ANTIMICROBIAL EFFECT OF TOOTHPASTES CONTAINING BIRCH EXTRACT AND NANO-HYDROXYAPATITES

Cristina Teodora DOBROTA1,2,3, Alexandra Diana FLOREA1, Rahela CARPA2,4, Olga SORITAU5, Gheorghe TOMOAIA3,6, Ossi HOROVITZ1, Aurora MOCANU1, Cristina Lavinia ROSOIU2, Maria TOMOAIA-COTISEL1,3

1Babeş-Bolyai University, Scientific Research Center of Excellence in Physical Chemistry, part of STAR-UBB Institute, Faculty of Chemistry and Chemical Engineering, 11 Arany Janos St., 400028, Cluj-Napoca, Romania
2Faculty of Biology and Geology, Dept. of Molecular Biology and Biotechnology, Babes-Bolyai University, 1 Kogalniceanu St., Cluj-Napoca, Romania
3Academy of Romanian Scientists, 3 Ilfov St., 050044, Bucharest, Romania
4Institute for Research-Development-Innovation in Applied Natural Sciences, Babeş-Bolyai University, 30 Fântânele St., 400294 Cluj-Napoca, Romania
5Oncology Institute of Cluj-Napoca, 34-36 Republicii St., 400015 Cluj-Napoca, Romania
6Iuliu Hatieganu University of Medicine and Pharmacy, Department of Orthopedics and Traumatology, 47 General Traian Mosoiu St., 400132, Cluj-Napoca, Romania

Corresponding author: Maria Tomoaia-Cotisel.
maria.tomoaia@ubbcluj.ro; mcotisel@gmail.com

Abstract. The study investigates the antimicrobial efficacy of toothpaste formulations incorporating nano-hydroxyapatite (nHAP) and birch extract. Toothpastes were evaluated for their ability to inhibit bacterial growth, with observations revealing varied sensitivities among bacterial species to different formulations. Notably, toothpastes containing both nHAP and zinc exhibited heightened antimicrobial activity, while the addition of birch extract introduced variability in inhibition reactions across species. Further analysis delineated differences in effectiveness between nHAP-only and nHAP-birch extract formulations, suggesting the role of secondary metabolites in enhancing antibacterial properties. The study highlights toothpaste P11 as the most effective inhibitor of bacterial growth, offering a balanced combination of remineralization and antibacterial properties, except for S. mutans strain. Future research directions include time-course tests to assess long-term efficacy and oral microbiome studies to understand broader effects on oral microflora, informing the development of more targeted oral care products.

Keywords: antimicrobial effect, advanced hydroxyapatites, birch extract, toothpastes

DOI 10.56082/annalsarscibio.2024.1.66