Formulation and Evaluation of Herbal Mouthwash

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Abstract
The oral cavity is the home of various bacterial species. All through some of the oral bacteria are harmless and there are certain species that are harmfull which may causes oral plaque, bad breath and mouth disease. Thus maintain a good oral hygiene is essential for healthy mouth and body. The importance of herbs are highly considered as effective in contrast chemical products. Medicinal plants play important role in curing diseases due to their antimicrobial and antifungal activity against human pathogen through decades. Herbal product help to control dental plaque, inhibit growth of bacteria, freshen breath, cleanse tooth. Herbal mouthwashes can be used as an adjunct to various oral hygiene practices like tooth brushing, flossing. They have effective anti-inflammatory, anti-plaque properties and hence can be used in supportive periodontal therapy. Various herbal product and their extract such as Neem, Turmeric, clove, peppermint have shown significant advantages over chemical ones. Medicinal plants play a vital role in curing disease due to their anti-bacterial, anti-microbial, anti-fungal activity against human pathogen through decades. Natural mouthwashes may offer significant advantages over chemical ones. If such formulation can be formulated by which can be easily prepared and used safety by people at home using natural product. It may lead to improvement in the general dental health of population. Herbal mouthwashes are in high demand because they act on oral pathogen and relieve the pain instantly and are also less or no side effect. One of the most common infectious diseases encountered by many individuals are dental carries and periodontal disease at different stage of lifetime. This review is an attempt to outline such natural substances can be used as a effective mouthwashes. The present study aimed to formulate polyherbal mouthwash that have antibacterial properties.

Keywords: Herbal mouthwash, Herb, Natural extract, Neem, Turmeric, Clove, Liquorice, Peppermint

Introduction

History

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 emphasize 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.

• Before Europeans came to Americas, Native North American and Mesomerican cultures used mouthwashes, often made from plants such as Coptis trifolia.

Mouthwash, mouth rinse, oral rinse, or mouth bath is a liquid which is held in the mouth passively or swilled around the mouth by contraction of the perioral muscles and/or movement of the head, and may be gargled, where the head is tilted back and the liquid bubbled at the back of the mouth. Usually mouthwashes are antiseptic solutions intended to reduce the microbial load in the mouth, although other mouthwashes might be given for other reasons such as for their analgesic, antiinflammatory or antifungal action. Additionally, some rinses act as saliva substitutes to neutralize acid and keep the mouth moist in xerostomia (dry mouth).Cosmetic mouth rinses temporarily control or reduce bad breath and leave the mouth with a pleasant taste. Herbal Mouthwashes are in high demand, because they act on oral pathogens and relieve the pain instantly and are also less side-effective. Chemical mouthwashes have hydrogen peroxide and chlorhexidine as an immediate whitener, sterilizer and pain reliever of teeth, but they tend to produce discoloration of teeth and may produce side effect, meanwhile they are cost effective. One of the most common infectious diseases encountered by many individuals is Dental carries and Periodontal diseases at different stages of their life time. The mouth washes are concentrated aqueous anti-bacterial solution that are used against oral microbes to counter oral infection, cleansing, to get rid of bad breath refreshing ,anti-septic .The mouthwash plats an prominent role in the oral hygiene of an individual ,it helps to relieve symptoms of inflamed gums gingivitis. And also it reliably used to destruct the pathogenic germs. The mouth washes are used by most of the dental patients to overcome sour mouth (xerostomia), ulcerated throat and sensitive teeth. Dentists always use mouthwash as an antimicrobial agent before oral surgery of the patients, because they help to sterilize the surface of the inflamed gums and teeth, thereby the contamination of any other microorganisms can be avoided.

Define

• Mouthwash

Mouthwash is an aqueous solution which is most often used for control of plaque and is a medicated liquid which is held in mouth and swished by the action of perioral musculature to eliminate the oral pathogens.

• Herbal Mouthwash

Herbal mouthwashes are mouthwashes which are prepared from natural plant extracts. The natural extract present in the herbal mouthwashes are obtained from various plant leaves, fruits, seeds and various tree oils.

Why should we prefer Herbal Mouthwash?

Herbal mouthwashes are high in demand, because they act on oral pathogens and relieve the pain instantly and are also less side-effect. Chemical mouthwashes have hydrogen peroxide and chlorhexidine as an immediate whitener, sterilizer and pain reliever of teeth, but they tend to produce discoloration of teeth and may produce side effect, meanwhile they are cost effective.

Advantages of Herbal Mouthwash

• The use of herbal mouthwash has grown advantage over chemical mouthwashes due to their non-irritant and non-staining properties and it does not contain alcohol.

• They have very minimal or no side effect and they are less harmful.

• All herbal mouthwashes do not contain alcohol and/or sugar.

• Herbal mouthwashes is gentle for even the most sensitive mouth.

• Herbal mouthwashes has naturally antibacterial property.

• It contain no harsh additives.

• Herbal mouthwash doesn’t cause dry mouth.

• It is highly in demand.

• It keeps your mouth healthy.

• Herbal mouthwash do not contain:
1. Sugar
2. Artificial colors
3. Stannous fluoride
4. Artificial sweetener
5. Cetylpyridinium chloride (CPC)
6. Sodium Lauryl Sulphate (SLS)
7. Harsh chemical preservative
8. Dyes

Use of Herbal mouthwash

• Many conditions within the oral cavity require the use of a mouthwash
• This can vary from breath freshener to treatment of life threatening secondary infectious such as oral mucositis in patient undergoing bone marrow transplant therapy
. • The use of mouthwashes requires a correct diagnosis of the oral condition and through knowledge of the product to achieve an effective treatment.
• Use of herbal mouthwash is to improve oral hygiene.
• It help to control dental plaque.
• It can be use in gum diseases.
• Used for killing germs in oral cavity.
• It freshen breath and covers bad breath.
• Using a mouthwash for gum disease prevention is very important.
• It is use to clean septic sockets.
• It relieve pain and inflammation.
• In treatment of Mucositis and Halitosis
• Used in Periodontal dise

Table no 2. Marketed formulation ,key ingredients and category of mouthwash

SR NO	Brand name	Key ingredient	Part used	category
1	Himalaya herbals active fresh mouthwash	Fennel oilment	Dried seed oil used	Antimicrobial property fresh breath
2	Sylveco herbal mouthwash	Papermint oil sage clove bud	Leaves aq. Extract clove bud	Breath freshner anti inflametry prevention of cares
3	K P Namboodirin herbal herbal fresh mouthwash alcohol free	Menthol clotitries ginger nutmeg cardmoim	Leaves bud	Breath fresher anti microbial
4	Bioayurveda basics	Tulsi turmeric neem lemon	Leaves powder leaves extract	Anti bactecterial prevent plaque
5	Amarantha herbal mouth wash	Amarantha nimbi gandhapura leaf	Leaf extract	Freshness anti septic anti plaque anti gingivitis
6	Listrine naturals	Eucalyptol menthol thymol	Oils and extract	Reduce sensitivity remove detail plaque
7	Biomedsensetive mouthwash	Plantin brich leaf oak bark bromelain red grahe	Extracts	

Aim –

The primary function of a mouthwash is to clean and refresh the oral cavity. In addition, a number of modern formulations contain fluoride to prevent the development of caries and/or agents that inhibit or destroy oral microbial populations that are involved in generating dental plaque or oral malodour.

Objectives

Use of herbal mouthwash is to improve oral hygiene. It help to control dental plaque. It can be use in gum diseases. Used for killing germs in oral cavity

Herbal product as mouthwash

• Neem

Biological Source- The part of plant used are leaves of the plant Azadirachta indica belongs to the family Meliaceae.

Chemical constituent- Nimbin, Nimbdin, Nimbinin.

It inhibit the formulation of plaque and the growth of the bacteria. The leaves, twigs and seeds of neem have been used to clean the teeth and fight bacterial infection. Neem extract is appropriate for treating, gingivitis and oral infectious because it inhibits the formation of plaque and growth of bacteria. The leaves, twigs and seeds of neem have been used in India and South Asia for thousands of years to clean the teeth and fight bacterial and fungal infection. Neem extract is appropriate for treating gingivitis and oral infections because it inhibit the formation of plaque and the growth of bacteria. Neem has been shown to have significant effects on both gram-positive and gram-negative bacteria and other bacteria that cause a wide array of human and animal diseases including E.coli, streptococc

Nearly all parts of the neem tree are useful, and many of its medicinal and cosmetic uses are based on its antibacterial and antifungal properties. Neem is commonly used in shampoos for treating dandruff and in soaps or creams for skin conditions such as acne, psoriasis, and athlete's foot. It is also a component in some toothpastes and mouthwashes, especially in the Indian subcontinent, and young twigs are used directly as crude toothbrushes in rural areas. Neem leaves have long been used as a traditional treatment for diabetes, and there is some clinical evidence suggesting that it may help control blood sugar levels. Neem oil and neem bark and leaves are unsafe for consumption by pregnant women and can cause miscarriage.

Tulsi

Scientific name: Ocimum Sanctum

Family: Lamiaceae

Kingdom: Plantae

Order: Lamiales

An annual delicate herb cultivated extensively in tropical climate of the country. It is also planted in kitchen garden and as an indoor plant since it is kept sacred in Hindu philosophy. Medicinally the leaves are used for various kind of class

Use

Indian mythology attaches a great significance to Basil by recognizing it as a holy herb. Perhaps, such significance comes from the actual health applications of the herb. Its use is recommended as a first aid in the treatment of respiratory, digestive and skin diseases. Apart from these common ailments, Ayurveda also recognizes its use for the diseases ranging up to tumerous growths. Experimental studies identify it to be a highly promising immunomodulator, cytoprotective and anticancer agent.

Clove Oil

Biological Source

Clove consist of dried flower bud of the plant Eugenia caryophyllus belongs to the family Myrtaceae.

Chemical constituents- Eugenol, caryophyllene, methyl amyl ketone. Clove is dental analgesic also it fights bad breath, effective at fighting cavities, stimulate circulation

Uses

Before you use clove oil, you need to dilute it. Clove oil should never be put on your gums undiluted because it can cause irritation and may lead to toxicity. Clove oil can be diluted by adding two to three drops to a neutral carrier oil, such as olive oil or canola oil. Then, the oil preparation can be dabbed onto the affected area with a cotton ball or swab. You can actually keep the cotton ball in place for several minutes to help it absorb better. Once you put the clove oil on, you should feel a slight warming sensation and taste a strong, gunpowdery flavor. The numbing effect is usually fully felt within five to 10 minutes. You can reapply the clove oil every two to three hours as needed. If you have more than one area of mouth pain after a dental procedure, you can add a few drops of clove oil to a teaspoon of coconut oil and swirl it in your mouth to coat it. Just be careful that you do not swallow it. Some people apply ground cloves directly to their gums; however, the taste is not very pleasant.

Peppermint Oil

Biological Source Leaves of the plant Mentha piperata, a aromatic hern belongs to family Lamiacea.

Chemical constituents

Menthol, Menthone, cineole.

Peppermint is the mint that is most often used commercially in mouthwash because of its strong, pure, qualities. Mint is good remedy for gingivitis. Peppermint gives fragrance. Peppermint oil is more effective to reduce cavities. It has healing properties as well as anti-viral and anti-bacterial properties, it is an analgesic.

Liquorice

Biological SourceIt

is an extract from the plant Glycyrrhiza glabra belongs to the family Leguminosae

Chemical constituent-

Glycyrrhizin. Use of Liquorice, it is a natural sweetening agent as well as flavouring additive.

Uses Antimicrobial activity of licorice was shown in many studies (28,29). It is used for many purposes like antibacterial agent, for ulcerous lesions, mouth wash, endodontic infections, and periodontitis. It demonstrates anti-inflammatory, antimicrobial,

Table no 3: Formulation of herbal mouth wash

Ingrediants	F1(in20 ml)	F2 (in15ml)	F3 (in10 ml)	Function
Neem Extract	5ml	5ml	4ml	Active drug
Tulsi Extract	5ml	3ml	2ml	Active drug
Clove oil	1 ml	1ml	1ml	Active drug
Mint oil	1.5ml	1.5ml	1ml	flaver
Liquorice	1.5ml	1ml	0.5ml	sweetener
PEG40	2 ml	1.5	0.5ml	surfactant
Purified water	q.s	q.s	q.s	q.s

Material And Methods

Material

Srno	Material
1	Neem
2	Tulsi
3	Clove oil
4	Mint oil
5	Liquorice
6	PEG 40
7	Purified water

List of Equipments

Sr no	Equipments
1	Measuring cylinder
2	Beaker
3	Water pester
4	Conical flask
5	Funnel
6	Water bath
7	Burner
8	Petri dish
9	PH meter
10	Incubeter

Method for preparation of herbal mouthwash

Collection of plants

Leaves Azadirecta indica (neem)Mentha longifolia(mint) Clove Tulsi Were randomly collected from plants Clove oil mint oil liqurice PEG 40 glycerol and alcohol purchased from local market

Preparatoin of plant extract

The collected plant leave were washed with sterile water dried ,pulverized and stored in air tight bottles separately . The Aqueous extract of each plant material was prepared by soaking the powdered plant parts in sterile distilled water and maintain in incubator at 37 C for 72 hours . the herbal extract were filterd using Whatmann filter paper and store in to the container.

Neem extraction process-

Azadrichta indica leaves were harvested and dried for two days at 40°C (plus or minus 1°C). The leaves are then ground into a powder by grinders and kept until extraction in packets of airtight bags. Further, the dried powder is taken and extracted using pure ethanol as the solvent. This mixture has 150 ml of 100% ethanol solvent with 25 g of powdered medication added and is allowed to sit overnight. The extraction process is carried out the following day. It is performed three times, the filtered solvent is removed, and the resulting extract is stored at 5 to 6 degrees Celsius pending further processing.

Fig. Neem extraction

Tulsi extraction process

Azadrichta indica leaves were harvested and dried for two days at 40°C (plus or minus 1°C). The leaves are then ground into a powder by grinders and kept until extraction in packets of airtight bags. Further, the dried powder is taken and extracted using pure ethanol as the solvent. This mixture has 150 ml of 100% ethanol solvent with 25 g of powdered medication added and is allowed to sit overnight. The extraction process is carried out the following day. It is performed three times, the filtered solvent is removed, and the resulting extract is stored at 5 to 6 degrees Celsius pending further processing.

Fig. Tulsi extraction

Methods of Mouthwash preparation –

Weighted quantity of each ingredient will be taken mixed thoroughly in morter and pestle properly with small quantity of water all other remaining ingredient will be gradually added with good mixing Drop by Drop Clove oil and mint oil will be added and mixed properly taking care to avoid lump formation PEG 40 and glycerol will then br added drop by drop and mixed well . Finally, water added to make volume and preservative will br added and the product will be packed in an attractive , well closed container.

Evalution of herbal mouthwash

Colour –colour of herbal mouthwash is faint green colour were test by visual examination

Test – pungent and bitter

PH - pH of prepared herbal mouthwash was measured by using digital Ph meter

the Ph meter

was calibrated using standard buffer about 1 ml of mouthwash was weighed and dissolved in 50 ml of distilled water and its Ph was measured by pH meter.

Test for microbial growth in formulated mouthwash-

The formulated mouthwash was inoculated in the plates 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 plates were taken out and checked for microbial growth by comparing it with the control.

Stability Studies.

The formulation and preparation of any product is incomplete without proper stability studies of the prepared product. Ageneral method for predicting the stability of any product is accelerated stability studies, where theproduct is subjected to elevated temperatures as per the ICH guidelines. A short term accelerated stability study was carried out for the period of 3months for the prepared formulation. The samples were stored at under the following conditions of temperature as 3-50 C, 250 C RH=60%, 400 C ±2% RH= 75%. Finally the samples kept under accelerated study were withdrawn on monthly intervals and were analyzed.

In vitro antibacterial activity –

In vitro antibacterial activity was performed on isolated colonies of Streptococcus mutans. The Agar well diffusion technique was used for determining the zone of inhibition and minimum inhibitory concentrations (MIC). The strains of S. mutans were inoculated in prefabricated blood agar plate. Plates were dried and 4 wells were made with the help of 6 mm agar well cutter. 20 µl, 40µl, 60 µl, 80 µl of prepared mouthwash was loaded in all the respective wells. The agar plateswere kept undisturbed to allow the passive diffusion of herbal mouth wash into the agar culture medium. Then the plates were incubated at 37°C for 24 hours. The zone of inhibition was calculated in mm.

Result & Discussion –

Physical and color stability analysis

• Three different formulation were prepared. Each formulation was then split in half and incubated at two different temperatures: in the refrigerator at12oC and at room temperature at around25oC.

• Two different temperature were chosen to determine the optimum storage conditions for the mouthwash formulation in which they were able to maintain their activity for the longest time possible. The visual appearance phase separation and homogeneity of each formulation were monitored by ocular examination.

• Expectantly, the color of the mouthwash should be maintained throughout the experimental phase to ensure that the mouthwash formulations were acceptable. Mouthwash formulations that were stored in refrigerator (12OC) rendered a light brown color throughout the experiment, whereas those kept at room temperature (25oC) maintained at dark brown color.

• As indicated in the Table 7.1, the original color of the mouthwash was dark brown following the preparations and prior to storage. The dark brown color is dure to the influence of clove extract within the formulations

. • The formulations stored at 25oC did not experience changes in color, unlike the formulations stored at 12oC where there is color shift from dark brown to light brown. The change in color might be attributed to the oxidation of the mouthwash ingredients.

• Although the herbs that were used in mouthwash ingredients have natural anti- oxidants, the low storage temperature might have disable their antioxidant machinery leading to a change in coloration thus lower temperature storage might affect the color stability of the mouth wash formulation. phase separation in the mouth wash was not observed.

A mouthwash containing clove and neem and Tulsi, it is the best formulation is F3 now the stag mouthwash have been prepard long time it is freshness good antibacterial in mouth bacterial disease and over come and herbal mouthwash. It is stable in ph, color and odour for long time storage It is a very less side effect a Neem and tulsi gives the painless and cooling sensation and fresh breath and gives the good order and clove and mint plant gives in plant the good colour of the preparation and it is also the clear the throat infection it is also the good anti bacterial effect. Clove oil in plant a good aromatic order and it constitute and clove oil beneficial for teeth problem and also the antiinflamatry agent. Microbiological study the antibacterial property and inhibition the preparation free form microbia .The results of the present study showed that

herbal mouthwash can cause inhibition of bacterial growth. Bacterial plaques have been proven to have a role in the etiology of dental caries and periodontal diseases. The use of mouthwashes as cleaner can help mechanical methods to reduce plaques. Mouthwashes with antimicrobial effects perform this task using three methods, which include apoptosis, inhibition of bacterial growth and/or cell metabolic inhibition; and depending on their concentration their bactericidal and/or bacteriostatic properties vary.

CONCLUSION

An attempt has been made to outline some of the commonly available herbs and plants, which are readily available and can be used as effective mouthwashes by all.

If people can use and promote such cost effective measures of maintaining the oral health which are also devoid of any untoward side effects, it may help in overcoming some common dental problems.

Herbs which are powerful healing agents, must be used appropriately.

The use of herb in dentistry should be based on evidence of effectiveness and safety.

They will improve the immunity and help in healing of oral infections. Furthermore, the best mouthwash formulation was observed to be more stable when maintained at 25 °C.

Given its stability and antibacterial properties, the polyherbal mouthwash formulated in this study has the potential to be optimized and commercialized for maintaining oral health.Herbs, which are very effective agents, must be used appropriately.

Herbs contain active ingredients that may interact negatively with prescribed medications or other remedies.

It is wise, therefore, to consult a doctor and health expert in situations in which you question the appropriateness of the herb or its interaction withother remedies.

The use of herbs in dentistry should be based on evidence of effectiveness and safety. The anti-bacterial activities could be remove infectious agent in mouth.

The present results therefore offer a greater use for traditional use of herbal mouth wash.

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