

Formulation and Evaluation of Herbal Mouthwash

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ABSTRACT: The meaning of Mouthwash is a usually antiseptic for cleaning the mouth and teeth or freshening the breath. Mouthwash is often prescribed in dentistry for prevention and treatment of several oral conditions. In the recent time the of naturally occurring products what is otherwise known as grandmother remedy are used on a large scale. Herbal Mouthwash are in high demand, because they act on oral pathogens and relieve the pain instantly and are also less side effective. The liquid herbal mouthwash can work in long way to help people to get rid of bad breath and many oral disorders. These are liquids which contains anti-inflammatory, Antimicrobial and analgesic action. In the present work three formulations of herbal mouthwash consisting of spirulina, clove oil, peppermint oil, liquorice, sodium Benzoate, salt and water is used. Herbal mouthwash contains a natural ingredient called phytochemical that contains desired antimicrobial and anti-inflammatory effect. The prepared formulations is further evaluated for colour, odour, flavour, pH and microbial evaluation through agar diffusion method

I. INTRODUCTION - MOUTHWASHES:

Across the world, oral health is becoming a major concern. Mouthwashes are liquids which contain anti-inflammatory, anti-microbial and analgesic action. There are two types of mouthwashes which are Chemical and Herbal mouthwashes. Chlorhexidine digluconate has been the agent of choice as an antiplaque agent when compared to others, and is considered the gold standard. However, due to its side effects, its acceptance by patients can be limited, especially when a longer period of use is recommended.

Herbal mouthwash contains a natural ingredient called Phytochemical, that contain desired antimicrobial and anti-inflammatory effect.

As it contains natural herbs that have natural cleaning and healing property to teeth and gums. Many herbal mouthwashes contain herbs with anti-microbial property such as neem, Yovani sattva, raga Vali etc. Natural herbs such as Thriphala Tulsi, Neem, Clove oil, Pudina and many others are used as single or in combination. The purpose of the study is preparation of herbal mouth wash and determine its antimicrobial effect to evaluate the efficacy.

CLASSIFICATION OF MOUTHWASHES:

- **Cosmetic Mouthwash:** As the name indicates, cosmetic mouthwash aim to temporarily control the smell of the breath and leave a pleasant taste in the mouth without eliminating germs, as a mouthwash with germ-killing ingredients can do.
- **Fluoride Mouthwash:** Fluoride mouthwash helps rebuild weakened tooth enamel in a process called remineralization, making teeth more resistant to decay and tooth erosion.
- **Antiseptic Mouthwash:** Antiseptic mouthwash helps eliminate the bacteria that cause bad breath because it contains bacteria killing substances.
- **Natural Mouthwash:** For people who prefer using non-alcoholic products for whatever reason, a natural mouthwash is the choice for you. Natural mouthwashes offer the same benefits as other mouthwash, except that they are gentle with milder taste and are alcohol-free.
- **Whitening Mouthwash:** Dental care has become more than dental and oral health, as having bright white teeth and an attractive smile is a must have too.

USES OF MOUTHWASHES:

- Freshens Breath, most patients use mouthwash for this reason, to freshen their breath.
- Reduces Sensitivity.
- Removes Food Debris.

- Whitens Teeth.
- Fights Gum Disease.
- Cavity Protection.
- Reduces Dry Mouth.

AIM:

To formulate and evaluate herbal Mouthwash.

OBJECTIVE:

1. To select the herbal active ingredient for Mouthwash.
2. To formulate the Herbal mouthwash.
3. To determine the antimicrobial activity of prepared herbal mouthwash

II. MATERIALS AND INSTRUMENTS:

1.Liquorice: Glycyrrhiza glabra is one of the most popular medicinal plants belonging to the Fabaceae family (also known as Leguminosae), and its members are now commonly used as feed and food. The genus Glycyrrhiza is derived from the Greek words glykos (sweet) and rhiza (root). It is also called liquorice, liquorice, glycyrrhiza, sweet wood, and Liquorice radix (in English); süssholz and lakritzenwurzel (in German); réglisse and bios doux (in French); shirin bayan and make (in Persian); and liquirizia and regaliz (in Italian and Spanish, respectively). This species is a native of Mediterranean areas, but it is now also present in India, Russia, and China. The extracts are currently used in pharmaceutical and food industries, as well as in the manufacture of functional foods and food supplements.



Fig-1 Liquorice

2.Clove Oil: Eugenol, also called clove oil, is an aromatic oil extracted from cloves that is used widely as a flavouring for foods and teas and as an herbal oil used topically to treat toothache and more rarely to be taken orally to treat gastrointestinal and respiratory complaints. Eugenol is the major constituent [70% to 90%] in the aromatic oil extract from cloves, a spice widely

used as a flavouring for meats, stews, cakes and teas. Eugenol is also found in lower concentrations in cinnamon and other aromatic spices. Eugenol is the most abundant ingredient in clove oil and is thought to be responsible for its aromatic as well as both beneficial and harmful effects. In vitro, eugenol has been shown to have antibacterial, antifungal, antioxidant and antineoplastic activity.



Fig-2 Clove oil

3.Mint oil: Peppermint oil is promoted for topical use (applied to the skin) for problems like headache, muscle aches, joint pain, and itching. In aromatherapy, peppermint oil is promoted for treating coughs and colds, reducing pain, improving mental function, and reducing stress. Both peppermint leaves and the essential oil from peppermint have been used for health purposes. Peppermint oil is the essential oil taken from the flowering parts and leaves of the peppermint plant. (Essential oils are very concentrated oils containing substances that give a plant its characteristic odour or flavour.). Peppermint is a common flavouring agent in foods and beverages, and peppermint oil is used as a fragrance in soaps and cosmetics.



Fig-3 Mint oil

4.Sodium Benzoate: Sodium benzoate also known as benzoate of soda is the sodium salt of benzoic acid, widely used as a food preservative (with an E number of E211) and a pickling agent. It appears as a white crystalline chemical with the formula C_6H_5COONa . Many foods are natural sources of benzoic acid, its salts, and its esters. Fruits and vegetables can be rich sources, particularly berries such as cranberry and bilberry. Other sources include seafood, such as prawns, and dairy products. Sodium benzoate is used as a treatment for urea cycle disorders due to its ability to bind amino acids. This leads to excretion of these amino acids and a decrease in ammonia levels. Recent research shows that sodium benzoate may be beneficial as an add on therapy (1 gram/day) in schizophrenia. Total Positive and Negative Syndrome Scale scores dropped by 21% compared to placebo.



Fig-4 Sodium benzoate

5.Spirulina: Spirulina is a type of blue-green algae that is rich in protein, vitamins, minerals, carotenoids, and antioxidants that can help protect cells from damage. It contains nutrients, including B complex vitamins, beta-carotene, vitamin E, manganese, zinc, copper, iron, selenium, and gamma linolenic acid (an essential fatty acid). Spirulina like any blue-green algae can be contaminated with toxic substances called microcystins. It can also absorb heavy metals from the water where it is grown. While the amount of Spirulina in this supplement may be too low to have any effect, spirulina may lower blood pressure, slow blood clotting, increase immune system activity, and lower blood sugar.



Fig-5 Spirulina

6.Salt: Sodium is an essential nutrient for human health via its role as an electrolyte and osmotic solute. However, excessive salt consumption may increase the risk of cardiovascular diseases, such as hypertension, in children and adults.



Fig-6 Salt

7.Charcoal: Charcoal has been used since earliest times for a large range of purposes including art and medicine, but by far its most important use has been as a metallurgical fuel. Charcoal is the traditional fuel of a blacksmith's forge and other applications where an intense heat is required. Charcoal was also used historically as a source of black pigment by grinding it up. In this form charcoal was important to early chemists and was a constituent of formulas for mixtures such as black powder.



Fig-7 Charcoal

8.Methyl blue: The chemical substance known as methyl blue has the molecular formula $C_{37}H_{27}N_3Na_2O_9S_3$. It stains collagen blue in tissue sections and is used as a stain in histology [1]. It can mediate electron transfer in microbial fuel cells and be employed in certain differential staining methods, such as Mallory's connective tissue stain and Gömöri trichrome stain. Methyl blue also stains the cell walls of fungi. Methyl blue can also be found in solutions including phenol, glycerol, and lactic acid under the name Lactophenol cotton blue (LPCB), which is used to see fungus under a microscope. These mixtures of methyl blue and water blue are marketed as Aniline Blue WS, Aniline blue, China blue, or Soluble blue.

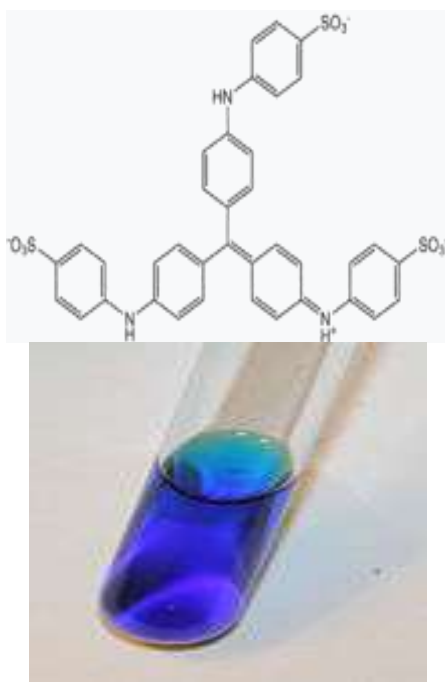


Fig-8 Methyl Blue

9.Distilled water: In chemical and biological laboratories, as well as in industry, in some appliances deionized water or reverse osmosis water can be used instead of distilled water as a cheaper alternative. If exceptionally high-purity water is required, double distilled water is used.

INSTRUMENTS:

Autoclave:

An autoclave is a machine that uses steam under pressure to kill harmful bacteria, viruses, fungi, and spores on items that are placed inside a pressure vessel. The items are heated to an appropriate sterilization temperature for a given amount of time. Autoclaves are also steam sterilizers, and are typically used for healthcare or industrial applications. The moisture in the steam efficiently transfers heat to the items to destroy the protein structure of the bacteria and spores.



Fig-9 Autoclave

Incubator:

A laboratory incubator is a heated, insulated box used to grow and maintain microbiological or cell cultures. It maintains optimal temperature, humidity and gaseous content of the atmosphere inside. An incubator is a device used to grow and maintain microbiological culture or cell cultures. The incubator maintains optimal temperature, humidity and other conditions such as CO_2 and oxygen content of the atmosphere inside. Incubators are essential for much experiment work in cell biology, microbiology and molecular biology, and are used to culture both bacterial and eukaryotic cells.



Fig-10 Incubator



METHOD:

Procedure of mouthwash:

Weight the ingredients spirulina (200mg), Clove oil (1ml), Peppermint oil(1ml), Liquorice (5mg), Sodium benzoate (0.5mg),methyl paraben (0.5mg), Salt (0.5mg), Methylene blue (1 drop), Water 100ml. Then dissolve spirulina in distilled water. To the solution add a pinch of charcoal. Filter the solution using filter paper. After that add remaining ingredients that is Clove oil, mint oil, sodium benzoate, liquorice in distilled water and make up to 100 ml. Add methylene blue and then transfer it into clean beaker.

EVALUATION OF MOUTHWASH:

1. Physical evaluation: Physical parameter such as colour, odour and consistency were examined by visual examination.

| S.NO | Name of ingredients | F1 | F2 | F3 | Uses |
|------|---------------------|--------|-------|-------|---------------------------|
| 1 | Spirulina | 200mg | 200mg | 200mg | Antibacterial |
| 2 | Clove oil | 1ml | 1ml | 1ml | Anti inflammatory |
| 3 | Mint oil | 1ml | 1ml | 1ml | Mouth freshner |
| 4 | liquorice | 5mg | 5mg | 5mg | Sweetner |
| 5 | Sodium benzoate | 0.5mg | 1.0mg | 1.5mg | Preservative |
| 6 | Methyl paraben | 0.5mg | 1.0mg | 1.5mg | Antimicrobial |
| 7 | Methylene blue | 1 drop | 1drop | 1drop | Indicater |
| 8 | salt | 0.5mg | 0.5mg | 0.5mg | Osmolytic Preservative |
| 9 | Water | 100ml | 100ml | 100ml | Solvent. |

Table-1

2.pH: The pH of prepared herbal mouthwash was measured by using digital pH meter. Initially the pH meter was calibrated using standard buffer solutions. Then the mouthwash was tested for pH.

3.Microbial Assay: The antibacterial activities were evaluated by Agar diffusion method by measuring the zones of inhibition (in mm). Agar media was prepared then the formulated mouthwash was inoculated on the plate's agar media by streak plate method and controlled is prepared by mouthwash. The plates were placed in the incubator and are incubated 37⁰ c for 24 hours. After the incubation period the plates were taken out and the Microbial growth were checked and compared with the control.

4.Stability studies: Physical parameters like colour, odour, consistency and pH was determined at room temperature. The result of stability studies was shown in table.

5.Flavour: The flavour of the herbal mouthwash was tested after a week whether it is same or lost at ambient temperature.

III. RESULT AND DISCUSSION:

Following evaluation parameters were performed to ensure superiority of prepared mouthwash.

1. Physical Evaluation: Mouthwash was evaluated for Morphological parameters shown in the table. The colour of formulation is yellow. The odour is sweet spicy clove woody powder.

2.pH: The pH meter was calibrated with the help of standard buffer solutions. pH of the herbal mouthwash was found to be 6.0.

3.Microbial Evaluation: Agar media was prepared then the formulated mouthwash was inoculated on the plate's agar media by steak plate method and controlled is prepared by mouthwash. The plates were placed in the incubator and are incubated 37⁰ c for 24hrs.

Table-2

| S.NO | PARAMETERS | OBSERVATION |
|------|------------|------------------------|
| 1 | Colour | Blue |
| 2 | Odour | Sweet spicy wood clove |
| 3 | Texture | Liquid |

AFTER INCUBATION:

TABLE-3

| S.NO | CONTENT | F1 | F2 | F3 |
|------|----------------------|--------------------|------|------|
| 1 | Formulations | Zone of Inhibition | | |
| 2 | Herbal formulation | 12mm | 12mm | 12mm |
| 3 | Marketed formulation | 12mm | 12mm | 12mm |

4.Stability studies: The result of stability was shown in table no change in colour, order, texture was observed. The Stability studies showed a slight change in pH formulation at room temperature.

| S.NO | PARAMETER | F1 | F2 | F3 |
|------|-----------|------------|------------|------------|
| 1 | Colour | No changes | No changes | No changes |
| 2 | Odour | No changes | No changes | No changes |
| 3 | Texture | Liquid | Liquid | Liquid |
| 4 | pH | 6 | 6 | 6 |

Table-4



F2 Formulation



F3 Formulation

IV. CONCLUSION:

The prepared herbal mouthwash can help to get rid of bad breath and oral disorder. The physiochemical evaluation results confirm that the colour and odour of present herbal formulation is acceptable with pleasant odour. The results of antimicrobial evaluation of herbal mouthwash was found that F3 formulation showed the highest zone of inhibition. pH of the formulation was found to be 6.1. Present study has an important impact in order to cure an effective and inexpensive herbal and health intervention for low social economic communities. The natural herbs used in preparation like spirulina, clove oil, peppermint oil, have been proven to prevent the problem of oral hygiene.

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