Academia Journal of Medicine
Year 2026, Volume-9, Issue- 1 (Jan- Jun)

Comparative Evaluation of Chlorhexidine, Herbal Mouthwash (Amarantha), and Probiotic Mouthwash (Oralvit) on Plaque Index: An Observational Study

[1] Dr. Sumit Bhatt,[2] Dr. Apeksha Ghatge, [3] Dr. Ruchi Agrawal, [4] Dr. Verdine Virginia Antony,[5] Dr. Rahamath Ulla Khan, [6] Dr. Prachi Hazari,

[1]PhD Scholar, Assistant Professor, Department of Oral and Maxillofacial Surgery, Rajasthan Dental College & Hospital, Nirwan University, Jaipur, Rajasthan.
[2]BAMS, MSc Medical Pharmacology, PhD Scholar, Lecturer, Yogita Dental College, Khed, Ratnagiri, Maharashtra.
[3]Postgraduate Student, Department of Paediatric and Preventive Dentistry, Maharana Pratap College of Dentistry and Research Centre, Gwalior, Madhya Pradesh
[4]Prof & HOD, Department of Periodontology and Implantology, Sirte Dental College and Hospital, Libya.
[5]Prof & HOD, Department of Orthodontics, Sirte Dental College and Hospital, Libya.Reader, Department of Pediatric and Preventive Dentistry, Nanded Rural Dental College and Research Centre, Nanded, Maharashtra
[6]Reader, Department of Pediatric and Preventive Dentistry, Nanded Rural Dental College and Research Centre, Nanded, Maharashtra

ARTICLE INFO

Keywords

Chlorhexidine, Plaque, Probiotic Mouthwash

doi:10.48165/ajm.2026.9.01.1

ABSTRACT

Background: Dental plaque is the primary etiological factor for gingivitis and periodontal diseases. Mouthwashes are widely used as adjuncts to mechanical plaque control. Chlorhexidine (CHX) is the gold standard, whereas herbal and probiotic formulations are gaining popularity due to their safety and patient acceptance.
Aim: To compare the Plaque Index (PI) reduction produced by 0.12% chlorhexidine, a herbal mouthwash (Amarantha), and a probiotic mouthwash (Oralvit Probiotic Anti-Plaque) in an in vivo population.
Materials and Methods: An in vivo comparative study was conducted on 45 participants aged 18–40 years with mild to moderate plaque accumulation. Subjects were randomly divided into three groups: Group A (0.12% CHX), Group B (Amarantha herbal mouthwash), and Group C (Oralvit probiotic mouthwash). Plaque Index (Silness & Löe, 1964) was recorded at baseline, day 7, day 14, and day 28.
Results: All groups showed significant reductions in plaque scores over time. CHX demonstrated the most rapid reduction at day 7, while the herbal and probiotic groups showed progressive reductions, with comparable efficacy to CHX by day 28.
Conclusion: Chlorhexidine remains the most effective short-term antiplaque agent. Herbal and probiotic mouthwashes show comparable plaque reduction over longer durations and may serve as effective alternatives for long-term use.

Introduction:

Dental plaque is a complex biofilm composed of microorganisms embedded in an extracellular matrix. If not adequately removed, plaque leads to gingival inflammation, calculus formation, and periodontal diseases. Mechanical brushing is the primary method for plaque removal, but the use of adjunctive chemical plaque control agents is common in clinical practice.[1-3]

Chlorhexidine (CHX) mouthwash is considered the gold

Corresponding author: Dr. Sumit Bhatt
Email id: sumittbhatt22@gmail.com

standard due to its broad-spectrum antimicrobial activity and high substantivity. However, long-term use is limited by side effects such as tooth staining, altered taste sensation, and mucosal irritation.[4,5]

Herbal mouthwashes are emerging alternatives owing to their natural ingredients, antioxidant properties, and reduced side-effects. Amarantha herbal mouthwash (ARI Healthcare Pvt Ltd) contains plant-based bioactive compounds with antimicrobial, anti-inflammatory, and antioxidant effects.[6]

Probiotic mouthwashes, such as Oralvit Probiotic Anti-Plaque (DF Pharmacy Ltd, Ahmedabad, Gujarat India), aim to restore oral microbial balance. Probiotics colonize the oral cavity, inhibit pathogenic species, and contribute to plaque reduction through microbial competition rather than bactericidal mechanisms.[7]

The present in vivo study compares the antiplaque efficacy of CHX, Amarantha herbal mouthwash, and Oralvit probiotic mouthwash over four weeks using Plaque Index as the primary outcome measure.

Materials and Methods:

This in vivo randomized controlled study was conducted in the Department of Periodontics after obtaining institutional ethical approval, and included 45 systemically healthy participants aged 18–40 years who presented with mild to moderate plaque accumulation. Individuals with a history of periodontal therapy in the past six months, use of mouthwash within the last three months, recent antibiotic therapy, smoking or tobacco habits, systemic illness, or pregnancy/lactation were excluded. Eligible subjects were randomly allocated into three equal groups (n = 15): Group A received 0.12% chlorhexidine mouthwash, Group B received Amarantha herbal mouthwash, and Group C received Oralvit Probiotic Anti-Plaque mouthwash. Baseline Plaque Index (Silness and Löe, 1964) was recorded by a single calibrated examiner using a mouth mirror and probe under adequate illumination. Participants were instructed to rinse with 10 mL of the assigned mouthwash for 30 seconds twice daily after brushing, and to refrain from any other oral rinses during the study period. Follow-up examinations were performed on Day 7, Day 14, and Day 28, and Plaque Index scores were recorded at each visit using the same protocol to ensure consistency. All data were compiled and subjected to statistical analysis using appropriate tests, including repeated-measures ANOVA for intragroup comparison and one-way ANOVA with post-hoc Tukey analysis for intergroup comparison, with significance set at $p < 0.05$.

Result:

The table 1 shows that at baseline, all three groups demonstrated comparable Plaque Index scores with no statistically significant difference ($p > 0.05$). At Day 7 and Day 14, the table indicates a highly significant difference between the groups ($p < 0.001$), with chlorhexidine (Group A) exhibiting the greatest reduction in PI compared to the herbal (Group B) and probiotic (Group C) groups. By Day 28, the table shows no statistically significant difference among the groups ($p > 0.05$), suggesting that although Group A maintained the lowest PI, the herbal and probiotic mouthwashes produced similar long-term plaque reduction. Table 2 shows that at baseline, there was no significant difference among the groups, confirming comparable starting plaque levels. By Day 7, chlorhexidine demonstrated significantly greater plaque reduction than both herbal and probiotic mouthwashes, with the herbal group also performing better than the probiotic group. On Day 14, chlorhexidine remained significantly superior to the probiotic mouthwash, and the herbal mouthwash continued to show better results than the probiotic group. By Day 28, no significant differences were observed, indicating that all three mouthwashes achieved similar long-term plaque control.

Table 1: Comparison of Mean Plaque Index (PI) Scores Among the Three Groups at Different Time Intervals

Time Interval	Group A Mean ± SD	Group B Mean ± SD	Group C Mean ± SD	p-value
Baseline	1.92 ± 0.14	1.89 ± 0.16	1.91 ± 0.15	0.842 (NS)
Day 7	1.12 ± 0.10	1.31 ± 0.12	1.48 ± 0.14	<0.001*
Day 14	0.86 ± 0.09	0.94 ± 0.11	1.12 ± 0.12	<0.001*
Day 28	0.62 ± 0.08	0.66 ± 0.09	0.71 ± 0.10	0.062 (NS)

*Significant

Table 2: Intergroup Comparison of Plaque Index Scores Between the Three Groups (One-way ANOVA with Post-hoc Tukey Test)

Time Interval	Comparison	Mean Difference	p-value	Interpretation
Baseline	A vs B	0.03	0.912	NS
	A vs C	0.01	0.987	NS
	B vs C	0.02	0.955	NS
Day 7	A vs B	−0.19	0.004*	Significant
	A vs C	−0.36	<0.001*	Highly significant
	B vs C	−0.17	0.013*	Significant
Day 14	A vs B	−0.08	0.118	NS
	A vs C	−0.26	<0.001*	Highly significant
	B vs C	−0.18	0.006*	Significant
Day 28	A vs B	−0.04	0.622	NS
	A vs C	−0.09	0.118	NS
	B vs C	−0.05	0.456	NS

Discussion:

Chlorhexidine has long been regarded as the gold standard among chemical plaque-control agents due to its broad-spectrum antimicrobial activity and strong substantivity. It binds to oral tissues and is released gradually, providing prolonged antibacterial action even after rinsing. Its ability to disrupt bacterial cell membranes and inhibit pellicle formation results in rapid suppression of plaque accumulation. In the present study, these well-known properties were clearly reflected in the outcomes.[8,9] CHX showed the most pronounced reduction in plaque levels during the early phase of the study, particularly by Day 7, where its effect was significantly superior to both herbal and probiotic rinses. This supports existing literature that highlights CHX as the most effective short-term agent for immediate plaque reduction. However, its long-term use is often limited due to known side effects such as tooth staining, altered taste sensation, and mucosal irritation.

Herbal mouthwash (Amarantha) demonstrated plaque reduction that approached the effectiveness of CHX by the fourth week, showing that herbal formulations can serve as effective alternatives for long-term use. Amarantha contains plant-derived compounds such as polyphenols, flavonoids, and essential oils, all of which possess antimicrobial, antioxidant, anti-inflammatory, and immunomodulatory properties. These components work synergistically to inhibit growth of cariogenic and periodontal pathogenic bacteria while supporting gingival health. The gradual improvement observed in this group suggests that herbal active ingredients require an adaptation period before reaching optimal efficacy. Importantly, herbal rinses are well tolerated by patients, with pleasant taste profiles and minimal side effects, which enhances patient compliance and supports their suitability for routine, long-term plaque control.[10]

The probiotic mouthwash (Oralvit) exhibited a slower but steady reduction in plaque levels throughout the study period. Probiotics function differently from antimicrobial agents; instead of killing bacteria, they modify the oral ecosystem by competing with pathogenic species, producing beneficial metabolites, and promoting microbial balance.[11] Their mechanism requires time for colonization of beneficial strains within the oral cavity, which typically becomes more evident after 2–4 weeks of continuous use. This explains why the probiotic group showed modest early changes but improved outcomes by Day 14 and Day 28. Although probiotics may not provide rapid plaque suppression, their side-effect-free nature and ability to promote ecological plaque control make them a promising option for long-term preventive care, especially in patients who cannot tolerate chemical agents or seek more natural alternatives.

Conclusion:

Overall, the findings of this study suggest that while chlorhexidine remains the most effective short-term plaque control agent, both herbal and probiotic mouthwashes can offer comparable long-term benefits. Herbal formulations provide a balance between efficacy and patient comfort, whereas probiotics offer a biological approach to sustainable plaque management. The convergence of plaque scores by Day 28 indicates that non-chemical alternatives may be suitable substitutes for maintaining long-term oral hygiene without the drawbacks associated with chlorhexidine.

References

Jakubovics, N. S., Goodman, S. D., Mashburn-Warren, L., Stafford, G. P., & Cieplik, F. (2021). The dental plaque biofilm matrix. *Periodontology 2000, 86*(1), 32–56.

Flemming, H. C., & Wingender, J. (2010). The biofilm matrix. *Nature Reviews Microbiology, 8*, 623–633.

Valm, A. M. (2019). The structure of dental plaque microbial communities in the transition from health to dental caries and periodontal disease. *Journal of Molecular Biology, 431*(16), 2957–2969.

Brookes, Z. L. S., Bescos, R., Belfield, L. A., Ali, K., & Roberts, A. (2020). Current uses of chlorhexidine for management of oral disease: A narrative review. *Journal of Dentistry, 103*, 103497.

Poppolo Deus, F., & Ouanounou, A. (2022). Chlorhexidine in dentistry: Pharmacology, uses, and adverse effects. *International Dental Journal, 72*(3), 269–277.

Ediga, S., Gulati, R., Chokotiya, H., Modi, M., Sethi, V., & Kashyap, S. K. (2024). Evaluating the effectiveness of Amarantha and chlorhexidine mouthwashes in chronic generalized gingivitis: A randomized clinical trial. *Journal of Pharmacy & Bioallied Sciences, 16*(Suppl 4), S3437–S3439.

Blais, L., Auclair-Ouellet, N., Tremblay, A., & Binda, S. (2025). Effect of the Darolac® (Oralis SB®) probiotic formulation on oral health: A narrative review. *Microorganisms, 13*(2), 408.

Thangavelu, A., Kaspar, S. S., Kathirvelu, R. P., Srinivasan, B., Srinivasan, S., & Sundram, R. (2020). Chlorhexidine: An elixir for periodontics. *Journal of Pharmacy & Bioallied Sciences, 12*(Suppl 1), S57–S59.

Greenstein, G., Berman, C., & Jaffin, R. (1986). Chlorhexidine: An adjunct to periodontal therapy. *Journal of Periodontology, 57*, 370–377.

Nipanikar, S., Agnihotri, S., Panicker, S., & Shelke, N. (2020). Evaluation of anti-microbial (in-vitro) activity of Amarantha herbal mouthwash. *International Journal of Scientific Research, 9*, 1624–1626.

Alhallak, E., Kouchaje, C., Hasan, A., & Makieh, R. (2022). Evaluation of the effectiveness of probiotic mouthwashes in reducing dental plaque in primary and permanent teeth: A randomized clinical trial. *Cureus, 14*(8), e28125.