

A REVIEW ON HERBAL MOUTH WASH A NATURAL APPROACH TO ORAL CARE.

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ABSTRACT

A mouthwash is also be recommended for an Anti-inflammatory, analgesics well as antimicrobial activity. In the current situation main objective of the mouthwash is reduces the plaque and improve the oral hygiene. The herbal mouth wash contains the ingredient which have the any pharmacological activity. The herbal mouth wash contains natural plant like Tulsi, Cinnamon, Neem, etc. Mouth wash are helps to reduce plaque as well as improve the oral hygiene and help to reduces formation of bad cavities. Herbal mouthwash which has Antimicrobial & Antibacterial properties & useful for oral hygiene. This review attempts to provide an overview of natural ingredients that can be used as mouthwash.

KEYWORDS: - Herbal mouth wash, Natural herbs, Oral hygiene, Dental plaque.

INTRODUCTION

Mouth washes 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. Numerous studies have been conducted on the versatility of these rinses to affect plaque formation and alter the progression of gingivitis inflammation. Over 50% of the Flavin Adenine Dinucleotide (FAD) drugs come from natural sources, and naturally occurring substances play a really significant

role in drug development.^[1] It should contain, glycerin, synthetic sweetness, surface-active agents, flavoring agents, coloring agents, etc.^[2] Mouthwash is more effective in plaque control, it cannot be used for long duration because some of its unpleasant side-effects after long duration usage pays more attention toward herbal drugs. Plants and plant extracts demonstrate effects that are immune enhancing, anti-inflammatory, anti-cancer, etc.^[2] The pliability of these rinses to influence plaque formation and to vary the course of gingivitis inflammation has been extensively studied. Over 50% of the fashionable drugs are of natural products origin and intrinsically natural products play a really important role in drug development. This study will discuss intimately about the benefits of herbal mouthwash as compared with chemical mouthwash.^[3] Mouthwash is an aqueous solution which is most often used for its deodorant, refreshing and antiseptic properties or for control of plaque. It may contain alcohol, glycerin, synthetic sweetness, surface active agents, flavoring agents, coloring agents, etc. Mouthwashes are liquids which contain anti-inflammatory, antimicrobial, and analgesic antibacterial action. There are two types of mouthwash - chemical and herbal.^[5] Research has connected specific oral diseases such dental caries, periodontal disease, and bad breath to oral bacteria, particularly those with adherent biofilm features. 70% to 100% of people worldwide have gingivitis, which is directly linked to tooth plaque, which has negative effects on oral health. Although gingivitis is treatable by controlling plaque, it can advance with poor dental hygiene and eventually impair the entire periodontal attachment system of the affected teeth, leading to further negative effects such periodontitis, tooth loss, and a lower quality of life.^[6] A higher prevalence of oral problems has been observed in the elderly population. One of the treatment options for some of these pathologies is the administration of mouthwashes combined with mechanical removal techniques. Besides, each type of oral rinse treats certain oral diseases, and it should be selected for each specific situation.^[8] More than 600 kinds of bacteria reside in the human oral cavity, which is known to suffer from dental caries and periodontal diseases, which are representative oral diseases.^[8] Mouthwash used to clean bacteria in the mouth are known to prevent microorganisms in the oral cavity from attaching to the dental pellicle or the surface of the teeth and act as a bacteriostatic agent to suppress buildup of dental plaque.^[9]

Current scenario tells us that the world is severely affected by covid-19 pandemic; Dec 2019 corona virus came into existence and changes our life completely. Prime moto is to take the safety precautions like wearing masks, using sanitizers, staying indoors, and maintaining social distancing and strengthen the immunity.^[10] This disease id having variety of symptoms

and the symptoms are mild to severe. Majority of patient shows the fever followed by cough, myalgia, and fatigue.

Ayurveda and some traditional Chinese medicines from Vedic period 1600-500 BCE, giving world the potential medicines to boost the immunity and cure against illness caused by microorganism.^[11] Drugs from ayurveda having wide range of effectiveness against various microorganisms without showing any side effect. By taking herbal drugs or medicines which are having active chemical constituent which may be having therapeutic effect like anti-inflammatory, antiviral, etc.^[12] Curcuma longa is a widely used as ayurvedic drug because of its effects like antioxidants, anti-inflammatory, anti-mutagenic, anticancer, antimicrobial effects.^[13,14]

Ashwagandha, giloy, tulasi, cardamom, cinnamon, cinchona, turmeric, amla, black pepper, fennel, garlic are some common examples of drugs used from the ancient times to cure multiple diseases. All the drugs potentially proven for their immune modulatory, anti-oxidant and anti-inflammatory properties. Because of that only the death rate in India is lower than others.^[15]

Glycyrrhiza Glabra roots are used in treatment of bronchitis and gastritis from ancient times. It is also having anti-oxidant and anti-inflammatory property.

Citrus Limon (Lemon)-Lemon is rich in vitamin C and it is also used to relieve cough and used as expectorant in bronchitis. It is also used as anti-inflammatory for sore throat.^[16]

Zingiber Officinalis (Ginger)- Many preclinical studies reports analgesics, expectorant, antipyretic, and anti-inflammatory effect. It is also effective in common cold and cough, asthma.^[17,18] The decoction of ginger, clove, and piper nigrum provides humeral and cell mediated response to healthy as well as covid-19 infected person. It also reduces the nasal congestion. The drug like Tulsi is present in every home garden also having wide range of effects like anti-microbial aromatic etc.^[19,20]

MOUTH: - In human anatomy, the mouth is also known as the oral cavity or buccal cavity. opening through which the body receives food and air. The back of the mouth empties into the throat after opening to the outside at the lips. The lips, cheeks, hard and soft palates, and glottis define their limits. It is split into two parts: the vestibule, which includes the region between the cheeks and teeth, and the oral cavity. The tongue, a sizable muscle that is firmly

attached to the floor of the mouth by the frenulum linguae, fills the latter region to a great extent.

ANATOMY OF ORAL CAVITY

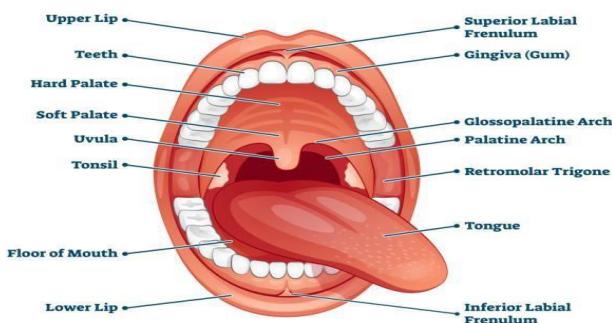


Fig 1. Anatomy of Oral Cavity.

Functions of the Mouth:- By causing salivation and propelling the alimentary bolus into the pharynx, it starts the digestive process. Additionally, it is a location for the chemosensory organ and the speech sound generator. Chewing and swallowing are facilitated. Taste buds on the tongue are used to detect flavor.

Oral Mucosa:- The term "oral mucosa" refers to the mucous membrane that lines the structures inside the boundaries of the oral cavity. Apart from teeth, the oral mucosa, which is the skin lining of the mouth, covers most of the oral cavity. The oral mucosa is continuous with the skin at the lips, and it is continuous with the mucosa lining the remainder of the gut at the throat. The two tissue components that make up the oral mucosa are the underlying connective tissue and the overlying epithelium.

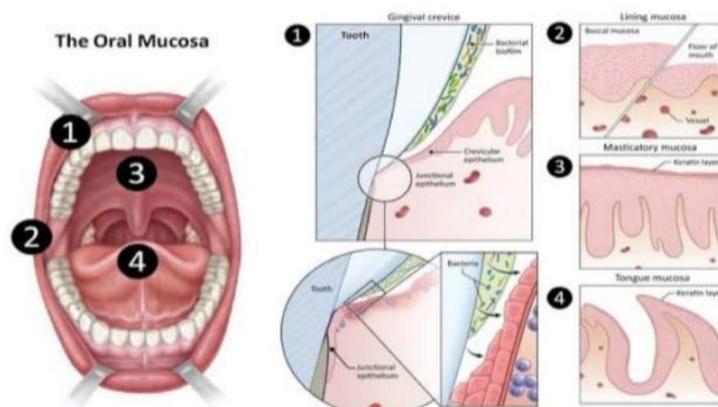


Fig 2. Anatomy of Oral mucosa.

Layers of oral mucosa: - Oral mucosa is composed of four layers

- Stratum basale
- Stratum spinosum
- Stratum granulosum
- Stratum corneum

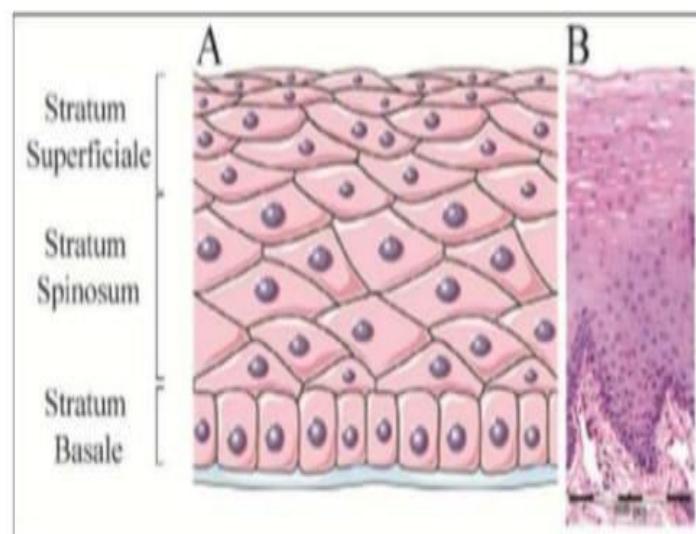


Fig 3. Layers of Oral mucosa.

Functions of the oral mucosa include

Protection against abrasion and mechanical forces from food chewing as well as from microorganisms that live in the mouth cavity.

Sensation: Touch, pain, taste, temperature

Secretion - Saliva is a major secretion.

The defense integrity of the oral epithelium serves as a reliable barrier against the invasion of microorganisms.

Mouthwash: Used to clean and deodorize the mouth or buccal cavity, mouthwashes are concentrated, clear, aqueous solutions with a pleasant taste. They help to maintain oral hygiene and treat oral infections. Hydroalcoholic solutions, such as mouthwashes or mouth rinses, are used for oral hygiene to clean and deodorize cavities. Mouthwash, also known as a mouth rinse, oral rinse, or mouth bath, is a liquid that is passively retained in the mouth or swirled around the mouth by perioral muscular contraction and head movement. It may also

be gargled, in which case the head is tilted back and the liquid is bubbled at the back of the mouth.

Neem, which has antibacterial properties and reduces oral microbial flora, is an ingredient in mouthwash.

Additionally, peppermint oil, a flavoring ingredient, and germ-killer, is present.

Tulsi oil is used in mouthwash because it possesses antiviral, antibacterial, and cooling qualities.

Why is herbal mouthwash more beneficial?

Due to their ability to target oral infections, provide immediate pain relief, and have fewer adverse effects, herbal mouthwashes are highly sought after. Chemical mouthwashes include hydrogen peroxide and chlorhexidine, which instantly whiten, sterilize, and soothe teeth. However, they tend to cause tooth discolorations and may have unintended side effects, while being reasonably priced.

Herbal Mouthwash

Herbal mouthwash contains a natural ingredient called phytochemical that contains desired anti-microbial and anti-inflammatory effect. Herbal mouthwash becomes more popular they work without alcohol, artificial preservatives, flavor, or colors.^[7] 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 follows: -

Table 1. Herbs Name and their Family and Scientific Name.

Herbs Name	Family	Scientific Name
Neem	<i>Meliaceae</i>	<i>Azadirachta indica</i>
Yavani Satva	<i>Apiaceae</i>	<i>Trachyspermum ammi</i>
Nag Valli	<i>Piperaceae</i>	<i>Piper betle L</i>
Gandhapura Taila	<i>Ericaceae</i>	<i>Gaultheria fragrantissima</i>
Pilu	<i>Salvadoraceae</i>	<i>Salvadora persica L</i>
Bhibhitaka	<i>Combretaceae</i>	<i>Terminalia bellirica</i>
Ocimum	<i>Lamiaceae</i>	<i>Ocimum tenuiflorum</i>
Echinacea	<i>Asteraceae</i>	<i>Echinacea purpurea (L.)</i>
Chameli leaves	<i>Oleaceae</i>	<i>Jasminum officinale</i>

Almost all chemical mouthwashes contain alcohol and fluoride which is toxic to our body in overdose. Hence, most herbal mouthwashes are safe alternative to pregnant women, people

with dry mouth, diabetic and to children. Instead of artificial dyes, herbal mouthwash made of vegetable juices such as beetroot, tomato, carrot, and annatto to add color. Vegetable glycerin, stevia, and xylitol are used as a sweetener in which foster bacteria does not grow. Vegetable glycerin is derived from soy, and it is clear, colorless, and odorless liquid with an incredibly sweet taste used as an agent in toothpaste, cosmetics, shampoos, soaps, herbal remedies, pharmaceuticals, and other household items. Because it is soluble in water and alcohol which also aids herbalists in extracting botanical properties from plant materials without the use of alcohol.^[7] Stevia is a natural sweet herb used by diabetic patient and it also inhibits the growth and reproduction of some bacteria and other infectious Organisms, including the bacteria that cause tooth decay and gum disease. Xylitol is a natural sweetener which helps to improve the dental health, to prevent bacteria from sticking to teeth and freshens the breath and cleans the mouth.^[5]

Types of Mouthwash

Here is an inventory of the various sorts of mouthwash.

- a) **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 is not good for your overall health.^[21]
- b) **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.^[21]
- c) **Cosmetic mouthwash:** A mouthwash that does not really do anything to your overall oral care but is just how to freshen your breath or to mask bad breath.^[21]
- d) **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.^[22]

Natural plant use in herbal mouth wash

1. **Peppermint (*Mentha piperita L.*):** Peppermint incorporates a high menthol content, and is usually used as tea and for flavoring dessert, confectionery, chewing gum, and

toothpaste. The oil also contains menthone and menthyl esters, particularly menthyl acetate. It is the oldest and preferred flavor of mintflavored confectionery. Peppermint could also be used in shampoos and soaps, which give the hair a minty scent and gives a cooling sensation on the skin.^[23]



Fig 4. Peppermint.

2. Clove (*Syzygium aromaticum*): 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.^[24]

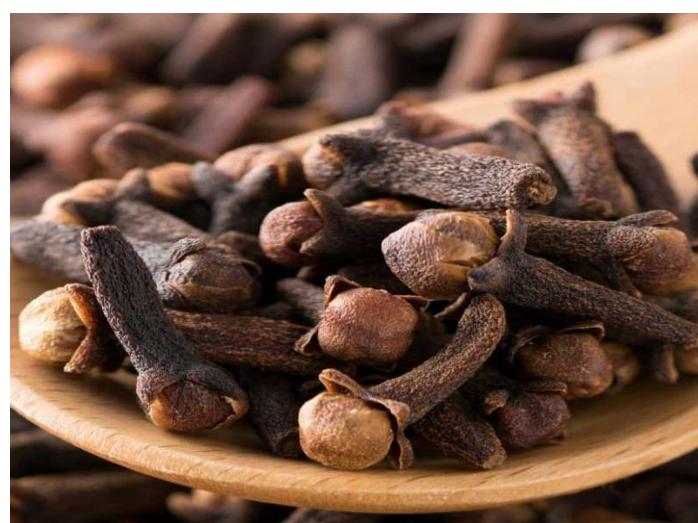


Fig 5. Clove.

3. Ajwain (*Trachyspermum Ammi L.*): Ajwain is used as an antiseptic. It is used for cleaning wounds and treating skin infections. Oil of Ajwain is additionally utilized in toothpaste and perfumery. Ajwain leaves are crushed and applied on infections. Ajwain seeds are utilized in prevention of bad breath. Thymol from Ajwain seeds is additionally utilized in various mouthwashes. Regularly chewing of Ajwain seeds alongside fennel seeds prevents bad breath.^[25]



Fig 6. Ajwain.

4. Tulsi (*Ocimum sanctum* or *Ocimum tenuiflorum*): Tulsi/Basil in Ayurveda having many medicinal properties and a wide therapeutic range. The leaves are quite effective for the ulcer and infections in the mouth. The anti-inflammatory and anti-infectious properties of Tulsi make it a powerful treatment for gum disease. The leaves are quite effective for the ulcer and infections in the mouth. It is also useful in pyorrhea and other gum disorders. The anti-inflammatory and anti-infectious properties of Tulsi make it a powerful treatment for gum disease.^[26]



Fig 7. Tulsi.

5.Turmeric (*Curcuma Longa*):- Turmeric is used for oral care in several ways. A mouth gel or rinse that is turmeric-based can decrease plaque and bacteria deposits on gums. Turmeric powder mixed with water or coconut oil can be used as a paste to reduce gum inflammation and pain. Further, research has proven that turmeric gel is equal to chlorhexidine, which is a well-known chemical mouthwash, in preventing plaque formation and promoting healthy Gums.^[27] Daily oral care incorporating turmeric can go a long way in helping to keep gums healthy and avoiding periodontal diseases. It reduces inflammation by lowering histamine levels and by increasing the production of natural cortisone by the adrenal glands. Curcumin is also useful for reducing inflammation and symptoms such as pain and stiffness in the joints. Turmeric in diet may prevent pain from arthritis, bursitis and tendonitis. A separate double blind clinical trial found that curcumin was superior to placebo or phenylbutazone (NSAID) for alleviating post-surgical inflammation.^[28]



Fig 8. Turmeric.

Chemicals use in herbal mouth wash

Chlorhexidine: Chlorhexidine mouthwash is the gold standard mouthwash which is good example for chemical mouthwash. It is a cationic polybiguanide. It is basically antibacterial used as an antiseptic and for other applications. A variety of products are available chemical plaque control, which is divided into the first generation (e.g., phenols, quaternary ammonium compounds) second generation (e.g., bisbiguanides chlorhexidine gluconate [CHXG]), and third generation (e.g., delmopinol).^[29]

Chlorhexidine is an important ingredient in mouthwashes to reduce plaques accumulation and bacterial growth. Hence, it is used during the treatments such as gingivitis, periodontitis, trauma, and after wisdom tooth extraction.

Side effects: Mouth irritation, Tooth staining, Dry mouth unusual or unpleasant taste in your mouth, or Decreased taste.

Benzydamine Hydrochloride: Benzydamine hydrochloride is assumed for its analgesic, anesthetic, anti-inflammatory, and antimicrobial properties. The precise mechanism of action is not fully understood but it probably affects the prostaglandin and thromboxane production and reduces pro-inflammatory cytokine production. Epstein *et al.* demonstrated that Benzydamine significantly reduces the duration, incidence, and severity of radiation-induced mucositis. Therefore, it is recommended for radiation-induced mucositis and ulcerative lesions like recurrent aphthous stomatitis.^[4]

Side effects: This may cause burning, stinging or numbness within the mouth or throat. Throat irritation, cough, waterlessness with thirst, and headache have also been reported.

Sodium Bicarbonate: It increases the salivary pH and suppresses the expansion of aciduric bacteria. Therefore, it is recommended in patients with xerostomia and erosion. Ethanol is used as a preservative and solvent in an exceedingly concentration range of 5 – 27 you uninterested in various commercially available mouthwashes. It is antimicrobial activity against various bacteria, fungi, and viruses by causing protein denaturation and dissolution of lipids. Various studies are done to ascertain the connection between use of alcohol containing mouthwashes and the danger of developing oropharyngeal cancer.^[4]

Uses of Mouthwash

Many conditions within the oral cavity require the use of a mouthwash. This can vary from breath fresheners to treatment of life-threatening secondary infections such as oral mucositis in patients undergoing bone marrow transplant therapy. The use of mouthwashes requires a correct diagnosis of the oral condition and a thorough knowledge of the product to achieve effective treatment. The selection needs to take into consideration factors such as the patient's oral condition, their disease risk and the efficacy and safety of the mouthwash.

Recommending particular mouthwashes should take into consideration the patient's ability to perform good oral hygiene practices (tooth brushing and dental flossing), the condition of their teeth, gingiva and oral mucosa, their risk of oral disease (for example, presence of xerostomia, and the proven efficacy of the mouthwash and its potential adverse effects).^[30]

Mouthwashes should only be used for short periods of time and should never be the sole means of oral hygiene. It can be used in the following cases.^[5]

- Halitosis
- Mucositis
- Periodontal Diseases
- Gum Disease
- To control plaque
- To relieve pain
- To effectively deliver fluoride to prevent dental caries
- Reduce inflammation.^[5]

Used of mouthwash in Daily Routine

1. Bad Breath (Halitosis): To freshen breath and kill odor-causing bacteria.
2. Plaque Control: Helps reduce plaque buildup and maintain 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.

Benefits of Herbal Mouth Wash

For the following reasons, herbal mouthwash has become more advantageous than the chemical mouthwash-

- Herbal mouthwashes are non-irritant and they have nonstaining properties. They are less harmful and have very few or no side effects.
- Herbal mouthwashes are the better option for even the most sensitive mouth.
- Herbal mouthwashes have naturally antibacterial property as they have polyphenols.
- It does not contain any abrasive additives.
- Unlike chemical mouthwashes, herbal mouthwash does not cause dry mouth.^[5]

METHOD OF PREPARATION OF HERBAL MOUTHWASH

A. Material used

Tulsi Extract, Cinnamon Oil, Clove Oil, Neem Oil, Turmeric Oil, Peppermint Oil, Nagarmotha Extract, SLS, Peg 400, Distilled Water.^[31,32]

B. Formulation of Herbal Mouthwash

- Dissolve the Tulsi extract 2.0ml and Nagarmotha extract 1.0ml in a separate container (no.1) and add distilled water to obtain a clear solution and well shake it.
- In a separate container (no.2) add 2 drops of peppermint oil, 2 drops of clove oil, 2 drops of neem oil, 2 drops of cinnamon oil and 1 drop of turmeric oil and mix it properly. Then slowly add polyethylene glycol 400 and slowly add SLS, stir well to obtain a clear solution.
- The 1st solution is slowly added in the 2nd mixture, stir well and slowly add a distilled water to make a volume up to 100 ml and then shake it continuously and clear liquid has a fresh mint taste.^[32]

Table 2: Formulation of herbal mouthwash.^[32]

Sr. no.	Ingredient	Function/Activity	Percentage (%)
1.	Neem oil	Antimicrobial	0.2%
2.	Cinnamon Oil	Bactericidal	0.2%
3.	Clove Oil	Analgesic, Anti-inflammatory	0.2%
4.	Peppermint Oil	Freshener, Anti-bacterial, Anti-fungal	0.2%
5.	Turmeric Oil	Anti-microbial Anti-inflammatory	0.1%
6.	Tulsi Extract	Anti-inflammatory, Anti-oxidant	2.0%
7.	Nagarmotha Extract	Flavoring agent	1.0%
8.	PEG 400	Solubilizing agent	16%
9.	SLS	Foaming agent	00.20%
10.	Distilled water	Vehicle	q.s.e.

EVALUATION OF HERBAL MOUTH WASH

Physical evaluation: - Physical parameter such as color, odor, taste and consistency were examined by visual examination.^[30]

pH determination: - The pH of formulated mouthwash was 5, falling within the ideal pH range for mouthwash which is 5.5 or below. The formulated mouthwash is acid balanced which is near to the skin pH.

Test for microbial growth in formulated mouthwash: - The formulated mouthwash was inoculated in the plate of agar media by streak plate method and a control was prepared. The plates were placed in the incubator and are incubated at 37°C for 24 hours. After the incubation period plate were taken out and checked for microbial growth by comparing it with the control.^[32]

Thin layer chromatography: - Thin Layer Chromatography is a technique used to isolate non-volatile mixtures. The experiment is conducted on a sheet of aluminum foil, plastic, or glass which is coated with a thin layer of adsorbent material. The material usually used is aluminum oxide, cellulose, or silica gel.^[32]

DISCUSSION AND CONCLUSION

In the current review we conclude that herbal mouth wash is helpful to reduction of formation of dental plaque as well as inflammation. Mouthwash plays effective role during dental treatments on short term usage. Herbal mouthwashes are suitable for maintaining good health and hygiene. Some of the common herbs are mostly used in the preparation of mouthwash are easily available in nature as well as market. If using the herbal mouth wash is helpful to the good health, they do not show adverse effects in most of the herbs are containing the active ingredient which interact with dental bacteria and overcome its plaque formation.

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