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 5, Issue 4, April 2025
Impact Factor: 7.67

Formulation and Assessment of a Herbal Mouthwash to Prevent Oral Infections.

Mr. Akbar Shaikh[1], Mr. Pratik Sandip Raut[2], Ms. Sharddha Ravte[3], Mr. Dhiraj Sapkal[4], Ms. Krutadnya Salve[5]
Guide, Pharmaceutical Department[1]
Students, Pharmaceutical Department[2,3,4,5]
Shri Goraksha C.O.P, Chh Sambhajinnagar, India

Abstract: *Because of their antiviral and antibacterial properties against human microorganisms, medicinal plants are essential in the treatment and prevention of disease. Compared to chemical mouthwash, herbal mouthwash is more popular since it works on oral bacteria and pathogens, reduces pain immediately, and has no negative side effects. Dental caries and periodontal disorders at all stages of life are the most prevalent infectious diseases caused by numerous infections and germs. Formulating and assessing IJPLS's efficacy against oral cavity microorganisms is the goal of the current study. Four herbs were used for mouthwash: Ocimum sanctum (tulsi), Syzgium aromaticum (clove), Mentha longifolia (mint), and Azadirecta indica (neem). The prepared formulation was additionally Formulating and assessing its efficacy against oral cavity microorganisms is the goal of the current investigation. Five herbs were used for mouthwash: Ocimum sanctum (tulsi), Syzgium aromaticum (clove), Mentha longifolia (mint), and Azadirecta indica (neem), Miswak . Physical characteristics such as pH, color, and stability were further assessed for the prepared product.*

The current mouthwash has good antimicrobial qualities. This preparation holds up well under a variety of temperature conditions. Curren These solutions can be applied to lessen oral cavity infections and microbial proliferation.

Keywords: Neem, Miswak, Tulsi, Mouthwash

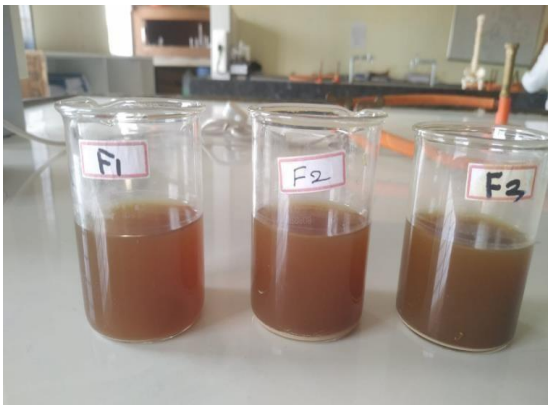
I. INTRODUCTION

Because they work on oral infections, provide immediate pain relief, and have fewer side effects, herbal mouthwashes are in high demand. Although chemical mouthwashes are inexpensive, they tend to discolor teeth and may have adverse effects. They contain hydrogen peroxide, chlorine dioxide, and cetylpyridinium chloride, which instantly whiten, sterilize, and reduce tooth discomfort. Dental caries and periodontal disorders are among the most prevalent infectious diseases that many people confront. As a serious mouth illness, periodontitis can impact the Cavity formation, enamel eruption, gum swelling, gum bleeding, and the development of a hollow black eruption on the tooth surface are all examples of dental caries. Early on, children and adolescents have a high rate of dental cavities due to poor oral hygiene. From the contaminated tooth's root, oral infections travel through the jaw bones and into the gaps between the soft tissue's fascial planes. Aqueous extracts of five distinct leaves& roots —Azadirecta indica (neem), Mentha longifolia (mint), Syzygium aromaticum (clove), and Ocimum sanctum (tulsi),(Salvadora persica) Miswak —were used to make the antibacterial herbal mouthwash. In this case, mint is a component that gives this mouthwash an aromatic base. After using mouthwash, it leaves the mouth feeling fresh. Neem (Azadirachta indica) has a bitter flavor as well as a number of active chemical components, including antiviral properties. Nematicide, antimicrobial, antifungal, and antibacterial qualities. Also miswak has some of features as Antibacterial mouthwash: To assist lessen plaque, gingivitis, and foul breath, mouthwash containing miswak extracts can work as an antibacterial agent.Oral rinse: To reduce inflammation and irritation of the gums, miswak extracts can be used as an oral rinse. Dental care product: Miswak extracts can be utilized to support oral health in dental care products like

Copyright to IJARSCT
www.ijarsct.co.in
DOI: 10.48175/IJARSCT-25132

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 5, Issue 4, April 2025
Impact Factor: 7.67

mouthwash.Stops bacterial growth: It has been demonstrated that miswak extracts stop the growth of several oral pathogens, including as Actinomyces viscosus, Lactobacillus acidophilus, and Streptococcus mutans.



II. MATERIAL &METHODS : COLLECTION OF PLANTS

Plant leaves were randomly selected, including those of Azadirecta indica (neem), Mentha longifolia (mint), Syzgium aromaticum (clove), Ocimum sanctum (tulsi), and Salvadora persica (miswak). We bought alcohol, glycerol, PEG 40, clove oil, mint oil, and saccharine from the Indore local market.

Preparation a Plant Extract The gathered plant leaves were dried, ground up, and placed in airtight bottles after being cleaned with sterile water. Each plant material's aqueous extract was made by soaking the powdered plant parts in sterile distilled water and keeping them in an incubator set at 37°C for 72 hours. The herbal extracts were placed in the container after being filtered with a Whatmann filter.

III. METHODS FOR MAKING MOUTHWASH

Each ingredient's weighted quantity will be taken. A tiny amount of water was added to the extract and thoroughly combined in a mortar and pestle. The other ingredients will be added gradually while being thoroughly mixed. Mint oil and clove oil will be added drop by drop and thoroughly combined, being careful not to create lumps. After that, PEG 40 and glycerol will be addedgradually and thoroughly blended. After adding preservative and water to create volume, the product will be packaged in a visually appealing, tightly sealed container. ready-made formulation

IV. ASSESSMENT OF HERBAL MOUTHWASH COLOR AND FRAGRANCE

Visual inspection was used to examine physical characteristics including color and odor. pH: A digital pH meter was used to measure the prepared herbal mouthwash's pH. Standard buffer was used to calibrate the pH meter. A pH meter was used to measure the pH of around 1 milliliter of mouthwash after it had been weighed and dissolved in 50 milliliters of distilled water.

DIAGRAM NO .1 .TULSI

Copyright to IJARSCT
www.ijarsct.co.in
DOI: 10.48175/IJARSCT-25132

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 5, Issue 4, April 2025
Impact Factor: 7.67

DIAGRAM NO. 2. MISWAK

V. TEST FOR MICROBIAL GROWTH IN MOUTHWASH FORMULATION

A control was made and the mouthwash formulation was injected using the streak plate method on agar media plates. The plates were put in the incubator and left there for twenty-four hours at 37°C. Following the incubation period, the plates were removed and compared to the control to see whether any microbial growth had occurred. Stability Studies: Without adequate stability studies of the final product, no product's formulation and preparation are complete. Accelerated stability tests, in which the product is exposed to high temperatures in accordance with ICH rules, are a generic technique for forecasting the stability of any product. For three months, a short-term accelerated stability study was conducted for the ready-made formulation. The samples were kept at 3–50 degrees Celsius, 250 degrees Celsius with a relative humidity of 60%, and 400 degrees Celsius with a relative humidity of 75%. Ultimately, the samples maintained during the expedited investigation were taken out and examined at monthly intervals.

TABLE NO .1. AVERAGE ZONE OF INHIBITION.

FORMULATION NO	INGREDIENT COMPOSITION	TEST ORGANISM	AVG. ZONE OF INHIBITION
FORMULATION NO 1 2 3	NEEM TULSI MISWAK CLOVE OIL MINT OIL	STREPTOCOCCUS MUTANS	18mm
FORMULATION 1 2 3	SAME	LACTOBACILLUS CILLUS	15mm
CONTROL (NO EXTRACT)	BASE WITHOUT ACTIVES	STREPTOCOCCUS MUTANS	0mm

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 5, Issue 4, April 2025
Impact Factor: 7.67

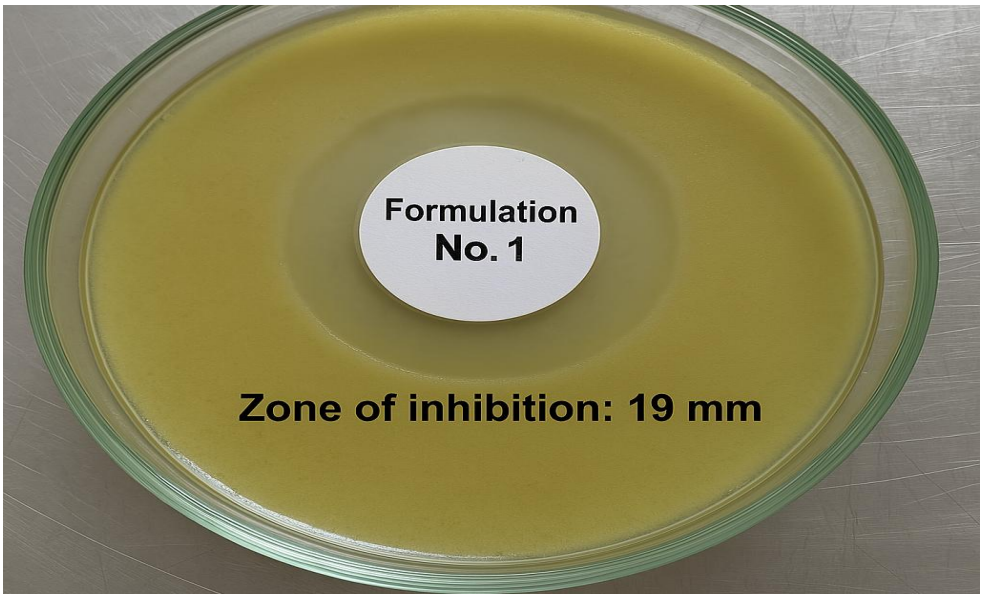


DIAGRAM NO. 3. ZONE OF INHIBITION FOR FORMULATION NO – 1,2,3 CONTAINING NEEM,TULSI, MISWAK, CLOVE OIL, MINT OIL.

VI. ANTIBACTERIAL ACTIVITY IN VITRO

Streptococcus mutans isolates were tested for in vitro antibacterial activity. The zone of inhibition and minimum inhibitory concentrations (MIC) were ascertained using the Agar well diffusion technique. Prefabricated blood agar plates were used to inoculate the S. mutans strains. After drying the plates, a 6 mm agar well cutter was used to create four wells. In each well, 20 µl, 40 µl, 60 µl, and 80 µl of produced mouthwash were added. Herbal mouthwash was allowed to passively diffuse into the agar culture media by leaving the agar plates undisturbed. After that, the plates were incubated for 24 hours at 37°C. In millimeters, the zone of inhibition was computed.

VIII. FINDINGS AND CONVERSATION

The best formulation is F2, a mouthwash that contains clove,miswak, neem, and tulsi. Stag mouthwash has been around for a while and is fresh, effective at fighting off oral bacteria, and herbal. For extended storage, its pH, color, and odor remain constant.

There aren't many negative effects. Neem and tulsi provide a soothing, cold feeling and fresh breath, while clove and mint plants give the preparation its lovely color and help to clear up throat infections. It also has good antibacterial properties.The plant that contains clove oil has a nice fragrant order, and it is an anti-inflammatory and tooth-benefitting oil. The antibacterial properties and inhibition of the preparation free from microbia are studied by microbiologists. The current study's findings demonstrated that using herbal mouthwash can suppress the growth of bacteria. It has been established that bacterial plaques contribute to the development of periodontal and dental caries. Plaque reduction mechanical methods can be aided by the use of mouthwashes as cleaners. Three strategies are used by mouthwashes with antimicrobial properties to accomplish this task: apoptosis, bacterial proliferation and/or cell metabolic inhibition; moreover, their bacteriostatic and/or bactericidal activities differ according on their concentration.

TABLE NO .2 . FORMULATION INGREDIENTS

Ingredient	Function	FORMULATION		
		F1 (mg)	F2 (mg)	F3 (mg)
Neem	Active drug	250	500	1000
Tulsi	Active drug	250	500	1000

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 5, Issue 4, April 2025
Impact Factor: 7.67

Miswak	Active Drug	250	500	1000
Clove oil	Active drug	0.1ml	0.15 ml	0.20 ml
Mint Oil	Flavor	0.1ml	0.1ml	0.1 ml
Saccharin	Sweetener	0.1mg	0.1mg	0.1mg
PEG 40	Surfactant	g	g	g
Glycerol	Co surfactant	6.5 ml	6.5 ml	6.5 ml
Alcohol	Preservative	ml	ml	ml
Purified water	Up to 100 ml	Up to 100 ml	Up to 100 ml	Up to 100 ml

TABLE NO. 3. EVALUATION PARAMETER.

Temperature	**Evaluation Parameter**	**Observation (Month)**				
3-5°C		**0**	**1**	**2**	**3**	**4**
	Visual Appearance	Light green	Light green	Light green	Light green	Light green
	Phase Separation	Nil	Nil	Nil	Nil	Nil
	Homogeneity	good	good	good	good	good
	Odor	No Change	No Change	No Change	No Change	No Change
	pH	6.7	6.7	6.8	6.8	6.8
Room Temperature (25°C RH=60%)	Visual Appearance	Light green	Light green	Light green	Light green	Light green
	Phase Separation	Nil	Nil	Nil	Nil	Nil
	Homogeneity	good	good	good	good	good
	Odor	No Change	No Change	No Change	No Change	No Change
	pH	6.7	6.7	6.8	6.8	6.8
40°C±2°C RH=75%	Visual Appearance	Light green	Light green	Light green	Light green	Light green
	Phase Separation	Nil	Nil	Nil	Nil	Nil
	Homogeneity	good	good	good	good	good
	Odor	Light green	Light green	Light green	Light green	Light green
	pH	6.7	6.7	6.7	6.7	6.7

IX. CONCLUSION

Herbs, which are highly effective agents, must be used with caution when using conventional mouthwash. Active compounds found in herbs may have unfavorable interactions with prescription drugs or other treatments. Therefore, if you are unsure about the herb's suitability or how it interacts with other treatments, it is advisable to speak with a physician or other health professional. Evidence of safety and efficacy should support the use of herbs in dentistry. The mouth's infectious agent may be eliminated by the antibacterial properties. Therefore, the current findings provide a wider application for the traditional use of herbal mouthwash.

REFERENCES

[1]. Vijayaalakshmi LG, Geetha RV. Comparison of Herbal Mouth Wash with Reducing Streptococcus Mutans-An Invitro Study. Journal of Pharmaceutical Sciences and Research. 2015 Jul 1;7(7):485.

[2]. Banu JN, Gayathri V. Preparation of Antibacterial Herbal Mouthwash against Oral Pathogens. Int. J. Curr. Microbiol. App. Sci. 2016;5(11):205-21.

[3]. Kukreja BJ, Dodwad V. Herbal mouthwashes-a gift of nature. Int J Pharma Bio Sci. 2012 Apr;3(2):46-52.

[4]. Cole, P; Rodu, B; Mathisen, A (2003). "Alcohol- containing mouthwash and oropharyngeal cancer: A review of the epidemiology". Journal of the American Dental Association. 134(8): 1079–87.

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 5, Issue 4, April 2025
Impact Factor: 7.67

[5]. Carretero Peláez, MA; Esparza Gómez, GC; Figuero Ruiz, E; Cerero Lapiedra, R, 2004. "Alcohol- containing mouthwashes and oral cancer. Critical analysis of literature". Medicina oral. 9(2): 120–3 116–20.

[6]. Lachenmeier, Dirk W, 2008. "Safety evaluation of topical applications of ethanol on the skin and inside the oral cavity". Journal of Occupational Medicine and Toxicology. 3(1): 26.

[7]. British National Formulary March 2014"Mouthwashes, gargles, and dentifrices". MJ Group and the Royal Pharmaceutical Society of Great Britain 2014.

[8]. Scully C 2013. Oral and maxillofacial medicine: the basis of diagnosis and treatment (3rd ed.). Edinburgh: Churchill Livingstone. pp. 39, 41. 20. Rosenberg, Mel (2002). "The Science of Bad Breath". Scientific American. 286(4): 72–9.

[9]. J. a. banas, "virulence properties of streptococcus mutans," frontiers in bioscience, vol. 1, no. 9, pp. 1267–1277, 2004.

[10]. .K.hojo, s. nagaoka, t. ohshima, and n. maeda, "bacterial interactions in dental biofilm development," journal of dental research, vol. 88, no. 11, pp. 982–990, 2009.

[11]. H. katsura, r.-i. tsukiyama, a. suzuki, and m. kobayashi, "in vitro antimicrobial activities of bakuchiol against oral microor- ganisms," antimicrobial agents and chemotherapy, vol. 45, no. 11, pp. 3009–3013, 2001.

[12]. B. y. hwang, s. k. roberts, l. r. chadwick, c. d. wu, and a. d. kinghorn, "antimicrobial constituents from goldenseal (the rhizomes of hydrastis canadensis) against selected oral pathogens," planta medica, vol. 69, no. 7, pp. 623–627, 2003.

[13]. d. atwa, r. y. abushahba, m. mostafa, and m. hashem, "effect of honey in preventing gingivitis and dental caries in patients undergoing orthodontic treatment," the saudi dental journal, vol. 26, no. 3, pp. 108–114, 2014.

[14]. S. s. hebbar, v. h. harsha, v. shripathi, and g. r. hegde, "eth- nomedicine of dharwad district in karnataka, india—plants used in oral health care," journal of ethnopharmacology, vol. 94, no. 2-3, pp. 261–266, 2004.

[15]. S. duarte, h. koo, w. h. bowen et al., "effect of a novel type of propolis and its chemical fractions on glucosyltransferases and on growth and adherence of mutans streptococci," biological and pharmaceutical bulletin, vol. 26, no. 4, pp. 527–531, 2003.

[16]. Amola Patil, D., Gunjal, S., & Latif, A. A. A. Tulsi: A Medicinal Herb for Oral Health.