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RESEARCH OF SILVER PRECIPITATION ONTO POWDERED HYDROXYAPATITE AND POROUS SUBSTRATES

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Hydroxyapatite (HA) is a key inorganic component forming the mineral basis of bone tissue. Its demonstrated bioactivity include antimicrobial properties, enhanced tissue regeneration, hemostasis and osteoinduction, making it invaluable in surgical, dental, and orthopedic applications.

The structure of HA allows for substitution of its basic structural elements with various ions, explaining the natural diversity of phosphate minerals with apatite-like crystal lattices.

Such substitutions often significantly influence biological behavior of hydroxyapatite. For cationic substitutions, ion charge and size are critical. Ag^{+} ions have a larger ionic radius than Ca^{2+} ions, enabling them to:

– modify physicochemical and biological properties,

– alter the overall phase composition [1].

Pharmacological studies demonstrate silver broad-spectrum antimicrobial activity against both Gram-positive and Gram-negative bacteria, as well as various fungal species. This justifies the development of silver-containing hydroxyapatite composites for medical applications with high risks of infectious complications [2].

To obtain silver-modified hydroxyapatite, two main approaches are used:

1. Silver adsorption from colloidal solutions.
2. Surface silver reduction via the silver mirror reaction.

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