

Natural Products in Dental Care (2010-2026): A Narrative Review of Efficacy, Clinical Utility, and Research Gaps

Hanan Bahjat Khojah*

Department of Pharmacy, College of Pharmacy, Nursing and Applied Sciences, Riyadh Elm University, Riyadh, SAUDI ARABIA.

ABSTRACT

Plant byproducts have been used as supplements owing to their antimicrobial, antioxidant, and anti-inflammatory properties. They also help treat and prevent many dental problems. However, the use of herbal treatments presents challenges for researchers. This narrative review highlights the evidence of the most clinically useful natural products in dental care published in Q1 to Q4 journals from 2010 to 2026. A comprehensive literature survey was performed using the Google Scholar and PubMed databases. Studies were screened for their relevance to the clinical or preclinical efficacy of natural products in dentistry. The narrative synthesis comprised a purposive sample of 29 high-impact studies. This review highlighted the major classes of natural products used in dental care and their effectiveness in managing dental caries, periodontal disease, and gingival management. The use of herbal products as adjuncts in endodontics and orthodontics has also been reported. The most effective agents for the prevention and treatment of dental conditions published in Q1-Q4 journals from 2010 to 2026 were natural products. They exhibit similar efficacy to conventional agents but with better safety and tolerability. However, they require further standardization and regulatory harmonization.

Keywords: Dental care, Essential oils, Plant extracts, Polyphenols, Supplements.

Correspondence:

Dr. Hanan Bahjat Khojah

Department of Pharmacy, College of Pharmacy, Nursing and Applied Sciences, Riyadh Elm University, King Fahad Road, Riyadh-13713, SAUDI ARABIA.
Email: hanan.khojah@riyadh.edu.sa

Received: 13-05-2026;

Revised: 08-06-2026;

Accepted: 29-07-2026.

INTRODUCTION

Natural products are increasingly used to supplement treatments in holistic medicine (Taheri *et al.*, 2011; Chauhan *et al.*, 2020). Plants and their byproducts have been used in medicine, including dentistry, for antimicrobial, antioxidative, and anti-inflammatory purposes (Lugo-Flores *et al.*, 2021). Furthermore, they have regenerative properties. They help treat and prevent dental caries, periodontal disease, gingivitis, halitosis, oral mucositis, and support endodontic and orthodontic treatments (Chen *et al.*, 2020; Moghadam *et al.*, 2020; Kumar *et al.*, 2021; Anwar *et al.*, 2025; Hashim *et al.*, 2025; Janakiram *et al.*, 2020; Flemming *et al.*, 2021; Budala *et al.*, 2023; Refaey *et al.*, 2024; Gloria-Garza *et al.*, 2025; Ibrahim and Khalel, 2025). Neem oil, Aloe, propolis, curcumin, and clove oil (*Syzygium aromaticum*) are used for medicinal purposes. These compounds are derived from nature, including green tea (*Camellia sinensis*) extracts and other essential oils, which act cumulatively (Anwar *et al.*, 2025; Janakiram *et al.*, 2020; Malcangi *et al.*, 2025; Laleman and Teughels, 2020; Inchingolo

et al., 2025). However, more challenging issues remain, such as the need for standards for the formulation of products, regulatory practices, bioavailability of herbal agents, and long-term clinical studies (Freires and Rosalen, 2016; Song *et al.*, 2025; Kumar *et al.*, 2022). This review aimed to present evidence from 2010 to 2026 regarding natural products that are most clinically useful in dental care from Q1 to Q4 journals.

METHODOLOGY

This narrative review was constructed based on a literature survey using sources such as Google Scholar and PubMed from 2010 to 2026. The search terms used to identify relevant literature were 'natural product', 'herbal medicine', 'plant extract', 'oral health', 'dental caries', 'periodontal disease', 'gingivitis', 'endodontics', and related keywords. A narrative perspective was synthesized on recent advances, product-specific efficacy, and comparisons with conventional care using a purposeful sampling approach rather than systematic extraction. Studies were screened for inclusion based on their relevance to clinical and preclinical applications in oral health, journal ranking (Q1-Q4), recency, and citation impacts. Finally, 29 key studies were selected to provide a comprehensive overview of the topic (Figure 1). The study was approved by the Institutional Review Board (IRB) of Riyadh Elm University (REU) (IRB approval number FRP/2026/605/1423/1298).



DOI: 10.5530/pres.20270176

Copyright Information :

Copyright Author (s) 2027 Distributed under
Creative Commons CC-BY 4.0

Publishing Partner : Manuscript Technomedia. [www.mstechnomedia.com]

DISCUSSION / REVIEW OF LITERATURE

The landscape of dental research between 2010 and 2026 witnessed a significant shift in the investigation of plant-derived agents. As illustrated in the chronological distribution of thematic clusters (Figure 1), this evolution represents a transition from an "Early Phase" of preliminary identification to a "Growth Phase" and a "Recent Phase" characterized by high-density research in specific therapeutic applications. This progression reflects the increasing global emphasis on validating natural products as viable, evidence-based alternatives or adjuncts to conventional therapies.

Major Classes of Natural Products Used in Dental Care

Building on the research trends identified in Figure 1, the following sections categorize these agents based on their clinical utility. The variety of phytochemicals occurring in many natural products offers great promise in the field of dentistry, particularly because of their synergistic activities. Natural products may be divided into four general therapeutic classes:

Plant Extracts and Herbal Medicines

Neem (*Azadirachta indica*): The Presence of Azadirachtin and Nimbin is responsible for anti-inflammatory and plaque reduction (Janakiram *et al.*, 2020; Anwar *et al.*, 2025).

Aloe Vera (*Aloe barbadensis*): Contains acemannan and other glycoproteins that promote wound healing and immune response modulation of the gingiva (Figueiredo *et al.*, 2022; Niculescu *et al.*, 2024).

Clove (*Syzygium aromaticum*): Eugenol is the primary component and is well known for its analgesic and antimicrobial properties in endodontics (Jain *et al.*, 2024; Anwar *et al.*, 2025).

Miswak (*Salvadora persica*): Contains Benzyl isothiocyanate and silica, and the combination of both is responsible for plaque disruption and enamel remineralization (Wassel and Khattab, 2017).

Bee Propolis: Complex mixture of Caffeic Acid Phenethyl Ester (CAPE) and pinocembrin, which exerts broad antimicrobial activity against periodontopathogens and resinous bee products (Wassel and Khattab, 2017; Figueiredo *et al.*, 2022).

Turmeric (*Curcuma longa*): Contains curcumin, a polyphenol with strong anti-inflammatory properties, and is used in endodontics for disinfection (Jain *et al.*, 2024).

Cranberries (*Vaccinium macrocarpon*): Contain A-type proanthocyanidins that form a barrier limiting adherence and biofilm formation on teeth (Chen *et al.*, 2020; Figueiredo *et al.*, 2022).

Calendula (*Calendula officinalis*): Saponins and flavonoids of triterpenes that promote the health and repair of tissues and mucosa (Figueiredo *et al.*, 2022).

Chamomile (*Matricaria recutita*): Bisabolol and chamazulene are soothing and anti-inflammatory compounds present in chamomile. Their effects on gingival tissues have been discussed (Figueiredo *et al.*, 2022; Anwar *et al.*, 2025).

Essential Oils

Thymol, eucalyptol, and menthol are active compounds in many mouth rinses. These volatile compounds create disruptions to the bacterial membrane, coupled with the ability to modulate quorum sensing, to inhibit biofilm maturation (Anwar *et al.*, 2025).

Polyphenols and Flavonoids

Camellia sinensis (green tea) contains the bioactive compound epigallocatechin gallate (EGCG). EGCG inhibits Glucosyltransferase (GTF), an enzyme vital for biofilm formation (Flemming *et al.*, 2021; Budala *et al.*, 2023).

Natural Polymers and Bioactive Compounds

Advanced applications utilize chitin-derived chitosan nanoparticles and Arabic gum. In addition to being superior scaffolding materials, these natural polymers are also carriers of bioactive compounds with the potential to shift the scope of dentistry from palliative to regenerative (Paradowska-Stolarz *et al.*, 2021; Song *et al.*, 2025).

Although heterogeneous formulations and inadequate standards have limited the clinical application of natural products (Freires and Rosalen, 2016; Song *et al.*, 2025), promising clinical evidence has been reported based on Randomized Controlled Trials (RCTs) and systematic reviews. The need for comprehensive and prolonged studies to establish the safety and effectiveness of long-term use is crucial (Table 1).

Efficacy Against Dental Caries

Certain plant compounds and polyphenols exhibit remarkable antibacterial activity against *S. mutans* and other acidogenic pathogens. These compounds can be extracted from green tea (*Camellia sinensis*) and cranberries (*Vaccinium macrocarpon*) (Chen *et al.*, 2020; Flemming *et al.*, 2021; Gloria-Garza *et al.*, 2025; Tzimas *et al.*, 2024). The application of varnishes that include propolis, *Salvadora persica* (miswak), and chitosan-based polymers shows better *S. mutans* activity than varnishes that only include fluoride in both *in vitro* and *ex vivo* models (Wassel and Khattab, 2017). Furthermore, xylitol and similar non-cariogenic polyols do not induce caries. They affect bacterial metabolic activity and subsequently lessen the acidic response of these pathogens to tooth enamel (Angarita-Díaz *et al.*, 2025; Philip *et al.*, 2019).

In addition to non-cariogenic polyols, other herbal agents have shown tremendous clinical applications in treating gingival and periodontal inflammatory conditions. Neem (*Azadirachta indica*)-based dentifrices have shown similar efficacy in plaque and gingivitis as chlorhexidine, while being better tolerated, as they have fewer side effects such as staining or dysgeusia (Janakiram *et al.*, 2020; Malcangi *et al.*, 2025). Furthermore, polyphenols in *Camellia sinensis* can inhibit bacterial adhesion and provide antioxidative defense at the oral level (Flemming *et al.*, 2021). Aloe vera (*Aloe barbadensis*) gel can help control the inflammatory response of the gingiva in both periodontal and orthodontic therapy (Niculescu *et al.*, 2024), and propolis has an impressive deep antimicrobial action against all oral periodontopathogens (Wassel and Khattab, 2017; Figueiredo *et al.*, 2022).

Periodontal Disease and Gingivitis Management

Herbal dentifrices and mouth rinses containing *Azadirachta indica* (neem) or *Camellia sinensis* (green tea) extracts have been shown to be clinically non-inferior to traditional chlorhexidine or fluoride-based controls in reducing Plaque Index (PI) and Gingival Index (GI) scores and in reducing the incidence of treatment-related adverse effects (Janakiram *et al.*, 2020; Malcangi *et al.*, 2025; Laleman and Teughels, 2020; Inchingolo *et al.*, 2025). Similarly, Aloe vera (*Aloe barbadensis*) gel and rinses are effective in reducing gingival inflammation. Propolis offers potent, broad-spectrum antimicrobial protection against various periodontal pathogens (Figueiredo *et al.*, 2022).

In addition, polyherbal formulations containing sage, *Matricaria recutita* (chamomile), thyme, and *Syzygium aromaticum* (clove)

use synergistic biological pathways to improve therapeutic outcomes (Anwar *et al.*, 2025; Pytko-Polończyk *et al.*, 2021). Ultimately, these natural formulations have better tolerability profiles with less mucosal irritation and extrinsic staining rates than synthetic agents, resulting in better patient compliance in long-term periodontal maintenance regimens (Inchingolo *et al.*, 2025).

Adjunctive Uses: Endodontics and Orthodontics

Beyond routine plaque and gingivitis management, natural products serve as essential therapeutic adjuncts in specialized dental disciplines, such as endodontics and orthodontics, where traditional synthetic agents may be limited by their toxicity or tissue irritation.

Achieving complete disinfection of the root canal system remains a significant challenge in endodontic therapy. Herbal irrigants, including propolis, triphala, *Azadirachta indica* (neem), *Curcuma longa* (turmeric), and *Camellia sinensis* (green tea), have demonstrated significant antibacterial efficacy, particularly against resilient pathogens such as *Enterococcus faecalis* (Jain *et al.*, 2024).

Similarly, in orthodontics, the focus often shifts to managing iatrogenic gingival inflammation associated with fixed-appliance therapy. The application of Aloe vera (*Aloe barbadensis*), resveratrol, and honey has been shown to be effective in modulating gingival inflammatory responses and enhancing patient comfort during orthodontic interventions (Niculescu *et al.*, 2024). These findings underscore the potential of natural

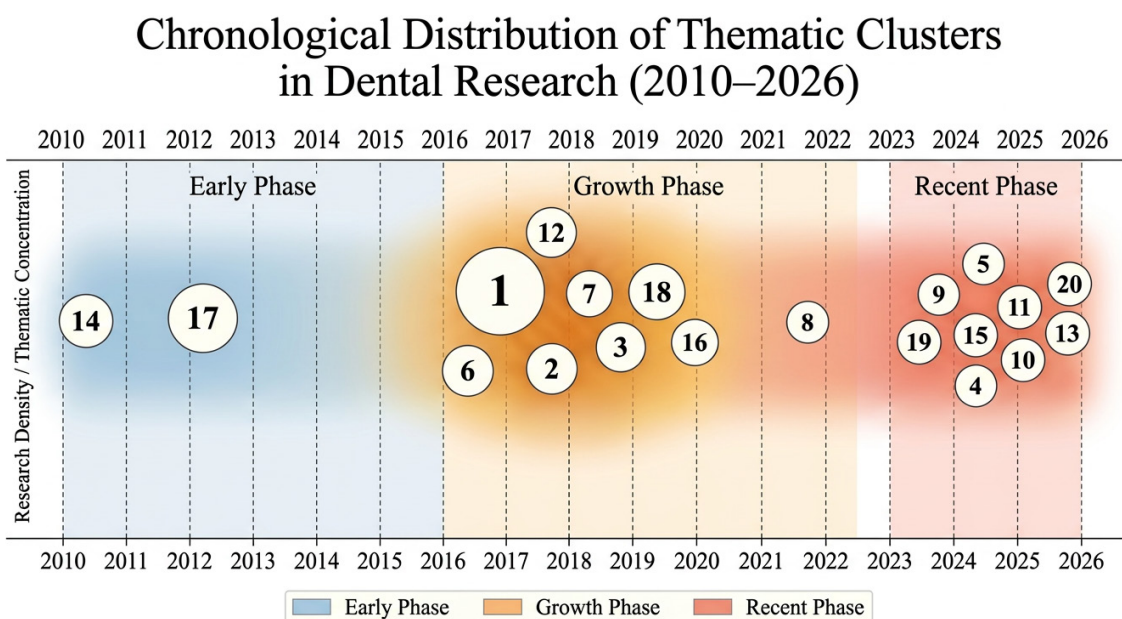


Figure 1: Chronological distribution of thematic clusters in the selected literature (2010–2026). The diagram illustrates the concentration of research across key dental applications, highlighting the evolution of natural product investigations in the last decade.

agents to act as active, biocompatible contributors to the clinical success of complex restorative and corrective procedures.

RESEARCH GAPS

Despite the extensive literature supporting the efficacy of natural products in cariology and periodontology, significant research gaps remain across specialized dental disciplines and their methodological approaches. As illustrated in the research coverage matrix (Figure 2), there is a notable scarcity of studies

investigating the adjunctive use of neem (*Azadirachta indica*), propolis, and chitosan nanoparticles in orthodontics. Similarly, the clinical application of Aloe vera (*Aloe barbadensis*) as an endodontic adjunct requires further exploration. Beyond these discipline-specific deficits, a broader methodological void exists regarding the execution of long-term, large-scale Randomized Controlled Trials (RCTs) that compare head-to-head outcomes with the gold standard synthetic agents. The current literature frequently lacks standardized protocols for formulation, precise

Evidence Density by Herbal Products and Dental Outcome

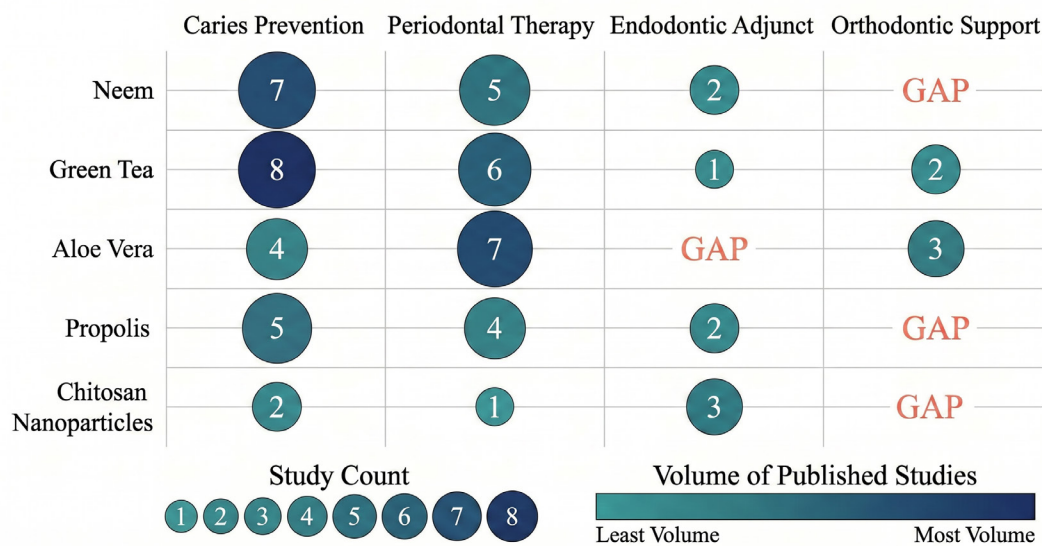


Figure 2: Research coverage matrix identifying gaps and study density by product type and clinical application area. Darker shades indicate a higher volume of published studies, and 'GAP' indicates areas that require further investigation.

Table 1: Summary of key claims and evidence strength for the use of natural products in dentistry.

Claim	Evidence Strength	Reasoning	Studies
Neem, green tea, aloe vera, and propolis are as effective as CHX/fluoride for plaque/gingivitis control	Strong	Multiple RCTs/systematic reviews show non-inferiority with fewer side effects	(Janakiram <i>et al.</i> , 2020; Malcangi <i>et al.</i> , 2025; Laleman and Teughels, 2020; Inchingolo <i>et al.</i> , 2025)
Polyphenols/flavonoids inhibit cariogenic bacteria and biofilm formation	Moderate	Strong preclinical/ <i>in vitro</i> / <i>in vivo</i> evidence; some clinical confirmation	(Chen <i>et al.</i> , 2020; Flemming <i>et al.</i> , 2021; Gloria-Garza <i>et al.</i> , 2025)
Propolis, miswak, and chitosan varnishes enhance caries prevention	Moderate	<i>Ex vivo</i> / <i>in vitro</i> studies show superior <i>S. mutans</i> inhibition vs fluoride alone	(Wassel and Khattab, 2017)
Herbal irrigants are effective adjuncts in endodontic therapy	Moderate	<i>Ex vivo</i> studies support antibacterial efficacy; limited clinical data	(Jain <i>et al.</i> , 2024)
Standardisation and regulatory oversight remains a barrier	Moderate	Reviews highlight lack of uniformity and formulation standards	(Freires and Rosalen, 2016; Song <i>et al.</i> , 2025)
Long-term safety and effectiveness data are insufficient	Weak	Most studies are short-term/small-scale; need more robust trials	(Laleman and Teughels, 2020)

Table 2: Future research directions and open questions regarding the use of natural products in dental care.

Question	Why
What is the long-term clinical effectiveness of standardized neem-based toothpaste compared with that of fluoride toothpaste?	Long-term head-to-head trials are needed to clarify whether neem can safely and effectively replace fluoride as the gold standard.
How do nanoformulations improve the bioavailability and sustained release of plant-derived actives in oral care?	Nanotechnology may overcome the current limitations related to the stability and bioavailability of herbal actives.
What are the optimal combinations/dosages for multi-herb/polyherbal oral care formulations?	Synergistic blends may maximize efficacy but require rigorous testing for safety, interactions, and dosage guidelines.

dosing guidelines, and optimized delivery systems, which limits the translation of these natural agents into widespread clinical practice. Consequently, future investigations must prioritize resolving these regulatory and standardization barriers while exploring the synergistic effects of polyherbal combinations and integrating nanotechnology to enhance the bioavailability of plant-derived compounds.

Future research should focus on large-scale RCTs with standardized formulations, dosages, and delivery systems to confirm their long-term safety and effectiveness. Table 2 summarizes future research directions and open questions regarding the use of natural products in dental care.

CONCLUSION

Natural products-including neem (*Azadirachta indica*) extract toothpaste and mouthwash, green tea (*Camellia sinensis*) polyphenols, catechins, ECCG rinses, gels, toothpastes, lollipops, gums, chewing sticks, mouthwashes, aloe vera (*Aloe barbadensis*) gel, propolis, triphala, chitosan nanoparticles, and clove oil (*Syzygium aromaticum*) /turmeric (*Curcuma longa*) -are among the most effective agents used from 2010 to 2026 for the prevention or treatment of caries, gingivitis, periodontal disease, oral infections, and endodontic adjuncts in Q1-Q4 journals. They offer comparable efficacy to conventional agents with improved safety and tolerability; however, they require further standardization and regulatory harmonization.

In summary, natural products offer promising alternatives or adjuncts to conventional dental therapies, with neem extract toothpaste, mouthwash, green tea (*Camellia sinensis*), aloe vera (*Aloe barbadensis*), and propolis being among the most effective products. However, further high-quality research is required before widespread adoption in clinical practice.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to Riyadh Elm University (REU) for providing institutional support and resources necessary to conduct this review. I wish to extend my utmost appreciation to the Research and Innovation Center (RIC) for the remarkable advice, support, and help provided in an inspiring way, along with the technical assistance provided during the writing and research sections. This study was approved by the Institutional Review Board of REU (IRB approval number: FRP/2026/605/1423/1298). I declare that this narrative review was written without the support of any sponsors or profits.

ABBREVIATIONS

CHX: Chlorhexidine; **EGCG:** Epigallocatechin Gallate; **GI:** Gingival Index; **IRB:** Institutional Review Board; **PI:** Plaque Index; **Q1-Q4:** Journal Quality Quartiles; **RCTs:** Randomized Controlled Trials; **REU:** Riyadh Elm University; **RIC:** Research and Innovation Center.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

As the sole author, Hanan Khojah is designated as the 'guarantor' and takes full responsibility for the integrity of the work as a whole, from inception to the published article. The contributions to this manuscript, categorized as requested, are as follows:

Concept: Hanan Khojah, Design: Hanan Khojah, Definition of intellectual content: Not applicable, Literature search: Hanan Khojah, Data acquisition: Hanan Khojah, Data analysis: Hanan Khojah, Manuscript preparation: Hanan Khojah, Manuscript editing: Hanan Khojah, Manuscript review: Hanan Khojah.

SUMMARY

This narrative review evaluated 29 high-impact studies from 2010 to 2026 that investigated the efficacy of natural products in dentistry. Key findings indicate that agents such as neem, green tea, aloe vera, and propolis are non-inferior to conventional treatments such as chlorhexidine and fluoride in managing plaque, gingivitis, and caries. Although these products offer superior safety profiles and high patient compliance, the field faces significant hurdles in standardizing formulations and establishing long-term clinical protocols.

REFERENCES

Angarita-Díaz, M., Bernal-Cepeda, L., Sarmiento-Ordóñez, J., Yañez-Navas, Y., Garcia-Plazas, K., et al. (2025). Natural compounds in oral microbiota modulation and caries prevention: A systematic review. *Dentistry Journal*, 13(11), 518. <https://doi.org/10.3390/dj13110518>

Anwar, M., Sayed, G., Hal, D., Hafeez, M., Shatat, A., et al. (2025). Herbal remedies for oral and dental health: a comprehensive review of their multifaceted mechanisms, including antimicrobial, anti-inflammatory, and antioxidant pathways.

- Inflammopharmacology, 33, 1085-1160. <https://doi.org/10.1007/s10787-024-01631-8>
- Budala, D., Mârţu, M., Maftei, G., Diaconu-Popa, D., Dănilă, V., *et al.* (2023). The role of natural compounds in optimizing contemporary dental treatment-current status and future trends. *Journal of Functional Biomaterials*, 14(5), 273. <https://doi.org/10.3390/jfb14050273>
- Chauhan, D. N., Singh, P. R., Shah, K., & Chauhan, N. S. (2020). Natural oral care in dental therapy. *Natural Oral Care in Dental Therapy*, 1-29. <https://doi.org/10.1002/9781119618973.ch1>
- Chen, X., Daliri, E., Kim, N., Kim, J., Yoo, D., *et al.* (2020). Microbial etiology and prevention of dental caries: Exploiting natural products to inhibit cariogenic biofilms. *Pathogens*, 9(7), 569. <https://doi.org/10.3390/pathogens9070569>
- Figueiredo, L., Figueiredo, N., Da Cruz, D., Baccelli, G., Sarachini, G., *et al.* (2022). Propolis, aloe vera, green tea, cranberry, calendula, myrrha and salvia properties against periodontal microorganisms. *Microorganisms*, 10(11), 2172. <https://doi.org/10.3390/microorganisms10112172>
- Flemming, J., Meyer-Probst, C., Speer, K., Kölling-Speer, I., Hannig, C., *et al.* (2021). Preventive applications of polyphenols in dentistry-A review. *International Journal of Molecular Sciences*, 22(9), 4892. <https://doi.org/10.3390/ijms22094892>
- Freires, I., & Rosalen, P. (2016). How natural product research has contributed to oral care product development? A critical view. *Pharmaceutical Research*, 33, 1311-1317. <https://doi.org/10.1007/s11095-016-1905-5>
- Gloria-Garza, M., Reyna-Martínez, G., Jiménez-Salas, Z., Campos-Góngora, E., Kačániová, M., *et al.* (2025). Medicinal plants against dental caries: research and application of their antibacterial properties. *Plants*, 14(9), 1390. <https://doi.org/10.3390/plants14091390>
- Hashim, N., Babiker, R., Chaitanya, N., Mohammed, R., Priya, S., *et al.* (2025). New insights in natural bioactive compounds for periodontal disease: advanced molecular mechanisms and therapeutic potential. *Molecules*, 30(4), 807. <https://doi.org/10.3390/molecules30040807>
- Ibrahim, S. M., & Khalel, A. M. (2025). Revolutionizing dental therapy: A comprehensive review on the innovative use of natural extracts in tooth care and treatment. *Current Traditional Medicine*, 12(1), E22150838410159. <https://doi.org/10.2174/0122150838410159250909103512>
- Inchingolo, A., Marinelli, G., Colonna, V., Pennacchio, B., Giorgio, R., *et al.* (2025). Efficacy and safety of natural versus conventional toothpastes and mouthwashes in gingivitis management: A systematic review. *Hygiene*, 5(3), 38. <https://doi.org/10.3390/hygiene5030038>
- Jain, O., Larenlakpam, R., Priya, P., Chouhan, V., Anand, K., *et al.* (2024). A comparative evaluation of antimicrobial efficacy of five different herbal solutions: propolis, neem *Azadirachta indica*, triphala, green tea, and turmeric against *Enterococcus faecalis* and debris removal from the root canal using two irrigation protocols-manual and ultrasonic-an *ex vivo* study. *Journal of Pharmacy & Bioallied Sciences*, 16(Suppl 4), S3834-S3836. https://doi.org/10.4103/jpbs.jpbs_1316_24
- Janakiram, C., Venkitachalam, R., Fontelo, P., Iafolla, T., & Dye, B. (2020). Effectiveness of herbal oral care products in reducing dental plaque & gingivitis - a systematic review and meta-analysis. *BMC Complementary Medicine and Therapies*, 20(43). <https://doi.org/10.1186/s12906-020-2812-1>
- Kumar, M., Prakash, S., R., Kumari, N., Pundir, A., Punia, S., *et al.* (2021). Beneficial role of antioxidant secondary metabolites from medicinal plants in maintaining oral health. *Antioxidants*, 10(7), 1061. <https://doi.org/10.3390/antiox10071061>
- Kumar, R., Mirza, M., Naseef, P., Kuruniyan, M., Zakir, F., *et al.* (2022). Exploring the potential of natural product-based nanomedicine for maintaining oral health. *Molecules*, 27(5), 1725. <https://doi.org/10.3390/molecules27051725>
- Laleman, I., & Teughels, W. (2020). Novel natural product-based oral topical rinses and toothpastes to prevent periodontal diseases. *Periodontology* 2000, 84(1), 102-123. <https://doi.org/10.1111/prd.12339>
- Lugo-Flores, M., Quintero-Cabello, K., Palafox-Rivera, P., Silva-Espinoza, B., Cruz-Valenzuela, M., *et al.* (2021). Plant-derived substances with antibacterial, antioxidant, and flavoring potential to formulate oral health care products. *Biomedicines*, 9(11), 1669. <https://doi.org/10.3390/biomedicines9111669>
- Malcangi, G., Inchingolo, A., Casamassima, L., Trilli, I., Ferrante, L., *et al.* (2025). Effectiveness of herbal medicines with anti-inflammatory, antimicrobial, and antioxidant properties in improving oral health and treating gingivitis and periodontitis: A systematic review. *Nutrients*, 17(5), 762. <https://doi.org/10.3390/nu17050762>
- Moghadam, E., Yazdani, M., Tahmasebi, E., Tebyanian, H., Ranjbar, R., *et al.* (2020). Current herbal medicine as an alternative treatment in dentistry: *In vitro*, *in vivo* and clinical studies. *European Journal of Pharmacology*, 889, 173665. <https://doi.org/10.1016/j.ejphar.2020.173665>
- Niculescu, S., Avramut, R., Hajaj, T., Nikolajevic-Stoican, N., Maracineanu, R., *et al.* (2024). Evaluating the therapeutic properties of natural products in orthodontic and surgical treatment of dentofacial deformities: A systematic review of clinical trials. *Nutrients*, 16(12), 1941. <https://doi.org/10.3390/nu16121941>
- Paradowska-Stolarz, A., Więckiewicz, M., Owczarek, A., & Weźgowiec, J. (2021). Natural polymers for the maintenance of oral health: Review of recent advances and perspectives. *International Journal of Molecular Sciences*, 22(9), 10337. <https://doi.org/10.3390/ijms221910337>
- Philip, N., Leishman, S., & Walsh, L. (2019). Potential role for natural products in dental caries control. *Oral Health & Preventive Dentistry*, 17(5), 479-485. <https://doi.org/10.3290/j.ojphd.a42741>
- Pytko-Polończyk, J., Stawarz-Janeczek, M., Kryczyk-Poprawa, A., & Muszyńska, B. (2021). Antioxidant-rich natural raw materials in the prevention and treatment of selected oral cavity and periodontal diseases. *Antioxidants*, 10(11), 1848. <https://doi.org/10.3390/antiox10111848>
- Refaei, M., Abosalem, E., El-Basyouni, R., Elsheriri, S., Elbehary, S., *et al.* (2024). Exploring the therapeutic potential of medicinal plants and their active principles in dental care: A comprehensive review. *Heliyon*, 10(18). <https://doi.org/10.1016/j.heliyon.2024.e37641>
- Song, X., Ji, M., Shu, X., & Zou, L. (2025). Drug delivery systems loaded with plant-derived natural products for dental caries prevention and treatment. *Journal of Materials Chemistry B*, 13(6), 1920-1934. <https://doi.org/10.1039/d4tb01924e>
- Taheri, J., Azimi, S., Rafeian, N., & Zanjani, H. (2011). Herbs in dentistry. *International Dental Journal*, 61(6), 287-96. <https://doi.org/10.1111/j.1875-595x.2011.00064.x>
- Tzimas, K., Antoniadou, M., Varzakas, T., & Voidarou, C. (2024). Plant-derived compounds: A promising tool for dental caries prevention. *Current Issues in Molecular Biology*, 46(6), 5257-5290. <https://doi.org/10.3390/cimb46060315>
- Wassel, M. O., & Khattab, M. A. (2017). Antibacterial activity against *streptococcus mutans* and inhibition of bacterial induced enamel demineralization of propolis, miswak, and chitosan nanoparticles based dental varnishes. *Journal of Advanced Research*, 8(4), 387-392. <https://doi.org/10.1016/j.jare.2017.05.006>

Cite this article: Khojah HB. Natural Products in Dental Care (2010-2026): A Narrative Review of Efficacy, Clinical Utility, and Research Gaps. *Pharmacog Res.* 2027;19(1):34-9.