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Synergism in novel silver-copper/hydroxyapatite composites for increased antibacterial activity and biocompatibility

Nabor Oswvaldo Martínez-Gracida [a], Sandra Cecilia Esparza-González [b], Nydia Alejandra Castillo-Martínez [c], Aracely Serrano-Medina [d], Imelda Olivas-Armendariz [e], Lizeth Guadalupe Campos-Múzquiz [a], Elia Martha Múzquiz-Ramos [a]

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Abstract

This study develops a novel silver-copper/hydroxyapatite composite (Ag–Cu/HA) with high biocompatibility and antibacterial activity. Two different materials were synthesized, namely silver-hydroxyapatite (Ag-HA) and copper-hydroxyapatite (Cu-HA) composites, with 0.1%, 0.5%, and 1.0% (mol) of each metal. These materials were mixed in a planetary mill to obtain the Ag–Cu/HA composites. The results of our characterization demonstrated the low cytotoxicity and hemolytic response. The composite showed higher percent-inhibition for bacterial growth compared to those in separated composites of silver or copper with hydroxyapatite. Hence, these new materials promise higher efficacy as antibacterial hydroxyapatites.