OP308

Synergistic Antimicrobial Activity of Boric Acid and Biosynthesized-Hydroxyapatite against Oral Pathogenic Microorganism

Tuba BAYGAR[1], Rukiye BORAN[2], Nurdan SARAC[3], Aysel UGUR[4], Ozgur CEYLAN[5], Nur CEYHAN GUVENSEN[3], Uydu BALCI[3]

[1]Material Research Laboratory, Research Laboratories Center, Mugla Sitki Kocman University, Turkey

[2]Medical Laboratory Program, Department of Medical Services and Techniques, Vocational School of Health Service, Aksaray University, Turkey

[3]Department of Biology, Faculty of Science, Mugla Sitki Kocman University, Turkey

[4]Section of Medical Microbiology, Department of Basic Sciences, Faculty of Dentistry, Gazi University, Turkey

[5]Departmentof Food Processing, Ula Ali Kocman Vocational School, Mugla Sitki Kocman University, Turkey

tubaygar@mu.edu.tr

Aim of the study: Hydroxyapatite (HAp) is a calcium phosphate similar to the human hard tissues in morphology and composition. It has excellent biocompatibility and is able to promote osteoconduction and osseointegration for dental applications. Turkey has the largest boron deposits in the world. Boric acid has been used in medicine as a bactericide, a fungicide, and an antiseptic since the 1860s. This study is aimed to demonstrate the in vitro antimicrobial properties of boric acid and hydroxyapatite from fish scale by-products (HAp) against pathogenic strains and investigate the synergism of the combination of boric acid and HAp.

Material and Methods: Hydroxyapatite was synthesized by using the fish scales as by-product of a seafood processing company. Boric acid has been provided commercially. The antimicrobial activity of synthesized hydroxyapatite and boric acid were tested by agar well diffusion assay against *Candida albicans* ATCC 10239, *Staphylococcus aureus* ATCC 25923, *Streptococcus mutans* ATCC 25575 and *Streptococcus sanguis* ATCC 10556 which were provided from Culture Collection of Mugla Sitki Kocman University (MUKK).

Results: As an expected result, HAp showed no antimicrobial against tested microrganisms. Boric acid was found to be highly active against *C. albicans* with 29 mm zone of inhibition (ZOI). When combining the HAp and boric acid together, ZOI was measured as 35 mm for *C. albicans*. ZOIs of the HAp and boric acid combination were 20, 19 and 18 for *S. aureus*, *S. sanguis* and *S. mutans*, respectively. Results verified the synergism between boric acid and HAp. The addition of boric acid to the suspension of hydroxyapatite resulted in faster elimination of the bacteria. It can be concluded that, boric acid has great potential to enhance the antimicrobial properties of HAp for dental applications.

Keywords: Hydroxyapatite, Boric acid, Antimicrobial, Pathogen, Dental.