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Synthesis and Properties of Bioactive Compounds Magnetic Nanocarriers Based on Hydroxyapatite and Iron Oxides

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Magnetic nanoparticles (NP) of iron oxides and their composites with hydroxyapatite (HA) are used for the targeted delivery of biologically active compounds (BAS) and drugs and have a significant advantage over traditional methods of therapy, since the active substances immobilized on the nanocarrier are protected from chemical, enzymatic and immune degradation on the way to the target of therapy. A simple one-step method for the synthesis of magnetic nanocarriers of bioactive compounds (BAC)-new amides and benzohydrazides of the 2-arylamino-pyrimidine series, containing fragments of the structure of known antitumor drugs, as well as functional NH_2 groups providing chemisorption of BAC nanoparticles, was developed. A distinctive feature of the preparation of composites is the presence of 2-arylamino-pyrimidine derivatives in the nanocarrier forming medium, including nanosized hydroxyapatite and magnetite - $(\text{HAP})\text{Fe}_x\text{O}_y$ or $((\text{HAP})\text{Fe}_x\text{O}_y)\text{PAD}$ (PAD - polyaldehydedextran) in the covalent immobilization method. The composition, morphology and magnetic characteristics of synthesized nanocomposites were studied. Composites $((\text{HAP})\text{Fe}_x\text{O}_y)\text{BAS}$ with an adsorbed biologically active substance based on 2-arylamino-pyrimidinamide derivatives are bioactive nanosystems ready for in vivo applications, for example, for the treatment of bone diseases. To check the effectiveness of a such system using, the kinetics of the BAC release was studied in the work, on the basis of which it was shown that the biologically active compound is released in two stages within 5 hours: 80% of the active substance is released in the first 2 hours and then the remainder is released in the next 3 hours substances.

Biography:

Zhanna Ihnatovich, PhD in Chemistry, acting head of the laboratory of organic composite materials at the Institute of Chemistry of New Materials of the National Academy of Sciences of Belarus.

Research Areas: Development of the methods of synthesis of new amides of 2-arylamino-pyrimidine series for the production of biologically active substances, potential inhibitors of tyrosine kinases, in order to create on their basis multifunctional nanocarriers of bioactive compounds for the targeted delivery. Zhanna Ihnatovich participated in the development and implementation of pilot-industrial technology for the synthesis of the pharmaceutical substance of the antitumor drug Imatinib.