GREEN SYNTHESIS OF METAL NANOPARTICLES WITH CONTROLLED MORPHOLOGY

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Nanotechnology is relatively new branch of science which deals with preparation, characterization, and application of materials with size of $<10^{-7}$ m. Unique properties of nanomaterials have initiated a great interest of scientists due to diverse applications of nanotechnology in the field of optics, engineering, life sciences, medicine, energy, and agriculture. This have initiated the extensive studies for development of novel synthesis methods for preparation of nanoparticles with controlled size and shape.

Biological systems, e.g., bacteria, fungi, plant extracts, have been already frequently used in the synthesis of metallic nanoparticles with the purpose to eliminate the use and production of hazardous reagents. Such a green chemistry approach becomes an innovative way in the development of alternative protocols for preparation of nanoparticles also because it is cost-, time- a energy-effective.

The formation of metal nanoparticles by interaction of metal ions with plant extract is complicate process due to the complicity of plants extract. Despite the extensive studies, there are still a lot of unanswered questions related to stability, understanding of roles of extracts components, and control over morphology. The development of trusted protocols for synthesis of biocompatible non-spherical gold nanoparticles, i.e. with response in near infra-red range, is an object of special interest thanks to prospective application in nanomedicine.

In the present study, we report the results of the green synthesis of non-spherical gold nanoparticles through the bio-reduction of tetrachloroauric acid using leaf extracts of selected plants (lemon balm, peppermint, juniper, solidago etc.) [1-3]. Nanoparticles were characterized using UV-Vis spectroscopy, infra-red spectroscopy, transmission electron microscopy, and energy dispersive X-ray spectroscopy.

References:

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