

## Bacterial Cellulose/Silver-Doped Hydroxyapatite Composites for Tissue Engineering Application

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**Abstract :** At present, the development of materials with biomedical applications is a domain of interest that will produce a full series of benefits in engineering and medicine. In this sense, it is required to use a natural material, and this paper is focused on the development of a composite material based on bacterial cellulose - hydroxyapatite and silver nanoparticles with applications in hard tissue. Bacterial cellulose own features like biocompatibility, non-toxicity character and flexibility. Moreover, the bacterial cellulose can be conjugated with different forms of active silver to possess antimicrobial activity. Hydroxyapatite is well known that can mimic at a significant level the activity of the initial bone. The material was synthesized by using an ultrasound probe and finally characterized by several methods. Thereby, the morphological properties were analyzed by using Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM). Because the synthesized material has medical application in restore the tissue and to fight against microbial invasion, the samples were tested from the biological point of view by evaluating the biodegradability in phosphate-buffered saline (PBS) and simulated body fluid (SBF) and moreover the antimicrobial effect was performed on Gram-positive bacterium *Staphylococcus aureus*, Gram-negative bacterium *Escherichia coli*, and fungi *Candida albicans*. The results reveal that the obtained material has specific characteristics for bone regeneration.

**Keywords :** bacterial cellulose, biomaterials, hydroxyapatite, scaffolds materials

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