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### عنوان مقاله:

Magnetic Nanoparticles and their Application in Bioremediation and Microbiology

### محل انتشار:

اولین همایش منطقه ای دستاوردهای نوین و پژوهشهای دانش بنیان در میکروبیولوژی و بیوتکنولوژی (سال: 1401)

تعداد صفحات اصل مقاله: 1

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#### خلاصه مقاله:

According to the increasing progress of the need to use new technologies, the topic of nanotechnology hasbecome one of the most practical topics in the field of science and industry. Magnetic Nanoparticles(MNPs) are one of the topics that have attracted the attention of researchers, including microbiologists, in the field of nanotechnology. Therefore, the purpose of this study is to investigate some properties and characteristics of magnetic nanoparticles, their synthesis methods, and some of their applications inmicrobiology. Numerous researches indicate that these nanoparticles are mainly made of natural magneticmaterials, especially iron, which due to their small size (less than 1.00 nm) and increased surface-tovolumeratio, their adsorption power and magnetic properties have increased. So, because of theirsuperparamagnetic properties, these small particles can be easily affected by an external magnetic fieldand separated from different matrix samples. According to the studies and research of F. Falaki and et al (research team of Pazhoh Azma technologists)in Shahr-e-Qods Branch, Islamic Azad University, there are three common methods for the synthesis of magnetic nanoparticles: chemical, physical and microbial methods. Among the physical synthesismethods, gas phase deposition and electron beam lithography are common methods of physical synthesis. Also, hydrothermal, co-precipitation, oxidation, electrochemical, and sonochemical methods are commonand interesting methods in the chemical synthesis of nanoparticles. Among the techniques, coprecipitationmethod is the most efficient and simple chemical method. These nanoparticles have beenwidely used in microbiology sciences during recent decades due to their ability to control magneticproperties and biocompatibility, as well as not affecting cell physiology. During the research conducted in the field of bioremediation by the research team of F. Falaki, it was shown that magnetic nanoparticlescan be used as a solid adsorbent in the extraction and removal of environmental pollutants. Among itsapplications in the field of microbiology and medicine, we can mention the use of magnetic nanoparticlesin MRI imaging, preparation of anti-cancer drugs, detection of cell membranes, and functionalization ofDNA or protein. In addition, MNP can be used for the molecular detection of microorganisms as well asthe rapid identification of live and uncultured bacteria. Because this technique can greatly contribute to abetter understanding of ... the diversity, functional potential, evolution, adaptation, physiology, and ecophysiology of b

## کلمات کلیدی:

Biological compounds, Bioremediation, Identification of bacteria, Magnetic nanoparticles

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