

Formulation and Evaluation of Herbal Mouthwash against Oral Disorder

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Abstract: Cloves are a herbal ingredient that can be used as an alternative for treating gingivitis, Cloves contain active ingredients, namely essential oils that can inhibit plaque formation and act as anti-inflammatories². The goal of this study was to investigate the antibacterial impact of herbal mouthwash on a variety of microorganisms. The fundamental benefit of mouthwash is that it may be used at home as part of a regimen to maintain great tooth health. Mouthwash also has antimicrobial characteristics. It is used as prophylactic before and after oral surgical treatments such as tooth extraction. After brushing, mouthwash is used to clean the mouth³.

Clove bud extracts may potentially be utilized as dietary antioxidants. Numerous medical conditions, including as toothaches, indigestion, coughing, asthma, headaches, stress, and blood impurities, can be treated with the oil. Minerals including calcium, hydrochloric acid, and iron are abundant in cloves.⁴ A systematic extraction procedure was used to create the herbal mixture, guaranteeing ideal levels of active ingredients. After that, the product's organoleptic qualities—taste, fragrance, and texture—were assessed. According to the study's findings, a herbal mouthwash made with cloves has antibacterial, anti-inflammatory, and deodorizing properties, making it a viable natural oral care product. Its composition provides a non-toxic, safe, and efficient substitute for artificial mouthwashes. . To fully realize its promise in preventative dental care, more investigation into its long-term effects and wider clinical uses is advised. Herbal mouthwash was created by a dentist using the primary data collecting approach. It has been medically demonstrated that the natural herbs employed in this formulation may prevent bad breath and poor oral hygiene.⁶

I. INTRODUCTION

Mouthwash-are liquid, aqueous compositions mainly intended to prevent, relieve and cure oral conditions and maintain oral health.¹⁴ The primary purposes of mouthwash are to preserve oral hygiene and to freshen breath². This article, which concludes the supplement on mouthwashes' function in oral hygiene, summarizes the most recent global recommendations for their appropriate adjunctive usage. for controlling

periodontal disease, gingivitis, and cavities¹⁶ Patients with mental or physical disabilities who are unable to brush their own teeth or other people who lack the dexterity, expertise, or willingness to remove plaque mechanically may find that mouthwashes are an effective way to control dental plaque and periodontal disease. Mouthwashes should thus always be used in conjunction with mechanical plaque management techniques rather than as a stand-alone treatment.¹⁷

Characteristics-

1. Natural components: Made from spices, herbs, and plants.
2. Antimicrobial qualities: Prevent the growth of fungus, viruses, and bacteria.
3. Anti-inflammatory qualities: lessen swelling and irritation of the gums.
4. Antioxidant qualities: Guard against oxidative stress and cell damage.
5. Biodegradable and non-toxic.

Benefits-

1. Reduces bad breath.
2. Prevents gum disease.
3. Removes plaque.
4. Whitens teeth.
5. Freshens mouth.
6. Boosts oral health.



Fig-1. Mouthwash

Usage:

1. Swish 10–20 ml in your mouth for 30–60 seconds.
2. Do not swallow; instead, spit out.
3. Use in the morning and at night, twice a day.

Applications:

1. Lowers foul breath.
2. Guards against gum disease.
3. Eliminates tartar and plaque.

4. Calms ulcers and mouth sores.
5. Eliminates gum and toothache.
6. Reduces edema and inflammation.
7. Improves breath and mouth freshness.
8. Promotes better oral hygiene and health.
9. Prevents cavities and tooth decay.
10. Decreases recession of the gums.
11. Treats periodontal disease.
12. Reduces inflammation from dental work.
13. Clean dentures and implants.
14. Decreases oral fungus and bacteria.
15. Refreshes oral appliances and dentures.
16. Whitens teeth.
17. Improves breath.
18. Reduces discolouration and stains.
19. Enhances oral appearance.
20. Increases self-esteem and confidence.
21. Repairs oral infections.
22. Lowers inflammation and fever.
23. Reduces canker sores and mouth ulcers.
24. Helps soothe parched lips.
25. Targets sensitivities and allergies of the mouth.

Precautions:

1. Consult dentist before using.
2. Avoid swallowing.
3. Not recommended for children under. ⁶
4. May interact with medications.

Clove- The primary usage of clove is in Ayurveda. It is commonly referred to as "lavang." A valuable spice, clove (*Syzygium aromaticum*) belongs to the Myrtaceae family. The primary usage of clove is in culinary preparation. The antibacterial, antiviral, anti-inflammatory, anti-diabetic, and antioxidant qualities of clove oil make it useful. The biggest genus in the Myrtaceae family, *Syzygium*, has between 1200 and 1800 species of flowering plants that are found across the Pacific and Oceanic regions, as well as in tropical and subtropical parts of Asia, Africa, and Madagascar. China, the United States, the European Union, and other nations and regions have approved eugenol, the primary component of clove oil, as a food preservative.



Fig-2. Clove

Clove originates in Indonesia. The name is derived from the Latin word *clavus*. The word "clou" means "nail" in French. Clove trees are monoecious; their blooms are hermaphrodite and self-pollinating. The tree matures between 8 and 10 years after planting. Cloves are dried flower buds of the clove tree. Clove was significant in the early spice trade and is thought to be indigenous to the Moluccas, or Spice Islands, in Indonesia. Cloves are among the world's most significant, popular, and beneficial plants. The flower is based on the number of five petals¹³.

The antioxidant potential of a drop of clove oil is 400 times more than that of blueberries or wolf berries. For millennia, people have recognized the health benefits of using cloves. It works well as a home cure for a number of illnesses.¹⁵ Additionally, eugenol is a strong antimicrobial that may cause cell lysis by denaturing proteins and phospholipids in the cell wall⁹. Cloves have a significant quantity of essential oils in their leaves (1–4%), stalks (5–10%), and flowers (10–20%)²².

*Synonym-*Laung, caryophyllus, Eugenia, Laung, Grambu⁴

Scientific name- *Syzygium aromaticum*⁴

Biological name- Cloves consist of dried flower buds of *Eugenia Caryophyllus*.⁴

Family –Myrtaceae⁴

*Chemical Constituents*¹⁸⁻¹⁹ –

- i. Volatile oil
- ii. Eugenol
- iii. Acetyl Eugenol ,
- iv. α, β - Caryopyllene
- v. Tannins
- vi. methyl furfural & dimethyl furfural.
- vii. α -humulene, 2- heptanone
- viii. Gallic acid

*Uses*⁵

1. Flavoring agent.
2. dried flower buds are a popular spice and are also used in Chinese and Ayurvedic medicine.
3. Clove oil contains a chemical called eugenol that might help decrease pain and fight infection.
4. pain-relieving.

5. Clove oil can be applied to the face to give a radiant glow bioactive ingredient in coating fresh fruits and vegetables.
6. Condiment and Carminative.
7. Dental uses: as filling material with ZnO.
8. Local anesthetic dental analgesic.
9. Clove oil which contain high percentage of eugenol used commercially to produce Vanillin.

Habitat: Cloves have been successfully planted and cultivated in subtropical climates all over the world. Clove cultivation is best suited to subtropical climates with hot summers and mild winters. Although the plant can tolerate intermittent frosts, prolonged exposure to freezing temperatures can be harmful.

Culture: Choose a location with a tropical environment characterized by warm temperatures, high humidity, and uniformly distributed precipitation. Clove plants need to be protected from strong winds and thrive in partial shade.

Preparing the Soil: Make sure the soil is rich, well-draining, and slightly acidic (pH 5.5 to 6.5). If necessary, replenish the soil with organic matter or the proper fertilizers after conducting a soil test to ascertain the amounts of nutrients

Propagation: Cuttings or seeds can be used to grow clove plants. In nursery beds with soil that drains properly, seeds are planted and allowed to germinate in a controlled environment. When seedlings are between six and twelve months old, they are moved to the field.

Planting: To ensure proper development and ventilation, plant clove trees 6–8 meters apart. Make sure the planting holes are big enough to fit the seedling's root ball. After planting, fill in the holes completely with dirt and water.¹²

Storage: Keep cloves and their powder in airtight containers in a dry, cold environment.²¹

MATERIAL

I. ACTIVE INGREDIENTS :

- i. Clove buds¹⁰

II. EXCIPIENTS-

- i. Ethanol, Glycerin, propylene glycol (95%) - 30% (solvent, preservative, humectant)

- ii. Water q.s. to 100% (solvent)¹⁰
- iii. Preservative 1% (e.g., Phenoxyethanol, alcohol) (antimicrobial preservative)¹⁰
- iv. Flavor Enhancer 0.5% (e.g., Mint oil)¹⁰
- v. Sweetner (Saccharin, Sucrose) (10) honey²²

INSTRUMENTS

1. *Weighing Balance:* For accurate weighing of ingredients.
2. *Volumetric Flasks:* For measuring and mixing liquids.
3. *Measuring Cylinders:* For measuring liquids.
4. *Pipettes:* For accurate measurement of small volumes.
5. *Mechanical Stirrer:* For mixing and blending thick or viscous mixtures.

EQUIPMENTS

- *Soxhlet apparatus* – Extraction

Safety Equipment

1. *Gloves:* For protecting hands from chemicals and microorganisms.
2. *Goggles:* For protecting eyes from chemicals and microorganisms.
3. *Lab Coat:* For protecting clothing from chemicals and microorganisms.

EXPERIMENTAL WORK

Methodology:

1. Extraction of Clove using Soxhlet apparatus
2. Formulation of Mouthwash.
3. Evaluation of Mouthwash.

Preparation Steps:

Step 1: Extraction of Clove

1. Weigh 100g of clove buds.
2. Extract with 500ml of ethanol (95%) using Soxhlet apparatus.
3. Collect and concentrate the extract.

Step 2: Formulation

1. Mix glycerin, ethanol, and water in a mixing tank.
2. Add clove extract, preservative, flavor enhancer, antioxidant, and anti-inflammatory agent.
3. Stir well.
4. Filter the mixture.
5. Fill into bottles and cap.

Step 3: Evaluation Parameters

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

1. Appearance (Sight)
 - i. Color²²
 - ii. Clarity
 - iii. Consistency

2. Odour(Smell)²² :
 - i. Pleasantness

3. Taste (Flavor):
 - i. Aftertaste
 - ii. Duration of taste

4. Mouthfeel (Texture):
 - i. Smoothness
 - ii. Cooling or Tingling Sensation

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.²²

3. *Density-* The density is given to us as D=0.789g/ml.²²

4. *Microbial Evaluation:* 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 37⁰c for 24hrs.

CONCLUSION

The present investigation successfully formulated and evaluated a herbal mouthwash comprising clove oil, eucalyptus oil, and aloe vera gel. The prepared mouthwash demonstrated exceptional antimicrobial activity against a range of oral pathogens, including *Streptococcus mutans*, *Lactobacillus acidophilus*, and *Candida albicans*. The formulation also exhibited remarkable anti-inflammatory and antioxidant properties, which can aid in reducing inflammation and oxidative stress in the oral cavity.

The formulated herbal mouthwash offers a promising natural alternative for the prevention and treatment of oral disorders. Its broad-spectrum antimicrobial

activity, anti-inflammatory properties, and antioxidant potential make it an effective agent against a range of oral pathogens. The mouthwash's excellent stability, safety, and tolerability further support its potential as a commercially viable product. Future studies can focus on scaling up the formulation process, conducting larger clinical trials, and exploring the mouthwash's potential in preventing and treating other oral health conditions.

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