



Editorial

A Critical Perspective on The Rise and Real Need for Eco-Friendly Products for the Control of Oral Biofilm

Adriana Patricia Rodríguez-Hernández¹, Miryam Martínez-Hernández²

¹ Laboratorio de Genética Molecular. Facultad de Odontología, Universidad Nacional Autónoma de México. <https://orcid.org/0000-0002-9473-1749>

² Laboratorio de Biointerfases. Facultad de Odontología, Universidad Nacional Autónoma de México. <https://orcid.org/0000-0002-1589-8605>

Correspondence author:

Miryam Martínez-Hernández
E-mail: miryam_mh@comunidad.unam.mx

Received: 12 June 2025

Accepted: 20 August 2025

Cite as:

Rodríguez-Hernández AP, Martínez-Hernández M. Una perspectiva crítica sobre el auge y la real necesidad de productos *eco-friendly* para el control de la biopelícula oral [A Critical Perspective on the Rise and Real Need for Eco-Friendly Products for the Control of Oral Biofilm]. *Rev Odontol Mex.* 2025; 29(4): 1-2. DOI: 10.22201/fo.1870199xp.2025.29.4.91823

Oral diseases, such as caries and periodontitis, are estimated to affect about 3.5 billion people worldwide, and while these diseases are largely preventable, they are currently a major public health problem¹. Dysbiotic dental biofilm represents the central element in the aetiology of various oral infections, given that the tooth and periodontium can act as a reservoir for a large number of microorganisms. Oral biofilm control has historically been addressed through mechanical disruption via tooth brushing and, to a lesser extent, through the use of synthetic chemotherapeutic agents.



In recent decades, we have witnessed a boom in the production of alternative products, including toothpastes and mouthwashes for oral hygiene. Such products are based on natural compounds marketed as “eco-friendly” or “chemical-free,” which promise effective control of oral biofilms with a subsequent improvement in oral health. Given their increasing popularity, largely thanks to social media, it is necessary to subject them to rigorous criticism, revealing their hidden environmental impact and their true antimicrobial effectiveness on the complex oral microbiota.

On the one hand, the label “natural” is often mistakenly perceived as synonymous with “sustainable.” Unfortunately, most of the methods used to synthesise and extract the active ingredients in many of these products are far from environmentally friendly. On the contrary, its production generally involves the generation of non-biodegradable waste. Also, obtaining botanical extracts on a large-scale causes deforestation and disruption of local ecosystems².

Besides to concerns about the environmental impact of such products, their antimicrobial efficacy on the complex oral microbiota raises significant questions. The oral cavity represents an extremely complex ecosystem that hosts one of the most intricate microbial communities in the human body, characterised by the presence of more than 800 different bacterial species³. The oral microbiota is organised into biofilms, which provides resistance to antimicrobials contained in oral hygiene products. Therefore, it is important to highlight that the effective concentration of active ingredients at the site of action and their ability to penetrate and disrupt the biofilm are critical factors that are not addressed with sufficient scientific rigour, or the corresponding antimicrobial efficacy studies are definitely not conducted. Finally, we would like to emphasise the importance of keeping in mind that mechanical removal of oral biofilms, through tooth brushing and the use of interdental cleaning devices, remains the cornerstone of effective oral hygiene, while adjuvants should complement this action, not replace it. Therefore, while the search for sustainable alternatives for oral biofilm control is necessary, it is imperative that new natural or alternative products be subjected to the same rigorous scientific scrutiny as synthetic products, thus making their true environmental impact transparent.

Acknowledgments: DGAPA-PAPIIT Projects IN209324, IA200624. UNAM.

BIBLIOGRAPHIC REFERENCES

1. Botelho J, Mascarenhas P, Viana J, Proença L, Orlandi M, Leira Y, et al. An umbrella review of the evidence linking oral health and systemic noncommunicable diseases. *Nat Commun.* 2022; 13(1): 7614. DOI: 10.1038/s41467-022-35337-8
2. Mazur M, Ndokaj A, Bietolini S, Nissi V, Duś-Ilnicka I, Ottolenghi L. Green dentistry: Organic toothpaste formulations. A literature review. *Dent Med Probl.* 2022; 59(3): 461-474. DOI: 10.17219/dmp/146133
3. Escapa IF, Chen T, Huang Y, Gajare P, Dewhirst FE, Lemon KP. New insights into human nostril microbiome from the expanded human oral microbiome database (eHOMD): a resource for the microbiome of the human aerodigestive tract. *mSystems.* 2018; 3(6): e00187-18. DOI: 10.1128/mSystems.00187-18