IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 9, May 2026
Impact Factor: 8.2

A Research on Formulation and Evaluation of Herbal Mouthwash

Samirkumar Dharmpal Ghutke and Payal Kuldhip Indurkar
Maharashtra Institute of Pharmacy (D Pharma), Betala, Brahmapuri
samirghutke58@gmail.com and payalindurkar111@gmail.com

Abstract: *Herbal mouthwash is a natural oral hygiene formulation prepared from medicinal plant extracts and essential oils that help maintain oral cleanliness and prevent dental diseases. The present study focuses on the formulation and evaluation of herbal mouthwash using natural ingredients such as Tulsi, Clove, peppermint oil, neem, and other herbal constituents known for their antimicrobial, anti-inflammatory, and antiseptic properties. Herbal mouthwash is considered a safer alternative to chemical mouthwashes because it produces fewer side effects such as tooth staining, burning sensation, and altered taste.*

The formulation was prepared by extracting active constituents from selected herbs and mixing them with suitable excipients, flavoring agents, preservatives, and purified water. The prepared mouthwash was evaluated for various parameters including color, odor, pH, stability, homogeneity, and antimicrobial activity. The herbal ingredients

demonstrated effective action against common oral microorganisms responsible for plaque, bad breath, gingivitis, and dental caries.

The study concludes that herbal mouthwash is an effective, economical, and safe oral care product with significant therapeutic benefits. Regular use of herbal mouthwash can improve oral hygiene, reduce microbial growth, freshen breath, and support healthy gums and teeth. Due to the increasing demand for natural healthcare products, herbal mouthwash has gained wide acceptance in modern oral care systems.

Keywords: Herbal Mouthwash, Formulation, Evaluation, oral Hygiene, Antimicrobial Activity, Herbal Extracts, plaque Control, Antiseptic, pH Study, Stability Study, Oral Health, Natural Ingredients.

I. INTRODUCTION

Herbal mouthwash is a liquid oral preparation made from natural herbs, plant extracts, and essential oils that helps maintain oral hygiene and prevent dental diseases. It is used as an adjunct to regular brushing and flossing for cleaning the mouth, freshening breath, and reducing microbial growth. Unlike synthetic mouthwashes that may contain alcohol and chemical agents, herbal mouthwash is prepared using natural ingredients with fewer side effects and better patient acceptability.

Oral diseases such as dental caries, plaque formation, gingivitis, periodontitis, and bad breath are among the most common health problems worldwide. Poor oral hygiene leads to the accumulation of microorganisms in the oral cavity, causing infection and inflammation. Mouthwash plays an important role in reducing oral bacteria and maintaining healthy gums and teeth. In recent years, herbal formulations have gained popularity because of their safety, effectiveness, low cost, and natural origin.

Herbal mouthwash commonly contains medicinal plants such as Tulsi, Neem, Clove, peppermint, aloe vera, and tea tree oil. These herbs possess antimicrobial, anti-inflammatory, antiseptic, antioxidant, and analgesic properties. For example, clove contains eugenol which helps relieve tooth pain and reduce bacterial growth, while tulsi and neem are known for their strong antibacterial and healing activities.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 9, May 2026 Impact Factor: 8.2

The preparation of herbal mouthwash involves extraction of active constituents from herbs followed by mixing with suitable excipients, preservatives, flavoring agents, and purified water. The formulation is then evaluated for physical appearance, pH, stability, odor, taste, and antimicrobial activity.

Herbal mouthwash offers several advantages over conventional mouthwashes. It causes minimal side effects such as tooth staining, burning sensation, dryness of mouth, and altered taste. It is eco-friendly, biodegradable, and suitable for longterm use. Due to the increasing awareness about herbal medicines and natural healthcare products, herbal mouthwash has become an important area of research and development in pharmaceutical and dental sciences.

Thus, herbal mouthwash can be considered an effective and safe alternative for promoting oral hygiene and preventing oral infections naturally.

Plant profile

1. Neem

Synonyms:- margosa, nimtree, indian lilac. Azadirachta indica

Biological Source:- The part of plant used are leaves of the plant Azadirachta indica

Family:- Meliaceae

Chemical constituent:- Nimbin, Nimbdin, Nimrinin. It inhibit the formalation of plaque and the growth of the bacteria.

Neem powder

2. Tulsi

Synonyms:- ocimum sanctum, ocimum tomentosum

Biological Source- Tulsi consists of the fresh and dried leaves of Ocimum species like Ocimum sanctum L. and Ocimumbasilicum L.

Family:- labiatae

Tulsi powder

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 9, May 2026
Impact Factor: 8.2

3. Clove

Synonyms: Caryophyllum; Clove flower; Clove bud; Laung

Biological Source: Cloves consist of dried flower buds of Eugenia caryophyllus, It should contain not less than 15 % (v/w) of clove oil.

Family: Myrtacea.

Chemical Constituents:- The drug contains about 15 to 20 % of volatile oil; 10 to 13 % of tannin (gallotannic acid), resin, chromone and eugenin. The volatile oil contains eugenol (about 70 to 90 %), eugenol acetate, methyl amyl ketone, caryophyllenes and small quantities of esters and alcohols.

Clove powder.

4. Peppermint

Synonyms :-peppermint gum, peppermint candy.

Biological source: 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 odor or flavor.)

Chemical constituent: menthol (40.7%) and menthone (23.4%). Further components were (+/-)-methyl acetate, 1,8-cincole, limonene, p-pinene and Bcaryophyllene.

MATERIAL & METHOD

1. Preparation of herbal mouthwash Four different extracts of polyherbal mouthwash were developed

2. The mouthwash formula made use of four main herbal ingredients: Neem, Tulsi, Clove, Peppermint

Three minor ingredients added which are; SLS, methyl paraben sodium saccharin The minor components were used for the

Preservation and for improving the taste. In order to test the anti-bacterial activity of the mouthwash herbs,

Different percentage of the herbal extract were prepared

2.For the formulation, the mouthwash herbal ingredients were ground to obtain their powder form. 10 grams of each Neem, turmeric, clove, peppermint were separately soaked into 100ml. of distilled water and incubated at 37oC for 48 hours.

2.After incubation, the herbal extract were filtered

2.The extract were then boiled separately and left to cool

2.Ten grams of each solid minor ingredient (SLS, methyl paraben sodium saccharin) were added separately into 100 mL of distilled water.

2.After the ingredients extracts cool down, the major and minor ingredients were mixed following the formulation in Table[33,35]

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 9, May 2026
Impact Factor: 8.2

Material

Sr.no	Ingerdients	Scientific name	chemical constients	Use
1	Neem	Azadirachata indical	Nimbin, nimdin	Antiseptic inhibit planque formation
2	Tulsi	Ocimum enuflorum	Eugenol	Antagngora halth
3	Clove	Eugenia caeyophyyllus	Eugenol	Dental analgesic fight bad breath
4	Peppermint	Metha peperata	menthol	Frangance and anti viral
5	Sodium saccharin			Preservative
6	Methyal paraden			surfactance
7	Sls			

Evaluation Parameters

1. Stability testing

Stability testing is conducted before the antibacterial assay to ensure the longevity and consistency of the mouthwash formulations.

2. Physical Stability

Visual appearance, physical separation, and homogeneity of the mouthwash formulations are assessed in the physical stability test. Different formulations are exposed to varying temperatures (120°C and 25°C), and their appearances are observed and recorded accordingly.

3. pH Stability pH stability:- of the mouthwash formulations is monitored using a calibrated pH meter. Mean and standard deviation calculations are performed to analyze pH variations over time. Formulations are stored at room temperature (25°C) and in refrigeration (12°C) for six weeks, with pH readings recorded periodically.

Physical and color stability analysis

Different formulations of mouthwash were prepared and subjected to analysis to determine their physical and color stability. Each formulation was divided into two parts and incubated at two different temperatures: in the refrigerator at 12°C and at room temperature around 25°C. The rationale for choosing two temperatures was to identify the optimal storage conditions for maintaining the activity of the mouthwash formulations for the longest possible duration. Visual appearance, phase separation, and homogeneity of each formulation were monitored through ocular examination.[37,38]

Initially, the mouthwash exhibited a dark brown color, attributed to the presence of clove extract in the formulations. Ideally, the color of the mouthwash should remain consistent throughout the experimental phase to ensure the acceptability of the formulations. During the experiment, formulations stored in the refrigerator (12°C) retained a light brown color, whereas those kept at room temperature (25°C) maintained a dark brown color. This shift in color suggests possible oxidation of the mouthwash ingredients. Formulations stored at room temperature did not exhibit changes in color, unlike those stored in the refrigerator, indicating a potential impact of temperature on color stability.

Despite the natural antioxidants present in the herbal ingredients, the lower storage temperature may have compromised their antioxidant activity, leading to color Changes. Phase separation in the mouthwash formulations was not observed, indicating good physical stability the physical characteristics of the different mouthwash formulations were assessed prior to incubation at different storage temperatures.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 9, May 2026
Impact Factor: 8.2

Ph stability

Stability test

II. CONCLUSION & DISCUSSION

Herbal mouthwashes have gained significant attention in recent years due to the growing preference for natural and safer healthcare products. They are formulated using plant-based ingredients such as neem, clove, tulsi, tea tree oil, peppermint, and aloe vera, which possess antimicrobial, anti-inflammatory, and antioxidant properties. These herbal components help in controlling oral bacteria, reducing plaque formation, preventing gingivitis, and maintaining fresh breath.

Compared to conventional chemical mouthwashes containing alcohol or chlorhexidine, herbal mouthwashes generally produce fewer side effects such as tooth staining, burning sensation, dryness of mouth, and altered taste perception. This makes them suitable for long-term use and for individuals who are sensitive to synthetic chemicals.

Several studies have shown that herbal mouthwashes can be nearly as effective as commercial mouthwashes in improving oral hygiene when used regularly along with proper brushing and flossing. In addition, herbal products are often more affordable, biodegradable, and culturally acceptable in many communities where traditional medicinal plants are commonly used.

However, despite their advantages, herbal mouthwashes also have certain limitations. The concentration and quality of herbal ingredients may vary between products, and scientific evidence supporting some formulations is still limited.

More clinical trials and standardization are required to confirm their long-term safety, effectiveness, and dosage.

Overall, herbal mouthwashes represent a promising and eco-friendly approach to oral healthcare. They can serve as a beneficial adjunct to daily oral hygiene practices, especially for individuals seeking natural alternatives to chemical-base.

REFERENCES

1. Pharmaceutical manufacturing handbook production and processes, Shyne Cox Gad., International journal of science and research ISSN:2319-7064 Index Copernicus Value 2015:78.96
2. Bioscientific Journal of Biology and Biology Education, 2020; 12(3): 288-296
3. World Journal of Pharmacy and Pharmaceutical Sciences 7(9): 436-445
4. International Journal of Current Microbiology and Applied Sciences, 2016; 5(11): 205-221
5. European journal of molecular and clinical medicine, 2020; 07(2): ISSN 2515-8260
6. Journal of Dental Research, February, 1996; 75(2): 816-822,

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 9, May 2026 Impact Factor: 8.2

7. Galore International Journal of Health Sciences and Research, Oct- Dec, 2018; 3.
8. Bulgaria scientific paper, 2008; 36 book 5, chemistry
9. A Horticulture Information article from the Wisconsin Master Gardner Website, posted 27 Jan 2003.
10. Journal of the American Oil Chemists'Society/ Volume 64, Issue 9/ p. 1348-1351.
11. Indo Global Journal of Pharmaceutical Sciences, 2018; 8(2): 37-40
12. Sandhya R. Herbal Product as mouthwash- a review. Int J Sci Res, 2017: 6(7): 1334-7.
13. International Journal of pharma and BioSciences, April-June 2012; 3(2).
14. Badria FA, Zidan OA. Natural products for dental caries prevention. J Med Food, 2004; 7(3): 381-384.
15. Jounal ofsouth African Academy of family practice/primary care- August 2014.
16. The yellow Emperor's Classic of International Medicine, Williams and Wilkins.
17. G. A. van der Weijden and K. P. Hioe, "A systematic review of the effectiveness of selfperformed mechanical plaque removal in adults with gingivitis using a manual toothbrush," Journal of Clinical Periodontology, 2005; 32(6): 214–228. View at: Publisher Site | Google Scholar
18. Ayurvedic Pharmacopoeia of India. Government of India, Ministry of Health and Family Welfare. Part I. III. New Delhi, India: Department of Indian Systems of Medicine and Homoeopathy, 2014. [Google Scholar]
19. World Health Organisation.Preventing Chronic Diseases: A Vital Investment: WHO Global Report.
20. Geneva: World Health Organization, 2005. Department of Chronic Diseases and Health Promotion; p. 18. [Google Scholar]
21. Bast F, Rani P, Meena D. Chloroplast DNA phylogeography of holy basil (Ocimumtenuiflorum) in Indian.
22. Lee, E.-J.; Lee, M.-O. Analysis on the Effect of the Dental Health Characteristics of Adult on the Status of Recognition and Practical Application of Dental Hygiene Devices. J. Dent. Hyg. Sci, 2010; 10: 241–250. [Google
A Research on Formulation and Evaluation of Herbal Mouthwash Maharastra Institute of Pharmacy (D Pharm), Betala Bramhapuri 20 Scholar]
23. Oliveira, L.M.; Pazinatto, J.; Zanatta, F.B. Are oral hygiene instructions with aid of plaquedisclosing methods effective in improving self-performed dental plaque control? A systematic review of randomized controlled trials. Int. J. Dent. Hyg, 2021: 1–16. [Google Scholar] [CrossRef]
https://www.sciencedirect.com/topics/chemistry/mouthwash
24. Kidd EA. Clinical threshold for carious tissue removal. Dent Clin North Am, 2010 Jul; 54(3): 541-9. [PubMed]
25. Schwendicke F, Dörfer CE, Schlattmann P, Foster Page L, Thomson WM, Paris S. Socioeconomic inequality and caries: a systematic review and meta-analysis. J Dent Res, 2015 Jan; 94(1): 10-8. [PubMed] [Ref list]
26. Fangtham M, Magder LS, Petri MA. Oral candidiasis in systemic lupus erythematosus. Lupus, 2014 Jun; 23(7): 684-90. [PubMed] [Ref list]
27. Marchesan JT, Girnary MS, Moss K, Monaghan ET, Egnatz GJ, Jiao Y, Zhang S, Beck J,
Swanson KV. Role of inflammasomes in the pathogenesis of periodontal disease and therapeutics. Periodontol 2000, 2020 Feb; 82(1): 93-114. [PMC free article] [PubMed] [Ref list]
28. https://my.clevelandclinic.org/health/diseases/21766-mouth-ulcer
29. https://pubmed.ncbi.nlm.nih.gov/20621240/#:~:text=Listerine%2C%20a%20mouthrinse%20composed%20of,and%20as%20a%20floor%20cleaner.
30. Tayles N., Domett K., Halcrow S. Can Dental Caries Be Interpreted as Evidence of Farming? The Asian Experience. Front. Oral Biol. 2009;13:162–166. Doi: 10.1159/000242411. [PubMed] [CrossRef] [Google Scholar]
31. Forshaw R. Dental Indicators of Ancient Dietary Patterns: Dental Analysis in Archaeology. Br. Dent. J., 2014; 216: 529–535. Doi: 10.1038/sj.bdj.2014.353. [PubMed] [CrossRef] [Google Scholar]
32. Matthews RW. Hot salt water mouth baths. British Dental Journal, 2003; 195(1): 3. [PubMed] [Google Scholar]
33. G. A. van der Weijden and K. P. Hioe, "A systematic review of the effectiveness of selfperformed mechanical plaque removal in adults with gingivitis using a manual toothbrush," Journal of Clinical Periodontology, 2005; 32(6): 214–228,.View at: Publisher Site | Google Scholar

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 9, May 2026
Impact Factor: 8.2

34. Ayurvedic Pharmacopoeia of India. Government of India, Ministry of Health and Family Welfare. Part I. III. New Delhi, India: Department of Indian Systems of Medicine and Homoeopathy, 2014. [Google Scholar]
35. World Health Organisation. Preventing Chronic Diseases: A Vital Investment: WHO Global Report. Geneva: World Health Organization; 2005. Department of Chronic Diseases and Health Promotion; p. 18.
36. Bast F, Rani P, Meena D. Chloroplast DNA phylogeography of holy basil (Ocimum tenuiflorum) in Indian subcontinent. ScientificWorldJournal, 2014; 2014: 847–482. [PMC free article] [PubMed] [Google Scholar]
37. Chrysanthakopoulos NA. Prevalence of gingivitis and associated factors in 13-16- year-old adolescents in Greece. Eur J Gen Dent, 2016; 5: 58–64. [Google Scholar]
Jayaprakasha G.K., Rao L.J. Chemistry, biogenesis, and biological activities of Cinnamomum zeylanicum. Crit. Rev.