Green biosynthesis of magnetic iron oxide nanoparticle using *crocus sativus* L. petal hydro-alcoholic extract

Hamid Mollania*[1], Majid Oloomi Buygi[2]

[1]PhD Student, Department of Electrical Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, Mashhad, Iran. hamid.mollania69@gmail.com
[2]Associate Professor, Department of Electrical Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, Mashhad, Iran. m.oloomi@um.ac.ir

Abstract
Nanotechnology has attracted a great interest in recent years due to its unexpected impact on many areas of science and life, especially in engineering, biology and biomedicine. Biologically synthesis of magnetic iron oxide nanoparticles (MIONPs) are among attractive nanomaterials. MIONPs have attracted the attention of many investigators owing to their magnetic properties and their ability of surface modification and high biocompatibility. Since biosynthesis is simple, cost-effective, and environmentally-friendly, it is of paramount importance in comparison to chemical and physical techniques of nanoparticles production. In the current research work, MIONPs are synthesized using a *crocus sativus L*. petal hydro-alcoholic extract. Created nanoparticles were characterized using FE-SEM, EDS and DLS methods.

Key words**:** *Crocus sativus L.* petal hydro-alcoholic extract, Nanoparticle green biosynthesis, Magnetic Iron oxide nanoparticles (MIONPs).

Introduction
In the nanobiotechnology, the reduction of particle size to nano extent has a significant effect on all physical and chemical properties of materials. Nano-sized particles as the base and starting point of nanotechnology are required in all research of this area; therefore, their production and synthesis is of paramount importance. Nanoparticles green synthesis has been investigated and admired in different research work as the by-product of bacterial enzymatic activities (Faramarzi and Sadighi, 2013), by the enzymatic reaction and by various plant extract. This method enjoys considerable benefits in comparison to other physical and chemical methods such as hydrothermal methods, co-precipitation, sol-gel and vapor-solid growth techniques (Kharissova et al., 2013). In fact, it is through these diverse mechanisms such as oxidation, reduction, sorption, and chelation that nanoparticles are formed and grown in an intracellular or extracellular way via nucleation (Singh, 2015).
Iron oxides are of nanoparticles that considering the specific inherent characteristics have a wide range of applications in several regions. They can be used as catalysts, energy storage systems, fuel cells and contrast agents in imaging techniques. Magnetite (Fe_3O_4) and hematite

[1]- Hamid Mollania- hamid.mollania69@gmail.com