



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Herbal Mouthwash – A Natural Oral Care Formulation

Vidya Kakad* , Himanshu Gaud , Rana Patel , Noor Khan

Chhatrapati Shivaji Maharaj University , Panvel , Navi Mumbai

Corresponding Author

Himanshu Gaud

ABSTRACT

The present study was carried out to formulate and evaluate a herbal mouthwash using natural ingredients for maintaining oral hygiene and preventing oral infections. Oral hygiene plays an important role in maintaining overall health, and poor oral care may lead to plaque formation, bad breath, gum inflammation, dental caries, and periodontal diseases. Conventional mouthwashes generally contain alcohol and synthetic chemicals, which may cause side effects such as burning sensation, dry mouth, tooth staining, and mucosal irritation after prolonged use. Therefore, there is a growing demand for safer and natural alternatives in oral care products.

In the present study, herbal ingredients such as Tulsi extract, Liquorice powder, Cinnamon oil, and Peppermint oil were selected due to their antimicrobial, anti-inflammatory, antiseptic, and refreshing properties. Other excipients including glycerol, sorbitol, sodium lauryl sulphate, brilliant blue FCF, alcohol, and distilled water were used for formulation preparation.

The herbal mouthwash was prepared by mixing aqueous and oil phases followed by filtration and packaging. The prepared formulation was evaluated for organoleptic properties, pH, viscosity, foamability, stability, and antimicrobial activity. The formulation showed acceptable colour, pleasant Odour, sweet taste, suitable pH, good stability, moderate foamability, and effective antimicrobial activity against oral microorganisms.

Keywords: Herbal Mouthwash, Oral Hygiene, Dental Care, Natural Mouthwash, Oral Infection, Herbal Formulation.

INTRODUCTION

Oral hygiene is one of the most important aspects of maintaining overall health and well-being. The oral cavity acts as the primary entry point to the body and remains continuously exposed to food particles, bacteria, and environmental contaminants. Poor oral hygiene may result in dental plaque, tooth decay, gingivitis, bad breath, and other oral infections. If not properly controlled, these conditions may progress into severe periodontal diseases leading to pain, discomfort, and tooth loss.

Mouthwash is widely used as an adjunct to brushing and flossing for maintaining oral hygiene. It helps reduce microbial load, freshens breath, and prevents oral infections. However, most commercially available mouthwashes contain alcohol, synthetic antimicrobial agents, preservatives, artificial flavours, and colouring agents. Prolonged use of such products may lead to side effects like tooth staining, burning sensation, dry mouth, altered taste, and irritation of oral mucosa.

Due to these limitations, there is increasing interest in herbal formulations. Herbal products are considered safer, economical, biocompatible, and associated with fewer side effects. Medicinal plants contain bioactive compounds such as flavonoids, alkaloids, tannins, glycosides, terpenoids, and essential oils, which possess antimicrobial, antioxidant, anti-inflammatory, and healing properties. These phytoconstituents help in reducing oral pathogens, maintaining gum health, promoting healing, and controlling bad breath.

The present project focuses on the formulation and evaluation of a herbal mouthwash prepared using Tulsi, Liquorice, Cinnamon oil, and Peppermint oil to provide a safe and effective natural oral care product.

Materials Used in Herbal Mouthwash Formulation

1. TULSI EXTRACT :



SCIENTIFIC NAME: *Ocimum sanctum*

ORIGIN: Leaves of *Ocimum sanctum* (Holy Basil)

APPEARANCE: Greenish-brown extract with characteristic aromatic odor.

USES: Used as a herbal antimicrobial and anti-inflammatory agent in mouthwash.

KEY BENEFITS OF TULSI EXTRACT IN MOUTHWASH

- Helps reduce harmful oral bacteria
- Prevents plaque formation and dental caries
- Reduces gum inflammation and bleeding gums
- Controls bad breath naturally
- Provides antimicrobial and antiseptic action
- Helps maintain proper oral hygiene

- Soothes oral tissues and gums
- Supports healing of minor mouth ulcers and infections
- Possesses antioxidant properties that protect oral cavity
- Safe and effective natural ingredient for daily oral care

2. LIQUORICE POWDER :



SCIENTIFIC NAME : Glycyrrhiza glabra

ORIGIN: Dried roots of Glycyrrhiza glabra, family Fabaceae.

APPEARANCE: Fine yellowish-brown powder with sweet taste.

USES: Used as a soothing, anti-inflammatory, and sweetening herbal agent in mouthwash.

Key Benefits of Liquorice Powder (*Glycyrrhiza glabra*) in Mouthwash

- Helps reduce gum inflammation and irritation
- Possesses antimicrobial activity against oral bacteria
- Prevents dental caries and plaque formation
- Soothes oral mucosa and sensitive gums
- Helps control bad breath naturally
- Provides anti-inflammatory effect in oral cavity
- Promotes healing of minor mouth ulcers
- Improves taste and sweetness of mouthwash naturally
- Protects oral tissues due to antioxidant properties
- Supports overall oral hygiene and gum health

3. CINNAMON OIL



SCIENTIFIC NAME : Cinnamomum burmannii

ORIGIN: Obtained from bark of Cinnamomum burmannii, family Lauraceae.

APPEARANCE: Yellow to brown colored aromatic volatile oil.

USES: Used as flavoring and antimicrobial agent in mouthwash.

Key Benefits of Cinnamon Oil (*Cinnamomum burmannii*) in Mouthwash

- Possesses strong antimicrobial and antiseptic properties
- Helps reduce oral bacterial growth
- Prevents plaque formation and dental caries
- Helps control bad breath naturally
- Provides refreshing flavor and aroma
- Reduces risk of oral infections
- Supports healthy gums and oral tissues
- Exhibits anti-inflammatory activity
- Helps maintain overall oral hygiene
- Enhances effectiveness of herbal mouthwash formulation

4. PEPPERMINT OIL



SCIENTIFIC NAME : *Mentha piperita*

ORIGIN: Obtained from leaves of *Mentha piperita*

APPEARANCE: Clear to pale yellow volatile oil with strong minty odor.

USES: Used as flavoring, cooling, and refreshing agent in mouthwash.

Key Benefits of Peppermint Oil (*Mentha piperita*) in Mouthwash

- Provides long-lasting fresh breath
- Gives cooling and refreshing sensation in oral cavity
- Possesses mild antimicrobial properties
- Helps reduce bad breath-causing bacteria
- Soothes irritated gums and oral tissues
- Enhances flavor and palatability of mouthwash
- Provides calming and refreshing effect after use
- Helps maintain oral cleanliness and freshness
- Supports overall oral hygiene
- Improves consumer acceptability of the formulation

5. GLYCEROL :



SCIENTIFIC NAME : Glycerinum

Origin: Obtained from vegetable oils or animal fats.

Appearance: Clear, colorless, viscous, sweet liquid.

Uses: Used as humectant, sweetening, and viscosity-enhancing agent in mouthwash.

Key Benefits of Glycerol (*Glycerinum*) in Mouthwash

- Keeps oral tissues moist and prevents dryness
- Provides soothing effect to gums and oral mucosa
- Improves texture and consistency of mouthwash
- Enhances mouthfeel and smoothness of formulation
- Acts as a humectant by retaining moisture
- Improves sweetness and palatability naturally
- Helps in uniform mixing of ingredients
- Reduces irritation in oral cavity
- Increases stability of the formulation
- Improves overall consumer acceptability of mouthwash

6. SORBITOL :



SCIENTIFIC NAME : D-Glucitol

ORIGIN: Sugar alcohol obtained from glucose, commonly derived from corn syrup.

APPEARANCE: Clear, colorless syrup or white crystalline powder with sweet taste.

USES: Used as sweetening and humectant agent in mouthwash.

Key Benefits of Sorbitol (*D-Glucitol*) in Mouthwash

- Provides sweetness without causing tooth decay
- Improves taste and palatability of mouthwash
- Acts as a humectant and retains moisture
- Prevents dryness in the oral cavity

- Enhances smooth texture and mouthfeel
- Increases patient acceptability of formulation
- Helps maintain stability of the mouthwash
- Safe for regular oral care use
- Supports comfortable rinsing experience
- Non-cariogenic and suitable for oral hygiene products

7. SODIUM LAURYL SULPHATE (SLS)



SCIENTIFIC NAME : Sodium dodecyl sulfate

ORIGIN: Synthetic surfactant derived from lauryl alcohol.

APPEARANCE: White crystalline powder or flakes.

USES: Used as surfactant and foaming agent in mouthwash.

Key Benefits of Sodium Lauryl Sulphate (SLS) (Sodium dodecyl sulfate) in Mouthwash

- Acts as an effective cleansing agent
- Helps remove food particles and debris from oral cavity
- Produces foam for better cleaning action
- Improves dispersion of oils and herbal ingredients in water
- Enhances uniform mixing of formulation
- Helps maintain oral cleanliness and freshness
- Increases effectiveness of mouthwash during rinsing
- Supports removal of plaque and impurities
- Improves texture and stability of formulation
- Enhances overall consumer experience during use

8. BRILLIANT BLUE FCF :



SCIENTIFIC NAME : FD&C Blue No. 1

ORIGIN: Synthetic food-grade coloring agent.

APPEARANCE: Dark blue to purple fine powder or granules.

USES: Used as coloring agent in mouthwash formulation.

Key Benefits of Brilliant Blue FCF (FD&C Blue No.1) in Mouthwash

- Provides attractive blue colour to formulation
- Improves visual appearance
- Enhances product acceptability
- Gives professional presentation
- Improves aesthetic quality of mouthwash

9. Distilled Water

- Scientific Name: Aqua destillata
- Origin: Purified water obtained by distillation process.
- Appearance: Clear, colorless, odorless liquid.
- Uses: Used as vehicle/base for preparing mouthwash and making volume up to 100 mL.

AIM AND OBJECTIVES

AIM

To formulate and evaluate a herbal mouthwash using Tulsi (*Ocimum sanctum*) for maintaining oral hygiene and preventing oral infections.

OBJECTIVES

1. To prepare a natural and alcohol-free herbal mouthwash.
2. To utilize Tulsi extract for its antibacterial and anti-inflammatory properties.
3. To reduce oral microbial load and prevent plaque formation.
4. To promote oral hygiene without causing side effects.
5. To provide a safe, economical, and effective alternative to synthetic mouthwashes.
6. To improve breath freshness and overall oral health.

LITERATURE REVIEW

Oral hygiene is essential for maintaining healthy teeth and gums. Brushing alone cannot completely remove microorganisms from all parts of the oral cavity; therefore, mouthwash is commonly used as an additional oral hygiene aid.

Conventional mouthwashes containing chlorhexidine, cetylpyridinium chloride, fluoride, and alcohol are effective against oral microorganisms, but prolonged use may produce side effects such as staining, burning sensation, dry mouth, and taste alteration.

Herbal mouthwashes have gained popularity because they contain plant-based ingredients with antimicrobial, antioxidant, anti-inflammatory, and soothing properties. Herbs like Neem, Tulsi, Clove, Peppermint, Liquorice, and Aloe vera have shown promising effects in maintaining oral hygiene naturally.

Tulsi possesses antibacterial and antioxidant activity and helps control oral infections. Clove contains eugenol which exhibits analgesic and antiseptic properties. Peppermint provides cooling sensation and fresh breath, while Liquorice reduces gum inflammation and improves taste.

Several studies have reported that herbal mouthwashes are comparable to chlorhexidine mouthwash in reducing plaque and gingival inflammation while causing fewer side effects.

MATERIALS USED

Ingredient	Role
Tulsi Extract	Antimicrobial and anti-inflammatory agent
Liquorice Powder	Soothing and sweetening agent
Cinnamon Oil	Antimicrobial and flavouring agent
Peppermint Oil	Cooling and refreshing agent
Glycerol	Humectant and viscosity enhancer
Sorbitol	Sweetening agent
Sodium Lauryl Sulphate	Surfactant and foaming agent

Brilliant Blue FCF	Colouring agent
Distilled Water	Vehicle

COMPOSITION OF HERBAL MOUTHWASH (100 ML)

Ingredients	Quantity
Tulsi Extract	2 g
Liquorice Powder	1 g
Cinnamon Oil	0.2 mL
Peppermint Oil	0.2 mL
Glycerol	5 mL
Sorbitol	10 mL
Sodium Lauryl Sulphate	0.5 g
Brilliant Blue FCF	q.s
Distilled Water	q.s to 100 mL

METHODOLOGY

1. Collection of Materials :

All ingredients required for the formulation were collected and authenticated before use.

2. Preparation of Aqueous Phase :

Distilled water was taken in a clean beaker, and Tulsi extract along with Liquorice powder was added gradually with continuous stirring until uniformly dispersed.

3. Addition of Humectants :

Glycerol and sorbitol were added to improve sweetness, consistency, and mouthfeel of the formulation.

4. Addition of Surfactant :

Sodium Lauryl Sulphate was added slowly to avoid excessive foam formation and improve cleansing action.

5. Preparation of Oil Phase :

Cinnamon oil and peppermint oil were mixed properly to obtain uniform dispersion.

6. Mixing of Phases :

The oil phase was slowly added into the aqueous phase with continuous stirring to ensure proper mixing and emulsification.

7. Addition of Colouring Agent :

Brilliant Blue FCF was added to obtain an attractive blue colour.

8. Final Volume Adjustment :

Distilled water was added to make the final volume up to 100 mL.

9. Filtration and Packaging :

The formulation was filtered and filled into amber coloured bottles for storage and evaluation.

PROCEDURE**Step 1: Preparation of Herbal Base :**

Take approximately 50 mL of distilled water in a clean beaker. Add Tulsi extract and Liquorice powder slowly with continuous stirring until uniformly mixed.

Step 2: Addition of Humectants :

Add Glycerol and Sorbitol to the above mixture and stir properly to obtain a smooth and homogeneous solution. These ingredients improve sweetness and mouthfeel of the mouthwash.

Step 3: Addition of Surfactant :

Add Sodium Lauryl Sulphate (SLS) gradually into the mixture with gentle stirring to avoid excessive foam formation. Continue stirring until completely dissolved.

Step 4: Preparation of Oil Phase :

In a separate beaker, mix Cinnamon oil and Peppermint oil properly. These oils act as flavoring and antimicrobial agents.

Step 5: Mixing of Oil Phase :

Add the oil mixture slowly into the aqueous phase with continuous stirring to ensure uniform distribution of oils throughout the formulation.

Step 6: Addition of Colouring Agent :

Add a small quantity of Brilliant Blue FCF and stir until a uniform blue color is obtained.

Step 7: Make-up of Volume :

Add distilled water gradually to make the final volume up to 100 mL and mix thoroughly.

Step 8: Filtration :

Filter the prepared mouthwash using muslin cloth or filter paper to remove undissolved particles and obtain a clear solution.

Step 9: Packaging and Storage :

Transfer the prepared herbal mouthwash into a clean, dry, airtight amber-colored bottle. Label properly and store in a cool and dry place.

EVALUATION TESTS**1. Organoleptic Evaluation :**

The prepared formulation was evaluated for colour, odour, taste, and appearance.

2. pH Determination :

The pH was measured using a digital pH meter to ensure compatibility with oral mucosa.

$pH = 6.4$

3. Viscosity :

The viscosity of the formulation was determined to study flow properties.

Foamability

Foamability was observed to determine cleansing ability.

4. Stability Study :

The formulation was observed for any change in colour, odour, pH, and precipitation during storage.

5. Antimicrobial Activity :

The antimicrobial activity was evaluated by observing the zone of inhibition against oral microorganisms.

RESULTS

Test	Observation	Result
Colour	Blue	Acceptable
Odour	Pleasant	Acceptable
Taste	Sweet	Acceptable
pH	6.4	Suitable
Viscosity	1.12 cps	Good
Foamability	Moderate Foam	Good
Stability	No Change	Stable
Antimicrobial Activity	Zone Observed	Effective

DISCUSSION

The prepared herbal mouthwash showed satisfactory physicochemical and antimicrobial properties. The organoleptic evaluation indicated acceptable colour, pleasant odour, and sweet taste, suggesting good patient acceptability. The pH was found to be suitable for oral use and safe for oral tissues and tooth enamel.

The viscosity and foamability studies indicated good flow and cleansing properties. Stability studies showed no significant change in colour, odour, or appearance during storage, indicating physical stability of the formulation.

The antimicrobial study confirmed that the formulation effectively inhibited oral microorganisms due to the presence of herbal ingredients like Tulsi, Cinnamon oil, and Peppermint oil. Hence, the formulation can be considered effective for maintaining oral hygiene and reducing oral infections.

SUMMARY AND CONCLUSION

The present study successfully formulated and evaluated a herbal mouthwash using natural ingredients. The prepared formulation showed acceptable physical appearance, suitable pH, good stability, moderate foamability, and satisfactory antimicrobial activity.

The herbal mouthwash can be considered a safe, effective, economical, and natural oral care product. Due to its herbal composition, it may produce fewer side effects compared to synthetic mouthwashes. Therefore, the prepared formulation can be used as a promising natural alternative for maintaining oral hygiene and preventing oral infections.

REFERENCE

1. Lee EJ, Lee MO. Analysis on the Effect of the Dental Health Characteristics of Adults on the Status of Recognition and Practical Application of Dental Hygiene Devices. *JDent Hyg Sci*. 2010;10:241-250.
2. Oliveira LM, Pazinato J, Zanatta FB. Are oral hygiene instructions with the aid of plaque-disclosing methods effective in improving self-performed dental plaque control? A systematic review of randomized controlled trials. *Int J Dent Hyg*. 2021;1-16.
3. Kidd EA. Clinical threshold for carious tissue removal. *Dent Clin North Am*. 2010;54(3):541-549.
4. Prasanth M. Antimicrobial efficacy of different toothpastes and mouthrinses: An in vitro study. *Dent Res .J* 2011;8(2):85- 94.
5. Prakash P, Gupta N. Therapeutic uses of *Ocimum sanctum* (Tulsi) with a note on eugenol and its pharmacological actions: A short review. *Indian J Physiol Pharmacol*. 2005;49(2):125-131.
6. Gupta VK, Fatima A, Faridi U, et al. Antimicrobial potential of *Glycyrrhiza glabra* roots. *J Ethnopharmacol*. 2008;116(2):377-380.
7. Ranasinghe P, Pigera S, Premakumara GA, et al. Medicinal properties of 'true' cinnamon (*Cinnamomum spp.*): A systematic review. *BMC Complement Altern Med*. 2013;13:275.
8. McKay DL, Blumberg JB. A review of the bioactivity and potential health benefits of peppermint (*Mentha piperita* L.). *Phytother Res*. 2006;20(8):619-633.