

REVIEW ON HERBAL MOUTHWASH: THE PROMISE TO FIGHT AGAINST GERMS

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ABSTRACT

Oral health is important as overall health. Now a days people may faces more oral problems like periodontal disease, sore throat, gingivitis, plague and so on. For maintaining good oral health various, formulation are formulated. A mouthwash is recommended for controlling plague, bad breath, toothache and bacteria. Herbal mouthwash are preferred over chemical mouthwash as it shows less side effect and is non-irritant, less toxic, and do not contain alcohol. Herbal mouthwash consist of extracts of crude drugs which has no or less side effects as compared to synthetic mouthwash. Herbal mouthwash are prepared from various plant extract. The extract is obtained from various plant parts like roots, leaves, seeds, and oils which contain chemical constituents showing antibacterial activity, antimicrobial activity, anti-inflammatory activity. The main objective of this review is to maintain oral health care by used natural mouthwash.

Key words: Mouthwash, Herbs, Antibacterial, Antiviral, Plague, Gingivitis

INTRODUCTION:

A mouthwash is a medicinal liquid that is held in the mouth and swished around by the perioral muscle in order to get treatment of oral infections [1]. Its main function is oral hygiene [2]. Mouthwashes can generally be formulated either in ready to use form or in concentrated form.

In general 3 types of mouthwashes are prepared: [3]

- 1) Mouthwashes containing antibacterials;
- 2) Mouthwashes containing fluoride;
- 3) Mouthwashes containing minerals,

Variations occur in mouthwashes as cosmetic and therapeutic mouthwash. Cosmetic mouthwash masks bad breath by flavour composition that gives fresh breath, temporarily. Whereas therapeutic mouthwash contain active ingredients which help mechanical control and maintain oral health [4]. Mouthwashes perform the function like, rinsing of food debris from the mouth, reduction in total bacterial count in mouth, imparting flavour to mouth cavity and imparting flavour to breath [3]. Mouthwash also contain some ingredients which acts as digestive aid. Mouthwash can be of chemical or natural type [5]. Now -a-days Herbal mouthwashes are in great demand and increase in interest rapidly due to their antibacterial and antioxidant activity [6]. Herbal plant has various medicinal properties and plants an important role in curing various disease as they have antibacterial and antifungal property [7].

Chemical mouthwashes contain hydrogen peroxide, chlorine dioxide, and cetylpyridinium chloride, which act as an immediate tooth whitener, sterilizer, and pain reliever, but they additionally have an ability to discolor teeth and may have numerous undesirable consequences while being affordable. Dental caries and periodontal diseases are among the most frequent infectious diseases that individuals face [8]. One's personality and quality of life can be greatly depend on good oral health and its hygiene with increase in cases of oral disease the universal need for prevention and treatment method has expanded [9]. Children and adolescents have higher rates of dental cavities because they fail to maintain good oral hygiene [8]. Alcohol free mouthwashes are also called as mouth rinses that helps to maintain acidity and basic nature of enzymes.

The food we are consuming affects the oral cavity of an individual which is unavoidable. The foods like Candies, chocolates, jellies and those contains high content of sugar, the sugar content possess insoluble glucan which gets attached to the enamel of the tooth which causes, cavity in tooth. The tooth enamel may also get destroyed and get erode which results in depth eruption of dentine and results in tooth discolouration [7].

Toothache also known as dental pain, is pain in the teeth or in supporting structures. Common causes include inflammation of the pulp, dental trauma, hypersensitivity, apical Periodontitis, collections of pus, temporomandibular disorder. Pulpitis is reversible when the pain is mild to moderate and lasts for a short time after a stimulus or irreversible when the pain is severe and lasts for a long time [11]. Dental biofilms is the primary etiology for dental caries, gingivitis and periodontitis [4]. Periodontal disease mostly affect the supporting tissues of the teeth and may be cause by poor oral hygiene and may also results in gingivitis [12].

Natural herb such as Tulsi, Guava, Peppermint, Triphala, Neem, Pomegranate, Clove oil, Grapefruit, Green tea, Propolis, Ajwain, Pudina, Aloe vera, Jyestiamadh, white oak bark, myrrh gum and so can be used in combination or in alone. Natural mouthwashes contains herbal extracts, essential oils can provide connective tissue rebuilding properties and strength overall health[10].

2. ANATOMY OF ORAL CAVITY:

The oral cavity consists of complex environment which consists of teeth buccal mucosa, soft and hard palate and tongue. Oral Microbiome, oral microbiota or oral microflora refers to the microorganisms found in the human oral cavity. Oral microbiome was identified by Antony van Leewenhoek using microscope. A number of bacteria is present in mouth among which some are bacteria fungi and viruses. Bacteria is resident of the mouth and comprise of bacteria like Bacillus Proteobacter, Actinomycetes. In human mouth 85 species of fungi can be found. Among this Candida is the important one. Candida attack oral tissue and forms biofilm with Streptococcus to play a pathogenic role. Virus can remain constant during all stages of life most commonly found bacteria are Streptococcus mutans, Porphyromonas gingivalis, Staphylococcus and Lactobacillus. S. mutans is main which form dental plaque, caries and which is bacterial infectious disease that occurs in hard Tissue of teeth. P. gingivalis is gram negative anaerobic bacterium and is periodontal pathogen. Lactobacillus produce large amount of lactic acid, which can easily cause dental caries[13].

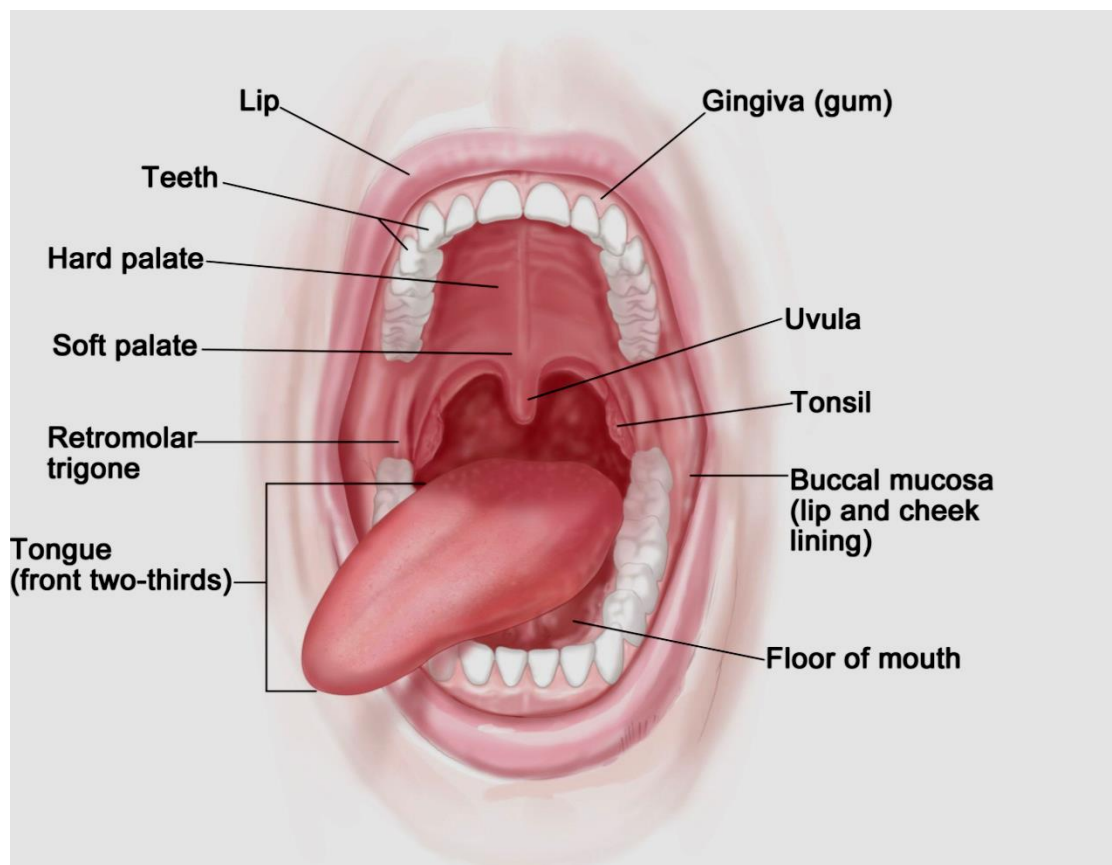


Fig-1: Oral Cavity

3. USES OF MOUTHWASH:

The use of mouthwashes needs a correct diagnosis of various and condition and thorough knowledge. The selection depends on factors such as the patient oral condition, disease risk and efficacy and safety of the mouthwash and should be considered the patient's ability to perform good oral hygiene practices, the condition of their teeth, gingiva and oral mucosa, their risk of oral disease, and the proven efficacy of the mouthwash and its potential adverse effects[14]. Many conditions within the oral cavity require the use of a mouthwash. This can vary from breath fresheners to treatment of life-threatening infections like oral mucositis in which patients undergoing bone marrow transplant therapy. Mouthwashes should only be used for a short period of time and should never be the only means of oral hygiene[15].

Mouthwashes can be used in the following cases: [14]

- 1) Gum disease
- 2) Mucositis
- 3) Halitosis
- 4) Periodontal disease
- 5) Xerostomia
- 6) To clean septic sockets
- 7) To control plaque

- 8) To relieve pain
- 9) To effectively deliver fluoride in order to prevent dental caries
- 10) Reduce inflammation
- 11) Breath freshener

- **PERIODONTIS:**

It is an infection of periodontium. 'Perio' means gingiva and other tissues surrounding teeth 'dont' means tooth and it is; means inflammation, Periodontis means chronic inflammation of gingival, Gingivitis is accumulation of plaque around teeth which forms microbial biofilms. By maintaining good oral health it is cured at initial stage but if it is not removed then formation of TARTAR (hard calcified deposits that forms and coat the teeth and gums) and CALCULUS (hard dental plaque) occurred which is not removable by using tooth brush or floss. Due to development of tartar, bacteria starts attacking deeper tissues which leads to degradation of periodontal ligaments around the teeth and cause resorption of alveolar bone [16].

- **GINGIVITIS:**

Gingivitis is a microbial disease inflammatory lesion that mainly occurs due to accumulation of dental plaque [17]. Hence it is important to inhibit growth of harmful bacteria and maintain oral health [12]. It is the form of gum disease and is due to accumulation of the plaque on the tooth and the soft tissue adjacent to the tooth. It occurs in both acute and chronic form. It is characterized by redness of the gum, edema, bleeding upon brushing and loss of periodontal attachment. Acute gingivitis is caused by microorganism, trauma, and infection while that if in chronic is related to bacterial biofilm which covers gingival and adjacent teeth [18].

- **ORAL MUCOSITIS:**

Oral mucositis is a complex biological process involving direct damage to the dividing cell of the epithelium with the depletion of the basal epithelium modulated by immune system [19]. Also known as inflammation of the oral mucosa, is a painful and debilitating side effect of cancer chemotherapy, radiotherapy and hematopoietic stem cell transplantation. Oral mucositis is characterized by erythema, edema, mucosal shedding, ulceration and pseudomonas formation. It is all important that dentist are also important in treating cancer patient due to the oral hygiene in the prevention of oral mucositis and systemic infection [20].

- **XEROSTOMIA:**

It is also referred to as dry mouth syndrome and is result of absence of saliva. People with xerostomia is result of mucosal dryness, oral discomfort and alteration in taste, cracked and peeled lips, dry nasal passages. Saliva secretion occurs through a complex process controlled by an autonomic nervous system and through receptors present in salivary glands. If xerostomia is untreated it leads to decrease in oral pH and increase in formation of dental caries and plaque [21].

4. ADVANTAGES AND DISADVANTAGES OF MOUTHWASH: [22]

4.1 ADVANTAGES

- **FRESH BREATH:** Almost everyone who hears the word mouthwash probably knows that mouthwashes make your breath fresh. Confidence can be gained by instant fresh breath. A person can do is rinse their mouth with mouthwash of their choice and do gargle. Mouthwashes contain astringent salt. It's a type of deodorizer that can temporarily cover up bad breath. Some also contain odour neutralizer which prevent bad breath.
- **STRIKE OUT ANY FOOD OR DEBRIS STUCK IN BETWEEN THE TEETH:** A few little fragments of whatever we eat become trapped in between our teeth. These particles are either too minute or deeply embedded between the teeth to be removed by brushing alone. This is where mouthwash, often known as oral rinses, can be useful. Most dentists advise using mouthwash for a cleaner mouth after cleaning teeth. However, whether you use the mouthwash before or after brushing and flossing is irrelevant. Some folks suggest using mouthwash before cleaning your teeth.
- **PREVENT BUILDUP OF PLAQUE:** If you feel fuzzy when you run your tongue over your teeth then that is plaque. It is sticky film of bacteria that covers the outer layer of the teeth. These bacteria produce acids when we eat or drink anything and these acids destroy the enamel teeth. This results in cavity and loss of teeth. On gums, plaque can build up. If not removed, plaque hardens into tartar. Brushing and flossing can remove this plaque but it is difficult to reach some places which neither the brush nor floss can reach. On the other hand, mouthwash can reach the places and get rid of the plaque and it prevents a buildup of plaque.
- **HELPS TO FIGHT CAVITIES:** using a mouthwash can prevent plaque which in turn prevents formation of cavities. Mouthwash can help to reduce tooth decay and prevent cavities. Fluoride is one such ingredient. It has antimicrobial which kills bacteria that cause bad breath and gingivitis.
- **WHITENS THE TEETH:** some mouthwashes contain whiteners, they can help to remove stains on your teeth. This may change the coloration of the teeth.

- **CURE CANKER SORES:** somemouthwash can reduce inflammation and pain associated with canker sores. Daily use of mouthwashes can stop gingivitis from becoming more acute periodontal diseases.

4.2 DISADVANTAGES OF THE MOUTHWASH:

- A lot of mouthwashes contain alcohol, which increases tooth sensitivity. Alcohol can cause the oral mucosa to dissolve and the oral microbiome, or natural habitat in the mouth, to be disturbed, making the teeth more sensitive.
- Infants under the age of six should avoid using mouthwash.
- Since mouthwash sometimes contains an excessive amount of alcohol, it might cause canker.
- Mouthwash has the potential to harm some oral tissues as well as stain and darken teeth.

5. HERBS USE IN MOUTHWASH PREPARATION:

5.1 CLOVE (Clove flowers, clove buds)

- *Eugenia Caryophyllus* Thumb, a member of the Myrtaceae family, is the source of clove
- It is indigenous to Indonesia and is primarily grown in the islands of Zanibar, Pemba, Brazil, and Amboniana. Penang Mauritius, etc.
- It is a reddish brown color and has 14% to 21% volatile oils, as well as acetyeugenol, eugenol, gallotannic acid, and resin gum. It serves as a flavoring agent.
- Clove oil is preferred by dentists for use as an oral anesthetic and as a root canal disinfectant. Clove can relieve toothaches and contains a wide range of antibacterial properties[24].
- Clove is used to inhibit growth of food borne bacteria like *Bacillus subtilis*, *Salmonella.typhimurium*, *Staphylococcus aureus* and *Listeria monocytogenes*
- According to reports, clove oil has anti-inflammatory properties and is a popular addition in toothpaste and mouthwash. In dentistry, eugenol from cloves mixed with zine oxide is used as a temporary filler for cavities.
- It can be purchased as a tincturet (1:5,25% ethanol), lozenges, and mouthwash[25,26].



Fig-2:Clove

5.2 NEEM (*Margosa.Azadirachta*)

- It consists of nearly all plant elements, themost significant of Which are the stem bark,root bark, leaves, and flowers,fruits of the Meliaceae family plant *Azadirachtaindica*.
- It is indigenous to Pakistan and India. The complex tetranortripenoid lactones azadirachtin, nimbim, salamin, and nimbolin B are found in neem seeds.
- Neem has antioxidant, antifungal, antiviral, antitumor, and antimicrobial properties [24,25].
- Periodontal disease is treated effectively by *A. indica* in dentistry[27].
- *Indica* is the best remedy for treating mouth ulcers, treating tooth pain, and treating tooth decay. The antibacterial activity of against numerous bacteria, including *S. mutan* and *S. faecalis*, has been demonstrated[28]
- Neem functions as an anti-inflammatory agent by inhibiting prostaglandin E and 5HT. Bacterial cell walls can be destroyed by azadirachtin, and osmotic pressure changes cause cell death[12].
- *Azadirachtaindica* exhibits sensitivity to *Escherichia coli* and *Staphylococcus aureus*. It is used in very small amounts because it is notorious for being bitter[7].



Fig-3: Neem

5.3GUAVA (*Lemon Guava, Apple Guava*)

- It belongs to the Myrtaceae plant family. It is a small tree that can reach a height of three meters, and its fruit, bark, and leaves are primarily used in herbal remedies.
- Leaf decoction can be used as mouthwashfor a number of illnesses, including toothaches, sore throats, inflamed gums, etc.[11]. It contains bioactive substances like saponin, tannin, flavonoids, and alkaloids that are effective against a variety of disorders.
- Guava mouthwash can be used a few times per day as an antiseptic and astringent, and it can treat pain and swelling in the gums, a sore throat, pyorrhea, and bleeding gums.
- Ferdinand et al. reported that morin-3-o-llyxoide and morin-o-arabinside,

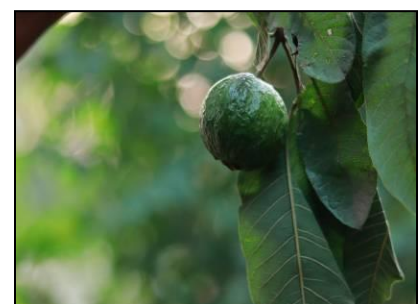


Fig-4: Guava

flavonoids extracted from leaves that have potent antibacterial and antiviral action and are effective in treating aphthous ulcers[10].

5.1 POMEGRANATE (*Punicagranetum*)

- The Punicaceae family includes the historical fruit *Punicagranetum* L. The pathogens in pomegranate extract are effectively reduced periodontal disease that is ongoing[7].
- Pomegranate juice can prevent viral infections, and the fruit's extract has antibacterial properties. Active substances have anti-inflammatory qualities that helps to calm irritated tissues and may prevent microorganisms from sticking to the surfaces of teeth[10].
- It contains gallotannins, anthocyanins, and other flavonoids, as well as ellagic acid in both free and bound forms. Its antiviral activity has been documented, and it was discovered that the combination of pomegranate and ferrous salt increased the polio virus's susceptibility to infection[23].
- Due to their antibacterial, anti-inflammatory, and antioxidant properties, seeds and juice have been studied as a tonic for the heart and throat[10].
- Pomegranate exhibits sensitivity to *Escherichia coli*, *Staphylococcus aureus*, *Lactobacillus bulgarius*, *Streptococcus pyogenes*, and *Lactobacillus bulgarius*[7].



Fig-5: Pomegranate

6. ADDITIONAL HERBS USED IN FORMULATION OF MOUTHWASH :

6.1 CARAWAY: (*Meridian Fennel*,*Persian Cumin*)

- It is made from dried, ripe *CarcumCarvi* fruits, which belong to the Umbelliferae family.
- It originated being used in Europe. It has antimicrobial, antiseptic, and antihistaminic properties.
- Caraway should not be given to children under the age of two due to some adverse effects, including skin and mucous membrane irritation[23,25].



Fig-6: Caraway

6.2 GINSENG (*Panax*,*Asiatic Ginseng*, *Pannag* ,*Ninjin*)

- It is made from the roots of *Panax ginseng* and other *Panax* species that belong to the Araliaceae family.
- The root possesses emetic, tonic, alternative, carminative, and demulcent properties[24].
- Triterpene, saponin, and oleanolic acid make up the chemical composition. Hypertension, jitters, skin rashes, and insomnia are side effects[25].
- It is used as mouthwash for ulcers and periodontal disease. People who have an allergy to plants in the Asteraceae family (radweed, aster, chrysanthemums[25]) should not use it.



Fig-7: Ginseng

6.3 GREEN TEA (*Thea*)

- It is made from the *Camellia sinesis* leafbud and leaves, which belong to the Theaceae family[29].
- It is antibacterial, anti-inflammatory, and antiviral[25].
- Periodontal disease is treated with green tea. Green tea contains polyphenols, of which (-) epigallocatechingallate, (-) -epicatechingallate, and (-) -epigallocatechin are the most important. *P.gingivalis* and *Prevotella* spp., which cause periodontal disease and produce odors, are susceptible to catechin's in vitro bactericidal activity[30].



Fig-8: Green tea

7. LITERATURE REVIEW :

| Sr. No | Title of research article | Name of herbal plant used | Use of mouthwash | Name of Author | Name of Journal & Year of publication |
|--------|--|---|---|---|---|
| 1. | Preparation of Antibacterial herbal mouthwash against oral pathogens | Neem,tulsi,mint,pomegranate, turmeric | Antibacterial | J Nasreen Banu , V. Gayatri | International Journal of current microbiology and applied science,2016, |
| 2. | Design, development and Evaluation of herbal mouthwash for antibacterial potency against oral bacteria | Neem ,spinach, tulsi,peppermint | Antibacterial | Shweta S. Patil, Akshay R Yadav, Dr.Atul R Chopade, Et Al | Journal of university of shanghai for science and technology , vol 22,issue 11 nov 2020 |
| 3. | Formulation of Antibacterial Mouthwash from Local Herbs:A Mini Review | Clove, oakgall, turmeric, neem, rosemary, ginger, peppermint,tea leaves | Anti-Inflammatory antibacterial | JumanNafea, HarisunYaoub, Mohamed FarajEdbeib,et al. | Journal of Biochemistry ,Microbiology and Biotechnology,2020 vol8,No2,7-12 |
| 4. | Antimicrobial Activity of Medicinal plant Leaf Extracts against Pathogenic Bacteria | Green tea, Guava, Neem, Marigold leaves | Antimicrobial activity or Antibacterial | AtikyaFarjana, Nagma Zerrin,Md. Shahidul Kabir | Asian Pacific Journal of Tropical Disease,2014,4(suppl 2):S920-S923 |

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