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"FORMULATION AND EVALUATION OF HERBAL MOUTHWASH"

[1]Samruddhi M.Jagdale, [2]Harshada S.Nawale, [3]Prof.Vikas D.Kunde

(Department of Pharmaceutics)

Pravara college of pharmacy women chincholi, Nashik

Abstract

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

They have very minimal or no side effects and they are less harmful. Phytotherapeutic plant extracts and essential oils are used to create and produce herbal mouthwashes, which contain a variety of active ingredients such catechins, tannins, and sterols. Herbal mouthwash is used to promote better oral hygiene. It aids in reducing tooth plaque. It is applicable to gum diseases. Used to eliminate bacteria in the mouth.

Keywords:- Herbal mouthwash, natural extracts, plaque maintanence.

INTRODUCTION

Mouthwash, an aqueous solution usually used to remove plaque, is held in the mouth and swished about by the perioral muscle to get rid of oral infections. An active approach is taken by herbal medicine. Since there haven't been any side effects related with their use documented to date, this natural herb's main benefit is that. Other than this, there is no sugar or alcohol in any herbal mouthwash. These items pose a problem because the bacteria that cause halitosis and bad breath like to feed on them and create the byproducts that lead to halitosis. Using herbal mouthwash to avoid hazardous elements is therefore a positive start. (1)

Plaque-induced gingivitis, a highly widespread periodontal disease, is commonly seen in dental practise. By using a number of techniques that raise oral hygiene standards, plaque accumulation can be prevented and controlled. The mechanical removal of dental plaque using tooth brushing, dental floss, tooth cleaning sticks, oral irrigators, and/or professional scaling and polishing are some examples of this. To control plaque formation, mechanical means alone might not be sufficient in all cases. Use of antimicrobial mouthwashes in conjunction with mechanical oral hygiene techniques is strongly advised in such circumstances. Several well-known herbal products have assisted in controlling. Mouthwashes are often prescribed in dentistry for prevention and treatment of several oral conditions. In the recent times the use of naturally occurring products what is otherwise known as grandmothers remedy are used on a large scale. This has now called for a newer age of mouth washes but is the new age mouth washes at par with the gold standard or even better than them this study investigates.

Herbal medicines, derived from botanical sources, have been applied in dentistry for a long history to inhibit microorganisms, reduce inflammation, soothe irritation, and relieve pain It has been recently reported that a considerable number of herbal mouthwashes have achieved encouraging results in plaque and gingivitis control Herbal mouthwashes are designed and prepared with extracts and essential oils from phytotherapeutic plants, containing a mixture of active agents such as catechins, tannins, and sterols . The mixture of natural compounds inside the herb- or plant-derived substances usually performs gentle remedial effects. Compared with the antimicrobial mechanisms by synthetic chemicals, herbal mouthwashes can have additional anti-inflammatory and antioxidant properties, which could further benefit gingival health. (2)(3)

Oral diseases:-

1. Dental Caries:

Caries is the most typical oral infection and illness. A persistent, contagious illness called caries is brought on by bacteria that consume sugar to generate an acidic environment that erodes teeth. This process causes holes (cavities) in the tooth's structure over time. Streptococcus mutans is the main bacterium implicated, but the disease may be caused by the breakdown of a complex biofilm on the teeth rather than an abundance of one particular species. Saliva and fluoride are protective elements. Risk elements Caries risk factors are multifaceted and include both socioeconomic and physical variables. Adult caries risk factors include: Previous caries High oral bacterial numbers, especially S mutans .Insufficient use of fluoridated toothpaste and flossing, as well as insufficient exposure to fluoride Consumption of sugary foods on a regular basis,(4)(5)

2.Candidiasis:

A candida species infection of the oral mucosa is known as candidiasis. Candida albicans is the type of candida that affects people most frequently. Risk elements Species of Candida are typical dweller of the digestive system. Oral candidal infections are more common among immunocompromised people, such as the elderly, young children, HIV-positive people, cancer patients, diabetics, and people with glucose intolerance.People who take certain treatments, such as chemotherapy, inhaled steroids, broad-spectrum antibiotics (which alter the body's usual defensive flora), and antibacterial therapy are more susceptible. Additionally, dentures may develop a Candida infection, leaving the surrounding skin erythematous rather than white. (6)

Prevalence According to annual estimates, there are 50 cases of candidiasis for every 100,000 people. However, the numbers are more common in high-risk populations: 5% to 7%

3.Gingivitis:

An reversible form of gingival inflammation is gingivitis. A gentle form of periodontal disease, that. There are three classifications: plaque-induced, non-plaque-induced, and systemic diseases and medication-induced gingivitis.

Poor dental hygiene/plaque formation, primary or secondary tooth emergence, and dental equipment (braces, dentures) are risk factors for gingivitis.

Crowded teeth or malocclusions, poor dental restorations, uncontrolled diabetes mellitus, and smoking prevalence When all forms and causes are taken into account, gingivitis affects up to 50% of youngsters and up to 90% of adults. The high prevalence of gingivitis during pregnancy is caused by hormonal changes. Menarche, menstruation, and usage of contraceptives are a few more hormonal changes in women that can increase the prevalence of gingivitis. (7)

4. Mouth Ulcer :

Mouth ulcers are small sores that form on gums, lips, inner cheeks or palate (roof of mouth). They can be triggered by several different factors, including minor injuries, hormonal changes and emotional stress. Mouth ulcers aren't contagious and they go away on their own

but there are treatments to help ease pain and discomfort .(8)

When Was Mouthwash Invented?

In the late 1800s, mouthwash was created. When toothpaste was created in the 1800s, oral care products as we know them now first entered the market. In the late 1800s, mouthwash was first mass-produced for commercial purposes. Most early mouthwash brands contained alcohol to stabilise the formulation, but nowadays, alternatives, such cetylpyridinium chloride (CPC), offer germ-killing qualities without the requirement for alcohol stabilisation. Numerous health care products contain CPC; nevertheless, the effectiveness of each product's composition in eradicating germs that produce plaque and gingivitis varies.

Who made mouthwash popular?

Dr. Lawrence invented Listerine, a mouthwash intended to sanitise surgical incisions and clean lips, in 1879.By 1895, Lambert Pharmaceutical Co. purchased Listerine, and dentists started using it.(9)

Types of Mouthwash : Guide to Mouthwash

There are several types of mouthwash which all perform a particular function. There are fluoride mouthwashes which help to strengthen your teeth, antiseptic mouthwashes which deal with tooth decay and hide bad breath and herbal mouthwashes which do not contain alcohol.

To re-iterate: the types of mouthwash available include: (10)(11)

1) Fluoride
2) Cosmetic
3) Antiseptic
4) Natural (herbal)
5) Total care

Herbal Mouthwash

Herbal mouthwashes can be used in addition to different oral hygiene techniques like flossing and teeth brushing. They can be utilised in supportive periodontal therapy due to their effective anti-inflammatory and anti-plaque characteristics, which have been demonstrated. Alcohol, artificial flavours, colours, or preservatives are not present. Hence Because of the additional benefits offered by herbal preparations, herbal mouthwashes might be thought of as a substitute for chemical mouthwashes in maintaining oral hygiene. A precise diagnosis of the oral condition and in-depth product knowledge are prerequisites for using mouthwashes. The choice must take into account elements like the patient's oral health, disease risk, the effectiveness and safety of the mouthwash, and the patient's capacity for practising excellent oral hygiene.(12)(13)

- Halitosis
- Mucositis
- Periodontal Diseases
- Gum disease
- Xerostomia
- To clean septic sockets
- Vincent's angina

- To control plaque
- To relieve pain
- To effectively deliver fluoride in order to prevent dental caries
- Reduce inflammation etc.

Herbal ingredients used in Mouthwash.

1)Liquorice (Glycyrrhiza glabra) :

About 20 natural species of Europe, Asia, North and South America, as well as Australia, can be found in the genus Glycyrrhiza. From "liquiritia," the English word "licorice" is derived. Liquorice is a tough herb or small shrub that erect grows to a height of approximately 2 metres. Long, cylindrical, substantial, and multibranched describe the roots.The plant's root and rhizomes are the parts that are used. A variety of constituents of licorice have been identified, including a water-soluble, physiologically active compound that makes up 40–50% of the dry material weight. Triterpene saponins, flavonoids, polysaccharides, pectin, simple sugars, amino acids, mineral salts, and several other compounds make up this complex. The triterpenoid component glycyrrhizin is responsible for the sweet flavour of liquorice root. Glycyrrhizic acid is a natural saponin .

Fig No.1 Liquorice Leaves

https://www.bhg.com/gardening/plant-dictionary/annual/licorice-plant/

Fig.No.2 Liquorice Root

https://www.medicalnewstoday.com/articles/323761

Licorice is effective in the reduction of pain and of the inflammatory halo and necrotic centre of apthous ulcers. (14)

2) Tulsi

Tulsi is rich in Vitamin C and zinc. It thus acts as a natural immunity booster and keeps infections at bay. It has immense anti-bacterial, anti-viral and anti-fungal properties which protect us from a variety of infections.(15)

Fig. No. 3 Tulsi

https://www.timesnownews.com/spiritual/decaying-tulsi-plant-is-considered-a-bad-omen-here-are-the-reasons-why-your-tulsi-plant-is-withering-article-97568569/amp.

In recent years, researchers from all around the world have come to the conclusion that any antimicrobial agent has a limited shelf life since microbes are increasingly developing resistance to it. In order to discover new

alternative sources of antimicrobial agents, particularly from plants, several investigations have been carried out. The objectives of this project were to quantify the volatile components found in flower spikes, leaves, and the essential oil, to examine the compounds responsible for any activity, and to examine the antimicrobial properties of essential oils distilled from Australian-grown Ocimum tenuiflorum (Tulsi). An effective topical antibacterial medication for the treatment of skin infections brought on by these organisms could be tulsi essential oil.

It is an odoriferous plant. Since its earliest days, plants have provided the human race with sources of therapeutic substances.

In fact natural product once served as the source of all drugs. The main chemical constituents of Tulsi are: Oleanolic acid, Ursolic acid, Rosmarinic acid, Eugenol, Carvacrol, Linalool, and β-caryophyllene, have been used extensively for many years in food products, perfumery, and dental and oral products and plant extract continues the numerous searches for more effective drugs of plant origin which are less toxic and available for low socioeconomic population in the treatment of diseases caused by pathogenic bacteria. Recent studies suggest that Tulsi may be a COX-2 inhibitor, like many modern painkillers, due to its high concentration of eugenol. The present study was to evaluate the phytochemical screening of aqueous extracts of leaves of Ocimum. Study has been shown that this medicinal herbs can be used as pharmaceutical adjuvants in the formulation of various dosage form.(16)(17)

3)Cinnamon oil

Fig No.4 Cinnamon

https://m.indiamart.com/proddetail/cinnamon-essential-oil-dalchini-oil-23406418312.html

The antibacterial action of cinnamon extracts, essential oils, and their constituents against Gram-positive and Gram-negative bacteria that cause infectious diseases in humans and degrade food or cosmetics is one of their most well-known qualities. Due to its antimicrobial properties, cinnamon is frequently used as a preservative. Indonesian native cinnamon is called Cinnamomum burmannii. Its antibacterial effect is mostly due to the antimicrobial chemicals cinnamaldehyde and eugenol.

One of the medical specialties where bacterial and fungal diseases are most prevalent is dental medicine. The primary focus of this review is on the antibacterial properties of cinnamon essential oil (EO), cinnamon extracts, and pure components against various oral pathogens, the oral biofilm, and potential effects on soft oral tissue.

Basic information is provided about cinnamon, as is a review of its antimicrobial properties against the most common microorganisms causing dental caries, endodontic and periodontal lesions, and candidiasis. Cinnamon EO, cinnamon extracts, and pure compounds show significant antimicrobial activities against oral pathogens and could be beneficial in caries and dental disease prevention endodontics, and candidiasis treatment.(18)

Formulation ingredients Table no 1

Ingredients	Uses	F1	F2
Tulsi Extract	Antibacterial, Antiseptic	10 ml	10 ml
Liquorice powder	Sweetening agent , Expectorant.	1.80 gm	2 gm
Cinnamon oil	Antibacterial , flavouring	0.1 ml	1 ml
Mentha peprita oil	Antibacterial	5 ml	2 ml
Glycerol	Co-surfactant	6.5 ml	6.5 ml
SLS	Surfactant	3 gm	1 gm
Alcohol	Preservative	2 ml	1 ml
Water	Up to 100 ml	_	_

. AIM AND OBJECTIVES

Aim : To prepare herbal mouthwash by using selected herbs to diminish the side effect of oral disorders.

Objectives :

1. **The main objective of formulation of herbal mouthwash is to maintain the oral hygiene.**
2. **Prevention, control and reduction of oral infection.**
3. **To reduce side effects by promoting herbal use.**

MATERIALS AND METHODS

Material used:-

1) Preparation of ocimum santum Extract

Tulsi extract for the study was obtained by washing the leaves clean and sundry them after that grinding that specific solution into mixer to get finely powdering the dried leaves. Then the powder was macerated with 100% ethanol for 48 Hr in the breaker,then filtered that solution with the whatmans Filter paper.The obtained extract used for procedure.

Fig No. 5 Ocimum Santum Extract

1) Cinnamon oil

Cinnamon oil, cinnamon extracts, and pure compounds show significant antimicrobial activities against oral pathogens and could be beneficial in caries and periodontal disease prevention, endodontics, and candidiasis treatment.

2) Peppermint oil

Peppermint oil appears to be safe when taken orally (by mouth) or applied topically in the doses commonly used. Peppermint oil has been safely used in many clinical trials. Possible side effects of peppermint oil taken orally include heartburn, nausea, abdominal pain, and dry mouth.

3) Liquorice powder

Licorice powder is useful in managing sore throat, cough and excessive production of mucus in the respiratory tract. It also helps loosen mucus and coughing it out. Licorice is good

properties.

4) Glycerol

Helps prevent products from drying out, acts as a thickener and provides sweetness

5) Sodium lauryl sulphate

SLS (sodium lauryl sulphate) is an emulsifying and surface-cleaning ingredient found in toothpaste and mouthwash. One of the most often used synthetic detergents in toothpaste is sodium lauryl sulphate. The material

that the dentifrice removes from the tooth is typically emulsified or suspended by surface active agents, which also penetrate and release surface deposits.

6) Equipment used

Conical flask , beaker, Test tube, pipette, Measuring cylinder, Autoclave, Incubators.

2) Preparation of ocimum sanctum Extract

Addition of the Herbal ingredients like Liquorice powder,Tulsi Extract, cinnamon oil,Mentha peprita oil, and Glycerol and SLS with alcohol with the constant string with the help of Mortal and pesal. Until we get the clear solution of that of preparation.

Than Filtration of that specific solution with the whatmans Filter paper to get clear appearance of that specific Mouthwash solution.Storage condition: At room temperature in Airtight container.

5.EVALUATION

1) Preparation of Agar plate

The most common solid foundation for growing bacteria is agar plates. Agar keeps the microbial growth medium in a semi-solid, gel-like form. Microbial growth media also contains nutrients and an energy source to power the microorganisms as they proliferate. Having used the autoclave Before pouring the agar into petri dishes, allow it to cool to 110–120 °F (when the breaker feels warm but not very hot to the touch). Just enough space should be left to slide open the petri dish's cover so that agar can be added. Pour enough agar (about 10–13ml) to completely cover the bottom of the plate. Keep the bottle's mouth away from the plate. To prevent contamination, cover the dish right away, then gently rock it back and forth until the agar covers the entire surface.

2) Growing microbial growth in plate

Prepare the soil solution sample in the test tube, and then, using nichrome wire, pour that particular solution onto the plate. Replace the dish's lid after gently rubbing the over the agar in a few zigzag motions. Before bacteria begin to proliferate, let the dish to stay in the incubator for 3 to 7 days. Each day, draw a picture and write a description to document the growth. Without a powerful microscope, it is impossible to view a single bacterium, but you can see bacterial colonies. By observing the colour and shape of the colonies, you may distinguish between several species of bacteria. After that, create a hole in the battery plate so that the formulation's solution can go there.

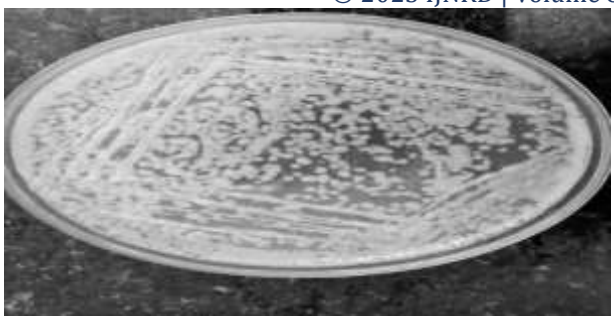
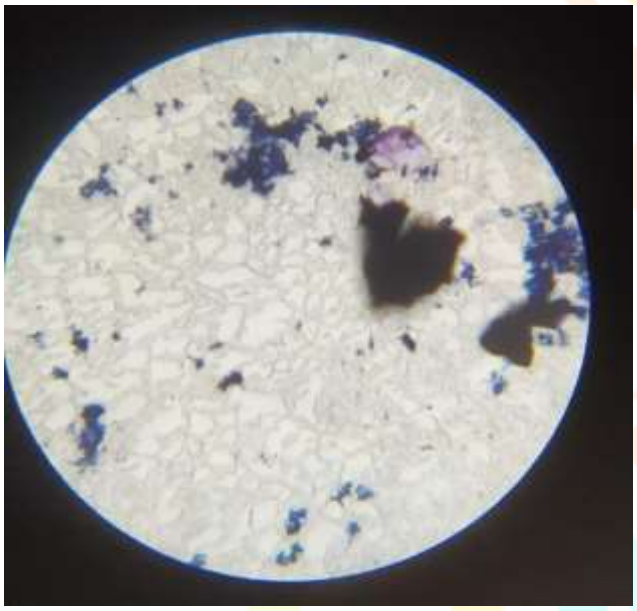


Fig No.6 Streak Plate Method

3) Staining procedure

Gramme staining separates bacteria based on the physical and chemical characteristics of their cell walls. The Gramm stain method can't be used to screen every type of bacterium, and it's not always enough to make a diagnosis. Instead, they aid in generically identifying the bacterial species.The staining technique was completed by extracting the bacteria mentioned above from the patri plate. As a result, we may see the following .



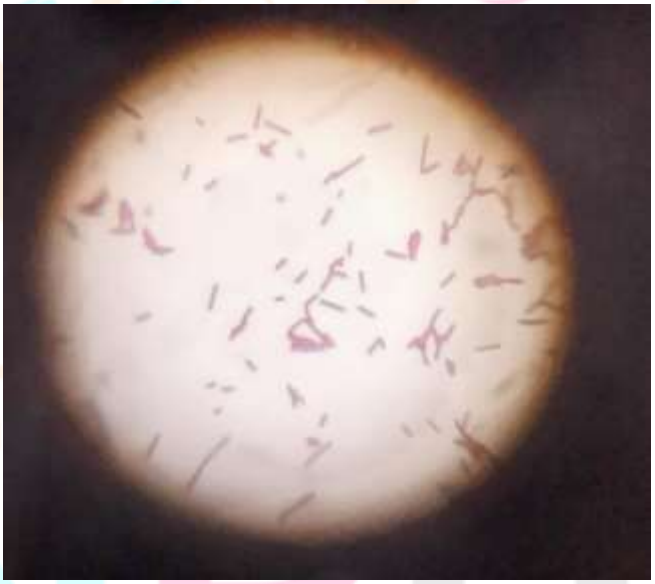


Fig No. 7.Gram positive.

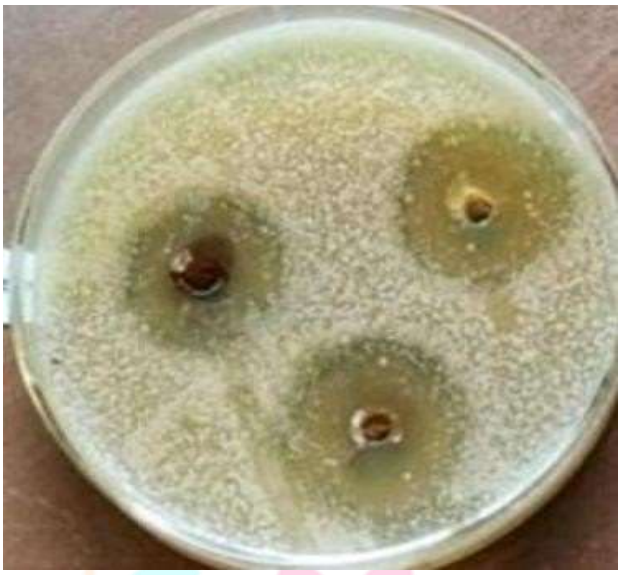
Staphylococcus aureus

Fig No.8 Gram Negative

E.coli

6. RESULTS AND DISCUSSION: !)Antimicrobial Growth

Fig No 7 Formulation F1



Formulation F2

Ingredients	Organisms	Zone of Inhibition (mm)	
		F!	F1
1.Prepared Formulation	S. aureus	16	25
	E.coli	18	27

2) pH of Formulation:

Since the scheme has an acidic pH of about 5.5, the pH of the formulation was discovered to be 6.1. Oral problems are appropriate for this pH range of formulation. The greatest way to maintain a healthy pH level in the mouth is through the foods you eat. The pH level in the mouth has a direct impact on the health of our teeth and gums. Your chance of developing cavities, gum disease, and tooth decay will be reduced by controlling the pH in your mouth.

Fig No.8 pH meter

CONCLUSION

According to the information presented in this study, the created herbal mouthwash has significant therapeutic potential and is an appropriate vehicle for medication delivery at a reasonable cost. When compared to commercial mouthwash, herbal mouthwash formulations work effectively and have few side effects; as a result, their use should be increased to prevent negative consequences. The current liquid herbal mouthwash may be really effective in assisting people to get rid of foul breath and other oral health issues.

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