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Formulation and Evaluation of Herbal Mouthwash against Oral Infections Disease

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Abstract

Medicinal plants, plays a predominant role in curing and preventing diseases due to their antiviral and antimicrobial activity against human microorganism. Herbal Mouthwash are in high demand as compare to chemical mouthwash, because they act on mouth pathogen and microbes and reduce the pain instantly and are also has a no more side effects. The most commonly infectious diseases cause by a many pathogens and microbes are Dental carries and periodontal diseases at different stages of their life time. The aim of present work is to formulate and to evaluate its effectiveness against microbes present in oral cavity. The four herb *Azadirecta indica* (neem), *Mentha longifolia* (mint), *Syzgium aromaticum* (clove) and *Ocimum sanctum* (tulsi) were selected for mouth wash and Prepared formulation was further evaluated for physical properties like pH, color and stability.

The present mouthwash possesses a good antibacterial property. This preparation is stable in different temperature condition Present mouthwash is a liquid preparation which normally contains antibacterial and antiseptic agents. These solutions can be used to reduce the microbial growth and it reduces infection in the oral cavity.

Keywords: Infectious Diseases, Mouth Wash, Herbal, Antimicrobial

Introduction

Herbal mouthwashes are in excessive demand, because they act on oral pathogens and relieve the pain instantly and are also less side-effective. Chemical mouthwashes have hydrogen peroxide a chlorine dioxide, and cetylpyridinium chloride, 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 Periodontitis as a major oral infection may affect the Dental caries contain the cavity formation, eruption of enamel, swelling of gums, bleeding in gums, and formation of hollow black eruption on the surface of the teeth.

In starting days, Dental caries are high in Children and Adolescents, because they do not take proper oral hygiene. Oral infections spread from the root of the contaminate tooth through the jaw bones and into spaces between the fascial planes of surrounding soft tissue. The prepared Anti-bacterial Herbal Mouthwash from the aqueous extracts of 4 different leaves namely *Azadirecta indica* (neem), *Mentha longifolia* (mint), *Syzygium aromaticum* (clove) *Ocimum sanctum* (tulsi). Here mint is a substance which is used to add a aromatic base in this mouthwash. It makes a freshnesss in the mouth after using mouth wash.

Neem (*Azadirachta indica*) it is also a bitter taste,and various active chemical constituents present such as, Antiviral action Antibacterial, antifungal properties nematicide and antimicrobial properties.

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And also improve cough, fever, worm infection, menthol has local anesthetic and counterirritant qualities, and it is widely used to relieve minor throat irritation.

Tulsi has also proven to be very effective in preventing halitosis. Its anti-inflammatory property makes it a suitable treatment for gingivitis and periodontitis, and it can be used for massaging the gingiva in these conditions. the constituent of tulsi eugenol it act as analge. Tulsi leaves contain 0.7% volatile oil consisting about 71% eugenol and 20% methyl eugenol. Oral infections tulsi leaves are quite effective in treating common oral infections. When chewed, tulsi leaves help in maintaining oral hygiene. Antibacterial agents namely carvacrol and terpene are present in this plant. Menthol gives a cooling sensation when applied to the skin or other tissues (such as the tongue, gums, or inside the cheeks). Menthol topical oral mucous membrane is used to treat minor sore throat pain, or mouth irritation caused by a canker sore.

Cloves are the aromatic. it posses antiseptic, stimulant, flavouring and local anesthetic agent it is used in mouth infections, also known as oral infections, are a group of infections that occur around the oral cavity. They include dental infection, dental abscess, and Ludwig's angin Mouth infections spread from the root of the infected tooth through the jaw bones and into potential spaces between the fascial planes of surrounding soft tissue, eventually forming an abscess. These teeth spaces are usually empty, but can expand and form a pocket of pus when an infection drains into them.

Material and Methods

Collection of Plants

Leaves *Azadirecta indica* (neem), *Mentha longifolia* (mint), *Syzgium aromaticum* (clove) and *Ocimum sanctum* (tulsi) were randomly collected from plants. Clove oil, mint oil, saccharine, PEG 40,Glycerol, and alcohol, purchased from local market of Indore.

Preparation 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 maintained in Incubator at 37°C for 72 h. The herbal extracts were filtered using Whatmann filter and stored in to the container.

Methods of Mouthwash Preparation

Weighted quantity of each ingredient will be taken. Extract were taken mixed thoroughly in mortar 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 be added drop by drop and mixed well. Finally, water added to make volume and preservative will be added and the product will be packed in an attractive, well closed container.

Table 1: Formulation of herbal mouth wash

Ingredient	Function	Formulation		
		F1 (mg)	F2 (mg)	F3 (mg)
Neem	Active drug	250	500	1000
Tulsi	Active drug	250	500	1000
Clove oil	Active drug	0.1ml	0.15 ml	0.20 ml
Mint Oil	Flavor	0.1ml	0.1ml	0.1 ml
Saccharin	Sweetener	0.1mg	0.1mg	0.1mg
PEG 40	Surfactant	6 g	6 g	6 g
Glycerol	Co surfactant	6.5 ml	6.5 ml	6.5 ml
Alcohol	Preservative	2 ml	2 ml	2 ml
Purified water	Up to 100 ml	Up to 100 ml	Up to 100 ml	Up to 100 ml

Evaluation of herbal mouthwash

Colour and Odour: Physical parameters like odour and colour were test by visual examination.

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

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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. A general method for predicting the stability of any product is accelerated stability studies, where the product is subjected to elevated temperatures as per the ICH guidelines. A short term accelerated stability study was carried out for the period of 3 months 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 plates were 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.

Results and Discussion

A mouthwash containing clove and neem and Tulsi, it is the best formulation is F2 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.

Fig. 1: Herbal Mouthwash Formulation

Table 2: Zone of inhibition study

Formulation Batch		F1	F2	F3
S/No.	**Ingredient**	**Zone Of Inhibition**		
1	Prepared formulation	16 mm	26 mm	19mm
2	Chlorhexidine	16 mm	20 mm	20 mm

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Fig.2: Agar diffusion method for assessment of Anti-bacterial study

Table 3: Physical evaluation and stability studies

Temperature	Evaluation Parameter	Observation (Month)				
3-5°C		0	1	2	3	4
	Visual Appearance	Light green	Light green	Light green	Light green	Light green
	Phase Separation	Nil	Nil	Nil	Nil	Nil
	Homogeneity	good	good	good	good	good
	Odor	No Change	No Change	No Change	No Change	No Change
	pH	6.7	6.7	6.8	6.8	6.8
Room Temperature (25°C RH=60%)	Visual Appearance	Light green	Light green	Light green	Light green	Light green
	Phase Separation	Nil	Nil	Nil	Nil	Nil
	Homogeneity	good	good	good	good	good
	Odor	No Change	No Change	No Change	No Change	No Change
	pH	6.7	6.7	6.8	6.8	6.8
40°C±2°C RH=75%	Visual Appearance	Light green	Light green	Light green	Light green	Light green
	Phase Separation	Nil	Nil	Nil	Nil	Nil
	Homogeneity	good	good	good	good	good
	Odor	Light green	Light green	Light green	Light green	Light green
	pH	6.7	6.7	6.7	6.7	6.7

Conclusion

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 with other 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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