made of salt and vinegar. Hippocrates recommended a mixture of salt, alum, and vinegar for cleaning the mouth.
- Medieval Period: Mouth rinsing practices continued with the use of herbal infusions, wine, or even urine (believed to have cleansing properties).(8)
- 18th Century: Mouthwash began to be recognized in Europe as a commercial product, often alcohol-based and used for both oral hygiene and breath freshening.
- Modern Era (19th-20th Century): The invention of antiseptic solutions like Listerine in the late 1800s revolutionized mouthwash use, making it a regular part of oral hygiene routines worldwide.(2-12)

ADVANTAGES OF HERBAL MOUTHWASH

1. Fresh Breath (Control of Halitosis)

Herbal mouthwashes containing peppermint, clove, tea tree oil, and green tea help reduce bad breath by eliminating volatile sulfur compounds (VSCs) produced by anaerobic bacteria such as Porphyromonas gingivalis. Menthol in peppermint provides an immediate cooling and refreshing effect. Green tea catechins inhibit odor-producing bacteria, improving breath freshness for several hours.(2,8)

2. Removal of Food Debris and Interdental Cleaning

Herbal mouthwash acts as a rinsing agent that helps dislodge food particles trapped between teeth. Ingredients such as mint oil and surfactants (e.g., polysorbate-80) enhance debris removal. This reduces substrate availability for bacterial growth and prevents plaque maturation.(3,5,7)

3. Prevention of Plaque Buildup

Herbs like neem, triphala, and tea tree oil possess strong anti-plaque activity. Tannins and flavonoids reduce bacterial adherence to enamel surfaces, preventing early plaque formation. Clinical studies show that neem mouthwash can reduce plaque index by 20–30%, comparable to chlorhexidine but without its side effects.(3)

4. Helps Fight Cavities (Anti-Caries Action)

Herbal mouthwashes containing green tea, licorice, and neem inhibit Streptococcus mutans, the main causative organism of dental caries. Green tea catechins reduce acid production, while neem strengthens enamel through its mineral-rich composition. Xylitol-containing herbal mouthwash further prevents demineralization.

5. Helps Whiten Teeth (Anti-Stain Activity)

Herbal mouthwashes with gentle abrasives and enzymatic components such as papain and bromelain help break down chromogenic stains caused by tea, coffee, and tobacco. Essential oils like lemon and mint also help reduce

extrinsic staining, improving the brightness of teeth over time.

6. Helps Cure Canker Sores (Aphthous Ulcers)

Herbs such as aloe vera, turmeric, and licorice have strong anti-inflammatory and wound-healing properties. Aloe vera accelerates epithelial regeneration, reducing pain and healing time. Turmeric's curcumin inhibits inflammatory mediators like COX-2, providing rapid relief from ulcer irritation.

7. Reduction of Gingivitis

Triphala, neem, and green tea extracts show significant anti-gingivitis effects. They reduce gingival inflammation by inhibiting P. gingivalis and lowering bleeding indices. These herbs contain antioxidants that protect gum tissues from oxidative stress.

8. Prevention of Periodontal Disease

Herbal mouthwash penetrates gingival crevices and reduces pathogenic bacteria responsible for periodontitis. Tea tree oil and neem reduce pocket-depth bacteria and prevent attachment loss. Their anti-inflammatory and antimicrobial synergysupports periodontal health.

9. Control of Oral Microbial Load

Herbal formulations act against a wide spectrum of microorganisms: Streptococcus mutans (cavity-causing) Candida albicans (fungal infections) Anaerobes responsible for halitosis Polyphenols and terpenoids damage bacterial cell walls, reducing oral microbial count significantly after regular use.

10. Reduces Tooth Sensitivity

Certain herbal mouthwashes contain ingredients like clove (eugenol), which provides natural analgesic and desensitizing effects. Herbal tannins form a protective layer over exposed dentinal tubules, reducing sensitivity to hot and cold stimuli.

12. Helps Reduce Dry Mouth (Xerostomia)

Herbal ingredients like aloe vera, licorice, and tulsi increase salivary flow and moisturize the mucosa. Herbal lubricants reduce dryness-related irritation while maintaining oral pH, making them ideal for xerostomia patients.

14. Reduces Stains from Tea, Coffee, and Tobacco

Herbal antioxidants and mild natural cleansers break down chromogenic compounds responsible for surface stains. Lime extract, peppermint, and papain-based formulations help maintain tooth brightness without causing enamel abrasion.

15. Safe, Non-Toxic, and Cost-EffectiveUnlike chemical mouthwashes, herbal ones do not cause tooth staining, taste alteration, or mucosal irritation. They are alcohol-free, suitable for children, and ideal for long-term daily use. Their affordability and natural composition make them widely acceptable.(7-12)

DISADVANTAGES OF CHEMICAL MOUTHWASH

- Dry Mouth (Xerostomia): Many commercial mouthwashes contain high levels of alcohol, which can have a drying effect on the mouth by reducing saliva production. Saliva is crucial for washing away food particles and neutralizing acids, so reduced flow increases the risk of cavities and bad breath.(4)
- Oral Irritation and Sensitivity: The high alcohol content can cause a burning sensation or pain, especially for individuals with existing canker sores, mouth ulcers, or sensitive gums. Ingredients like SLS can also aggravate these issues.
- Teeth Staining: Certain potent ingredients, particularly chlorhexidine (a prescription antiseptic), can cause brown stains on the teeth, tongue, and dental restorations with prolonged use. This is often the most frequently reported adverse effect of CHX and usually requires professional cleaning to remove.(8,9,2,12)
- Altered Taste Perception: Some chemicals, especially chlorhexidine, can cause temporary taste disturbances, such as a bitter aftertaste, which typically resolves after the product is discontinued.(4-8)

NEED OF HERBAL MOUTHWASH

1. Maintains oral hygiene: Helps remove food particles and reduces bacterial load in the mouth.
2. Freshens breaths: Provides a quick and easy way to combat bad breath (halitosis).
3. Reduces plaque and tartar: Aids in preventing buildup that leads to gum disease and cavities.
4. Prevents and soothes gum problems: Can reduce inflammation, bleeding, and risk of gingivitis.
5. Supports overall dental care: Complements brushing and flossing for a more complete oral care routine. {1}

Common Case were mouth wash is use ;

1. Bad Breath (Halitosis): To freshen breath and kill odor causing bacteria.
2. Plaque Control: Helps reduce plaque buildup andmaintain oral hygiene.
3. Gingivitis and Gum Disease: Used to reduce inflammation and bacterial infection in gums
4. After Dental Procedures: To prevent infection and promote healing post-surgery or tooth extraction.
5. Mouth Ulcers: Helps soothe pain and speed up healing of ulcers and sores.
6. Tooth Decay Prevention: Especially those with fluoride help strengthen enamel.
7. Dry Mouth: Alcohol-free herbal mouthwashes can relieve dryness and improve comfort.
8. Orthodontic Care: Helps clean around braces and reduce bacterial growth.
9. During Illness: To control bacterial load when brushing is difficult due to pain or fatigue.
10. General Oral Hygiene: As a supplementary step along with brushing and flossing.(15,16,18)

Benefits of using a herbal mouthwash

1. Natural Ingredients: Made from plant-based herbs and phytochemicals.
2. Antimicrobial Action: Helps kill or reduce harmful oral bacteria.
3. Anti-inflammatory Properties: Soothes inflamed gums and reduces swelling.
4. No Alcohol: Safer for people with dry mouth, children, and pregnant women.
5. Fewer Side Effects: Less likely to cause staining, burning sensation, or taste alteration compared to chemical mouthwashes.
6. Promotes Healing: Supports natural healing of mouth ulcers, wounds, and gum issues.
7. Prevents Dental Problems: Reduces risk of plaque, gingivitis, bad breath, and tooth decay.
8. Eco-Friendly: Biodegradable and generally safer for the environment.
9. No Artificial Additives: Free from synthetic preservatives, flavors, and colors.
10. Long-term Use: Safe and gentle for daily, long-term oral care.(25,26)

Main advantages of using herbal drugs

1. Natural and Safe: Derived from plants, reducing the risk of harmful side effects.
2. Fewer Chemicals: Free from synthetic additives like preservatives, artificial colors, and alcohol.
3. Multi-functional: Often possess multiple actions such as antimicrobial, anti-inflammatory, and antioxidant effects.
4. Biocompatible: Gentle on the body and suitable for long-term use.
5. Cost-effective: Generally more affordable and easily accessible, especially in traditional medicine systems.
6. Eco-friendly: Sustainable and biodegradable, causing less harm to the environment.(26)

HERBAL INGRIDENTS USE IN MOUTHWASH

FIG.1. CURCUMA

Drug Profile Curcuma (Turmeric)

Scientific Name	Curcuma Longa
Kingdom	Plantae

Subkingdom	Tracheobionta
Super Division	Spermatophyta
Order	Mangoliyaphyta
Family	Zingiberales
Genus	Curcuma
Species	Longa

Biological source ;

Turmeric consist of dried, as well as fresh rhizomes of plant known as curcuma longa linn belonging to family zingiberaceae.

Chemical constituents :

Turmeric contains 3-6% Polyphenolic compounds, collectively known as Curcuminoids as a coloring matter. The curcumanoid contains curcumine-I, Curcumine-II, curcumine III. Turmeric contains about 5% volatile oil. Their Volatile oil contain sesquiterpenes, alcohol and ketone and monoterpene Example, zingiberone, turmerone, arturmerone, alcohopl-p-tolylmethyl, Carbenol, borneole etc. It also contains arabinose, fructose, glucose, and Starch grains. Others are Cymene, Tumeron, Isdemethoxy curcumin, Demethoxy curcumin, Diaryl Heptanoids.

Parts used: Rhizomes, tubers.

Uses:

- Having Anti-plaque, Anti-inflammatory and Anti micobial property.
- Whiten teeth.
- Healthy gums.
- Releive the toothach.
- Keep your breath fresh.
- It is used as stomachic, carminative, aromatic, antiperiodic, blood purifier and stimulant.
- It is also an anti-arthritic, anti-inflammatory, anti lipidemic, carminative and digestant and anti-fertility.
- It is also used in menstrual pain, liver diseases and to produce choleritic and chologogue action.
- Turmeric is used in curry powders, sauces and paper impregnated with its tincture is used for the borate and boric acid detection.
- It is employed as colouring agent for formulation like ointments and creams. Ethanolic extracts of curcuma longa shows anti-ulcerogenic property. Rhizome extract has anti- diabetic action. Curcuma is used in conjunctivitis.
- A recent study involving mice has shown that turmeric slows the spread of breast cancer in to lungs and other body parts. Turmeric also enhances the effect of taxol in reducing metastasis of breast cancer.
- The rhizomes is well known for its anti-gastric ulcer and cholagogic properties. It is prescribed in the therapy of gastric and duodenal ulcer, hepatitis, jaundice, pain in the extrimities, boils and impetigo. It is also used as a poultice for wounds.(26,27)

Tulsi

FIG.2. TULSI

Taxonomical Classification	
Scientific NAME	Plantae
Kingdom	Magnoliophyta
Subkingdom Super Division	Magnoliopsida
Super Division	Lamiales
Order Family	Labiatae
Family	OCIMUM
Genus	o.tenuiflorum
Species	o.cimum sanctum

Biological source

Tulsi consist of the fresh & dried leaves of Ocimum sanctum L. and Ocimum basilicum L. belonging to family Labiatae.

Parts used

Leaves, Seeds and Roots.

Chemical constituents

1. Volatile Oil-0.8%
2. Eugenol, nerol, eugenol methyl ether.
3. Caryophyllene, terpinene-4-ol-decyladehyde
4. Camphor and carvacrol
5. Essential oils, ascorbic acid, carotene, calcium, phosphorus and insoluble oxalates.
6. It also contains terpenes, mucilage, fixed oil and fatty acids.

Uses:

Tulsi is a small plant, sub-shrub which has multiple uses.ayurveda mentions the importance of medicinal uses of it.

1. The leaves are quite effective for the ulcer and infections in the mouth. A few leaves chewed will cure these conditions.

2. The herb is useful in teeth disorders.

3. Its leaves, dried in the sun and powdered, can be used for brushing teeth.

4. It can also be mixed with mustered oil to make a paste and used as toothpaste.

5. These is very good for maintaining dental health counteracting bad breath and for massaging the gums.

6. It is also used in pyorrhea and other gum, disorders.

7. The anti-inflammatory and anti-infectious properties of tulsi make it a powerful treatment for gum disease.

8. It is used to treat bronchitis, cough, earache, gastric disorders, hepatic disorders, inflammation, otitis, otorrhoea, syphilis, malarial fever, cardiac debility, gonorrhea, palpitation, urino-genital complaints.(27)

Peppermint

FIG.3. Peppermint

Taxonomical Classification	
Kingdom	Plantae
Order	Lamiales
Family	Lamiaceae
Genus	Mentha
Species	M. Piperita

Biological source

It obtained from fresh leaves of Mentha piperita. belonging to family Labiatae.

Parts used: Leaves.

Chemical constituent :

Peppermint oil mainly contains menthol (about 70%).

It also contains menthone, menthyl acetate, and other terpene derivatives like cineole, pinene, isopulegone, camphene, limonene, zasmone, menthofurone, menthyl isovalerate.

Uses:

1. The dried flowering tops are used to prepare beverages like peppermint tea and in the formulation of liqueurs and bitter.
2. The current use of peppermint is mainly for colic and irritable bowel syndrome.
3. Peppermint oil is used as carminatives, aromatic, stimulant and flavouring agent.
4. It is widely used as an antiseptic in various preparations and in mouth freshners.
5. It is also used as antipruritic and counter irritant over skin and mucous membrane.
6. Helps in removing the bad breath.(12)

Clove:

FIG.4. CLOVE

Cloves are used as a carminative to increase acid within the stomach and to spice up peristalsis. Cloves are said to be a natural anthelmintic. The essential oil is used in aromatherapy when stimulation and warming are needed, especially for gastrointestinal systems problems. Topical application over the stomach or abdomen are said to warm the canal. Clove oil, applied to a cavity during a decayed tooth, also relieves toothache [10].

Lemon grass oil

FIG.5. LEMON GRASS OIL

Lemon grass oil: The cymbopogan citrus have anti-bacterial, anti-inflammatory, and also superoxide scavenging property 11, 12. It also reduces the bacterial load and decreases the inflammation and also reduces the oxidative stress of the tissue. The lemon grass oil mouthwash can be used as an adjunct along with the non surgical therapy

Green tea

FIG.6. GREEN TEA

Green Tea: It can be used as a gargle or mouthwash to treat dental decay, halitosis, laryngitis, mouth sores, plaque formation, sore throat, thrush, and tonsillitis. It effectively reduces plaque accumulation and is free from side effects as of chemical mouthwashes(27,26)

EVALUATION PARAMETERS

1. Organoleptic / Physical (Sensory) Evaluation

These are sensory and visual assessments, to ensure the mouthwash is acceptable to users (taste, smell, look).

Color / Appearance — The colour of the mouthwash is observed visually, often against a white background. It should be consistent and homogeneous (no sediment, discoloration, or phase separation).

Odour / Smell — The smell (herbal aroma, pleasantness or otherwise) is assessed by direct smelling. For herbal mouthwashes, a pleasant herbal or minty odour is usually desired.

Taste — Since it will be used in the oral cavity, taste (or aftertaste) is also evaluated. Many studies note whether the taste is acceptable/mild, bitter, herbal, etc.

Clarity / Homogeneity — If the formulation is supposed to be a clear solution (or uniformly turbid suspension), observations are made for clarity, presence of particles, cloudiness or precipitates.

Viscosity / Consistency / Flow Behavior — Measured (if relevant) to ensure the liquid is not too thick (which might make rinsing difficult) or too thin (which might feel watery). Instruments like a viscometer (e.g. Brookfield viscometer) may be used.

Why important: If the mouthwash is unpleasant in smell, taste or texture, people may not use it regularly — defeating the purpose. Also, physical instability (e.g. precipitation, phase separation) may reflect poor formulation or poor shelf-life.

2. pH Measurement / pH Stability

The pH of the mouthwash is typically measured using a calibrated digital pH meter.

Most studies report a pH in the approximate range 5.5–7.0 as acceptable/safe for oral tissues.

pH is important because an acidic or strongly alkaline mouthwash can irritate oral mucosa, damage enamel, or disturb normal oral flora.

3. Microbiological / Antimicrobial Efficacy

Antimicrobial activity is one of the most important functional tests. Since the goal is to reduce harmful oral bacteria (e.g. those causing plaque, gingivitis, bad breath), researchers test how well the mouthwash inhibits

microbial growth.

Common method: Agar well diffusion method — inoculate agar plates with bacteria (or fungi), create wells, add the mouthwash (or extract), incubate (e.g. 24–48 h at 37 °C for bacteria), then measure the "zone of inhibition" (diameter around well where microbes do not grow).

Test against relevant oral pathogens — often bacteria implicated in dental caries / gingivitis (e.g. Streptococcus mutans, Lactobacillus acidophilus, Escherichia coli, Staphylococcus aureus, etc.).

For commercial herbal mouthwashes, antimicrobial efficacy may also be tested according to recognized standards (e.g. bacterial/fungal reduction tests). For example, one recent study reported a 5-log reduction in bacteria/fungi within 60 min for a marketed herbal mouthwash, comparable to conventional mouthwash standards.(29)

Why important: This demonstrates that the mouthwash is not merely "natural" or "pleasant," but actually effective in reducing or inhibiting harmful microbes — which is the core intended use.

4. Stability Testing / Shelf-life / Safety (Physical & Chemical Stability)

Stability studies are done to evaluate how stable the mouthwash remains over time under different storage conditions (temperatures, humidity, light, etc.).

Researchers observe for phase separation, precipitation, colour change, odour change, turbidity, sedimentation, or any other visible change over time.

Along with physical stability, pH stability (does pH remain acceptable over time) is also monitored.

Sometimes other parameters like weight per mL (density) or consistency / viscosity may also be tracked over time.

Why important: A mouthwash may work well freshly prepared — but if it degrades, separates, or changes in pH over storage, it may lose effectiveness or even become unsafe. Stability studies help assess shelf-life and ensure long-term quality.(22,23,27,

Conclusion

Herbal mouthwashes are a safe and natural alternative to chemical mouthwashes. They effectively reduce plaque, bad breath, and gum problems with fewer side effects. Ingredients like neem, tulsi, mint, and aloe vera make them suitable for long-term use. Overall, herbal mouthwashes show good potential as a gentle and effective option for daily oral care.

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