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Актуальні питання створення нових лікарських засобів : тези доповідей XXIII Міжнародної науково-практичної конференції молодих вчених та студентів (21 квіт. 2016 р.). В 2-х.т., Т.1. – Х. : Вид-во НФаУ, 2016. – 433 с.

Збірка містить матеріали науково-практичної конференції молодих вчених та студентів «Актуальні питання створення нових лікарських засобів». Матеріали згруповано за провідними напрямками науково-дослідної та навчальної роботи Національного фармацевтичного університету. Розглянуто теоретичні та практичні аспекти синтезу біологічно-активних сполук і створення на їх основі лікарських субстанцій; стандартизації ліків, фармацевтичного та хіміко-технологічного аналізу; вивчення рослинної сировини та створення фітопрепаратів; сучасної технології ліків та екстемпоральної рецептури; біотехнології у фармації; досягнень сучасної фармацевтичної мікробіології та імунології; доклінічних досліджень нових лікарських засобів; фармацевтичної опіки рецептурних та безрецептурних лікарських препаратів; доказової медицини; сучасної фармакотерапії, соціально-економічних досліджень у фармації, маркетингового менеджменту та фармакоекономіки на етапах створення, реалізації та використання лікарських засобів; управління якістю у галузі створення, виробництва і обігу лікарських засобів; інформаційниих технологій у фармації та медицині; основ педагогіки та психології; суспільствознавства; філології. Для широкого кола наукових і практичних працівників фармації та медицини.

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Topical issues of new drugs development : Abstracts of XXIII International Scientific And Practical Conference Of Young Scientists And Student (April 21, 2016). In 2 vol. Vol.1. – Kharkiv : Publishing Office NUPh, 2016. – 433 P.

Book of Abstracts includes materials of Scientific and Practical Conference of Young Scientists and Students «Actual questions of development of new drugs». Materials are groupped according to the main directions of scientific, research and educational work of the National University of Pharmacy. Teoretical and practical aspects of the synthesis of biologically active compounds and development of medicinal substances on their basis; standardization of drugs, pharmaceutical and chemical-technological analysis, the study of raw materials and herbal remedies development, modern drug technology and extemporal recipe; biotechnology in pharmacy, modern advances in pharmaceutical microbiology and immunology, clinical trials of new drugs, pharmaceutical care for prescription and OTC-drugs, evidence-based medicine, modern pharmacotherapy, socio-economic studies in pharmacy, marketing management and pharmacoeconomics during the development, implementation and use of drugs, quality management in development, production and traffi cking of drugs; information technologies in pharmacy and medicine; basics of pedagogy and psychology; social science; philology are presented. For a wide audience of scientists and pharmaceutaical and medicinal employees.

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SYNTESIS, CHARACTERIZATION AND SURFACE STRUCTIURE OF $Ag@Fe_3O_4$ CORE-SHELL *NANOCOMPOSITE*

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Introduction. Magnetite nanoparticles are the most used magnetic material for biomedical applications. Surface modification of the magnetite particles can be used to prevent aggregation, improve stability, exhibit many interesting properties that can be exploited in a variety of biomedical applications such as drug delivery, magnetic resonance imaging, magnetic hyperthermia, cell separation and many others.

For systems such as core-shell is a very important issue for determining the structure of the surface. One of the modern methods used to study the surface is an optical spectrometry – surface plasmon resonance spectroscopy (SPR). SPR is the basis of many standard tools for measuring adsorption of material onto planar metal (typically gold or silver) surfaces or onto the surface of metal nanoparticles. It is the fundamental principle behind many color-based biosensor applications and different lab-on-a-chip sensors.

Silver nanoparticles have unique properties for biomedical application and plasmonic properties of silver nanoparticles have been studied, and they are extraordinarily efficient at absorbing and scattering light. Such properties make the silver nanoparticles ideal for numerous technologies, including biomedical, materials, optical, and antimicrobial applications.

Aim. Optimize the process for the synthesis of $Ag@Fe_3O_4$ magnetic nanocomposite of the "core-shell" type with the islet cover with preservation of the magnetic properties. To get more information about silver nanoparticles and to improve their applications or develop new ones, careful study related to their stability, functionality, particle sizes and also their materials and physical behaviors are essential.

Materials and methods. Magnetite with the islet silver coating obtained by the original single-phase method of chemical co-precipitation with the temperature increasing up to 60 – 70°C. The studies were conducted by the following methods: X-ray analysis, semi-quantitative phase analysis, scanning electron microscopy. The specific surface area of the samples was determined by thermal desorption of argon. The specular reflectance measurements of the nanoparticles were measured using a UV-visible spectrophotometer.

Results and discussions. In the diffraction pattern the silver peaks at 44.6°, 52° and 76.65° were registered, while magnetite peaks did not disappear. It may indicate the islet surface of the magnetic cores. According to the data of scanning

electron microscopy the average particle sizes of $Ag@Fe_3O_4$ they were 23 nm. $Ag@Fe_3O_4$ compared to the Fe_3O_4 one has a slightly larger specific surface area. Magnetization of saturation for the sample with a silver coating it is 62.5 emu/g.

The UV-Visible spectra of the samples measured in the range 100 – 1200 nm, using a double beam UV-Vis spectrophotometer. The strong broad reflection bands located between 250 and 710 nm for both samples with the *minimum value* ~440 nm assigned to a surface plasmon resonance typical of silver nanoparticles, is well-documented for various metal nanoparticles with sizes from 2 to 100 nm. Hyperchromic effect observed in the band of $Ag@Fe_3O_4$ nanocomposites. Such effect in the case of continuous nanoshells is more significant. It can be assumed, that the maximum shift caused by the influence of magnetite.

Clusters of surface layer are sensitive to changes of the metal core, such as the oxidation state and the number of metal atoms in the cluster. The plasmon width increases with decreasing cluster size for typical cluster shape distributions. The peak appears in the band of $Ag@Fe_3O_4$ nanocomposites at ~265 nm, indicating the formation of sub-*nanometer silver clusters* (*smaller than 1 nm*). The peak at ~770 nm can be attributed to an *increase in* the *thickness* or/and surface area of silver clusters. The location of this resonant peak matches to a flat silver clusters.

Among the samples it is apparent that there is a general increase in the measured surface area as the silver coat appears. This fact suggesting that the coverage of magnetite by silver is not complete. It can be assumed, that the silver atoms form “island-like” structures on the surface of magnetite. Such organization of surface layer will increase the contact area of the silver nanocomposite with bacteria or viruses, greatly improving its bactericidal effect. It is known that particles with a large specific surface area have a high chemical and biochemical activity.

Conclusion. The method of one-pot synthesis of $Ag@Fe_3O_4$ nanoparticles consisting of a spherical core of magnetite and silver islet shell has been developed. The particles are almost monodispersed with the average size <d> ~ 23 nm. The silver nanoparticles form of islands (20-100 atoms) on the surface of magnetite. As-synthesized core-shell nanocomposities $Ag@Fe_3O_4$ have good *perspectives* of applications, including chemical and biological sensing, due to the broad absorption in the optical region associated with localized surface plasmon resonance. Formation of $Ag@Fe_3O_4$ composite structures such as "core-shell" will allow combining magnetic controllability of the magnetite core with bactericidal and bacteriostatic properties of the silver shell. This effect is very interesting from the perspective of using particles with the "core-shell" structure in pharmacy and medicine to create new medicines.