

FORMULATION AND EVALUATION OF A NATURAL HERBAL MOUTH FRESHENER SPRAY FOR ORAL HYGIENE

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Abstract : The present project focuses on the formulation and evaluation of a herbal mouth freshener spray using natural ingredients such as Tulsi extract, Neem extract, Clove oil, Peppermint oil, Orange oil, glycerine, sodium benzoate, and ethanol. Oral infections and bad breath (halitosis) are frequently brought on by bacterial growth in the mouth, which produces volatile sulfur compounds such methyl mercaptan (CH₃SH) and hydrogen sulfide (H₂S). The high alcohol level and synthetic ingredients found in many conventional mouth fresheners on the market can cause adverse effects like dryness, irritation, and changed taste perception. The goal of this project is to provide a natural, safe, and efficient substitute for keeping good oral hygiene and fresh breath. The formulation's herbal components have antibacterial, antiseptic, antioxidant, and revitalizing qualities. While peppermint and orange oil have a cooling effect and a pleasing taste, tulsi, neem, and clove aid in the reduction of bacterial development. While sodium benzoate increases product stability by limiting microbiological contamination, glycerine functions as a humectant. A number of factors, including appearance, odor, pH, viscosity, sprayability, and stability, were assessed for the developed product. According to the findings, the mouth freshener spray had a pleasing taste, good antibacterial activity, appropriate viscosity, and long-lasting freshness. Therefore, when compared to synthetic formulations, the new herbal mouth freshener spray can be regarded as a safe and effective oral care product.

IndexTerms - Herbal mouth freshener spray, Oral hygiene, Herbal formulation, Antimicrobial activity, Essential oils, Halitosis, Stability evaluation, Natural oral care.

INTRODUCTION

Herbal mouth fresheners are natural oral care products made with essential oils and medicinal plants to preserve oral hygiene and give long-lasting fresh breath.

Herbal mouthwashes include antibacterial and anti-inflammatory qualities that promote oral health and are typically alcohol-free, non-irritating, and linked to less side effects such discoloration and mucosal irritation when compared to many traditional chemical mouthwashes.^(1,2, 3)

Clove oil, peppermint oil, tulsi, neem oil, and orange oil are examples of essential oils and herbal extracts that have antimicrobial, antioxidant, anti-inflammatory, and deodorizing qualities that help prevent oral infections, plaque formation, and halitosis (bad breath).

Due to the potent antibacterial, analgesic, and antiseptic qualities of its major ingredient clove oil is frequently utilized in oral care treatments. It lessens oral discomfort, bacterial growth in the mouth, and toothaches.

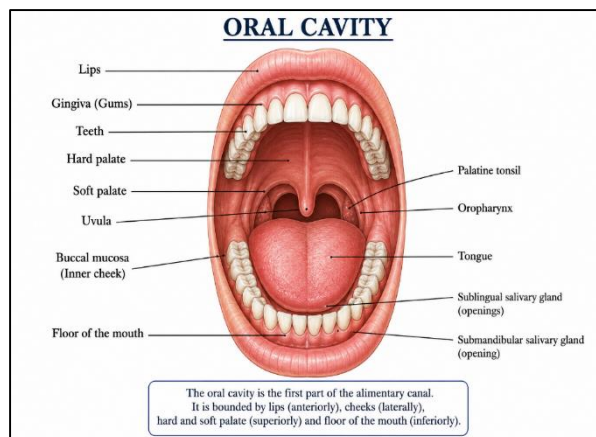
Peppermint oil contains menthol, which produces a cooling sensation and refreshing aroma while also showing antibacterial activity against oral microorganisms.^(4, 5, 6)

Tulsi, or *Ocimum sanctum*, is a significant medicinal herb with antibacterial, antifungal, anti-inflammatory, and antioxidant qualities. It enhances gum health and lessens the development of plaque.

Azadirachta indica is the source of neem extract, which has potent antibacterial and antiplaque properties and is frequently used in conventional oral care products to prevent gingivitis and dental cavities.

Natural flavonoids and limonene found in orange oil give it a pleasing citrus taste and antibacterial properties. It enhances the flavor and acceptability of herbal compositions and aids in breath freshening.

These herbal substances work together in a synergistic way to naturally maintain oral hygiene and control mouth infections.^(7, 8)



Several research studies have demonstrated that herbal oral care products containing essential oils and medicinal herbs effectively reduce oral microbial load and plaque formation with minimal side effects compared to synthetic mouthwashes. Alcohol and fluoride, which are toxic to our bodies in excess, are found in almost all chemical mouthwashes. Therefore, the majority of herbal mouthwashes are safe substitutes for children, diabetics, dry mouth sufferers, and pregnant women. This study was conducted to assess the effectiveness and safety of herbal mouth freshener spray for human medications. As a result, herbal mouth fresheners with peppermint, clove, tulsi, neem, and orange oils are becoming more and more popular as natural oral hygiene products that are both safe and effective.

NEED OF THE STUDY:

- Many commercial mouth fresheners contain synthetic chemicals and high alcohol content that may cause dryness, irritation, burning sensation, and alteration of taste.
- Chemical-based oral products may show side effects on long-term use and are not preferred by people seeking natural healthcare products.
- The primary cause of bad breath (halitosis) is oral bacteria that produce sulfur compounds like H_2S and CH_3SH , which need to be well controlled with antibiotics.
- Existing products often provide only temporary freshness and do not effectively control bacterial growth.
- Demand for natural, safe, and alcohol-balanced oral care products has increased due to growing understanding of herbal medicine.

OBJECTIVE:

- To formulate a safe and effective herbal mouth freshener spray using natural herbal ingredients.
- To improve oral hygiene by reducing microbial growth and providing long-lasting fresh breath.
- To assess the whitening efficiency and mouth-freshening ability of the formulated herbal spray.
- To evaluate the physicochemical and functional properties of the formulation, including pH, stability, spray pattern, and antimicrobial activity.
- To provide a natural alternative to conventional chemical oral care products with reduced side effects.

3.1 Drug Profile:

Common Name	: Neem
Synonym Name	: Azadirachta Indica
Biological Source	: Dried leaves of Azadirachta Indica
Family	: Meliaceae
Part used	: Leaves, Bark
Role	: Acts as antibacterial agent Maintains oral hygiene
Advantages	: Strong antimicrobial activity Prevents gum infection Safe for long-term use Natural alternative to chemical antiseptic

NEEM



Common Name : Clove
Synonym Name : Syzygium aromaticum
Biological Source : Dried flower buds
Family : Myrtaceae
Part used : Flower buds, Clove oil
Role : Reduces toothache Eliminate bad breath Kills oral bacteria
Advantages : Strong antiseptic property
Instant relief from tooth pain
Enhances shelf life of formulation

CLOVE



PEPPERMINT OIL

Common Name : Peppermint Oil
Synonym Name : Mentha Peprita
Biological Source : Leaves and flowering tops
Family : Lamiaceae
Part used : Essential oil
Role : Cooling sensation,
Improve patient acceptability
Mask unpleasant herbal taste
Provides fresh breath
Advantages : Pleasant flavor and aroma
Improve compliance
Antimicrobial effect
Natural mouth freshener



TULSI

Common Name : Holy Basil
Synonym Name : Scared Basil
Family : Lamiaceae
Part used : Leaves
Role : Acts as a natural Antimicrobial agents,
Helps in reducing oral bacteria,
Supports oral hygiene,
Provides mild herbal flavor
Advantages : Strong Antibacterial and Antiseptic properties
Helps in preventing bad breath has Anti-inflammatory effect



ORANGE OIL

Common Name : Orange oil
Synonym Name : Citrus oil
Biological source : Peel of Orange
Family : Rutaceae
Part used : Essential oil
Role : Acts as a Flavoring agent,
Provides pleasant citrus aroma,
Helps in masking unpleasant taste of other ingredients,
Contributes to mild antimicrobial activity
Advantages : Give instant freshness
Improve patient acceptability
Natural and safe compared to synthetic flavors

3.2 RESEARCH METHODOLOGY:

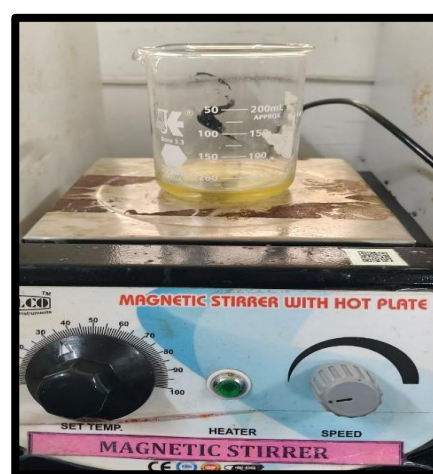
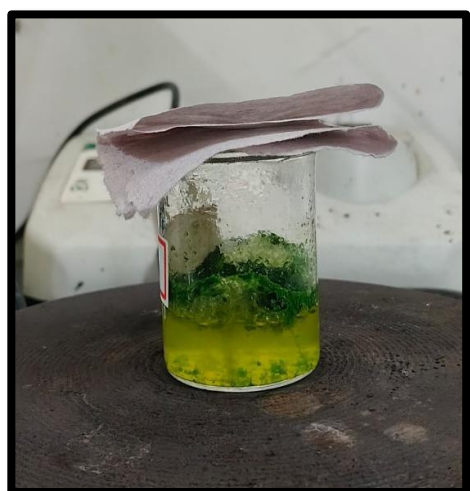


Table:1 Preparation Method of Herbal Mouth Freshener Spray (25 ml)

Sr. No	Ingredients	ml
1.	Clove oil	0.2 ml
2.	Peppermint Oil	0.3 ml
3.	Neem Extract	1 ml
4.	Tulsi Extract	2 ml
5.	Glycerin	5 ml
6.	Purified water	Q.s

1. Measure the required quantity of distilled water and heat it to boiling for sterilization.
2. Allow the boiled distilled water to cool to approximately 40–45°C.
3. Add the required quantities of clove oil, oregano oil, and peppermint oil to the cooled water. Mix thoroughly until a uniform solution or dispersion is obtained.
4. Filter the prepared formulation using muslin cloth or Whatman filter paper to remove any impurities.
5. Transfer the filtered formulation into a clean, sterilized spray bottle.
6. Label the container appropriately and store it in a cool, dry place until further evaluation

3.3 PHOTOS DURING FORMULATION



FINAL FORMULATION

3.4 EVALUATION PARAMETER

1. COLOR, ODOR AND TASTE

➤ We check this Parameters by simple touch and visual assessment

Sr. No.	Parameter	Result
1.	Color	Yellowish
2.	Taste	Sweet
3.	Odor	Pleasant

2. PH DETERMINATION:

We check the pH of the above mouth freshener spray by using simple pH meter. pH meter are most accurate type of measurement and are widely used. First we will calibrate this pH meter by using buffer solution. Then check the pH by dipping the electrode in undiluted sample solution. (Ideal range: 6-7)

Result = 6.57



3. SPRAY PATTERN

The composition is sprayed on plain white paper, and the spray pattern is assessed as Either good, somewhat uneven, or uneven. and the spray angle was also determined.



4. VISCOCITY:



The viscosity of the prepared mouth freshener spray was determined using an Ostwald viscometer and found to be suitable for easy spraying. (Result: 6 Cp)

5. STABILITY STUDY

- Formulation is stored under different temperature conditions and observed for:
 1. Color change
 2. Phase separation
 3. Odor change
 4. pH variation
 5. Precipitation

6. FOAMABILITY

- Determines foaming ability of product. Excess foam may cause irritation while very low foam affects acceptability

IV. CONCLUSION

The present study, "Formulation and Evaluation of a Natural Herbal Mouth Freshener Spray for Oral Hygiene," was successfully completed with the objective of developing a safe, effective and convenient herbal formulation for maintaining oral hygiene and preventing bad breath. The mouth freshener spray was prepared using natural herbal ingredients selected for their antimicrobial, antioxidant, anti-inflammatory and breath-freshening properties. These herbal components work synergistically to inhibit the growth of oral microorganisms, reduce unpleasant mouth odor and promote overall oral health without the adverse effects commonly associated with synthetic chemicals.

The formulated herbal mouth spray was evaluated for various physicochemical parameters, including appearance, color, odor, pH, spray pattern, homogeneity, stability and compatibility of ingredients. The formulation exhibited satisfactory characteristics with an acceptable pH suitable for the oral cavity, a pleasant aroma and taste, uniform spray distribution, and good physical stability during the study period. The evaluation results indicated that the formulation remained stable without any significant changes in its physical properties or performance.

The antimicrobial activity of the herbal formulation demonstrated its ability to inhibit the growth of common oral microorganisms responsible for dental plaque, bad breath, and minor oral infections. The refreshing effect of the spray was found to be immediate and long-lasting, making it suitable for regular daily use. The absence of harmful synthetic preservatives and alcohol makes the formulation a safer option, particularly for individuals seeking natural and herbal alternatives for oral care.

Overall, the developed natural herbal mouth freshener spray proved to be an effective, economical, and user-friendly oral hygiene product. It offers multiple benefits, including freshening breath, supporting oral cleanliness and enhancing oral health while minimizing the risk of side effects associated with conventional chemical-based mouth fresheners. The study concludes that herbal mouth freshener sprays have significant potential as an alternative oral care product. Further studies involving long-term stability testing, clinical evaluation, microbiological assessment and large-scale formulation optimization are recommended to validate its efficacy and support future commercial development.

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