



University of Zabol
Graduate School
Faculty of Science
Department of Biology
The Thesis Submitted for the Degree of M.Sc
(in the field of Plant Physiology)

Title

Title: Effect of different concentrations of Ce-Mn ferrite nanoparticles on some physiological parameters of *Triticum aestivum L.*

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Abstract

Nanotechnology is one of the technologies that can revolutionize agricultural and food systems. The use of nanotechnology in the production of medicinal and herbal products with better effects against diseases will create a major change in human life. Nanoparticles can be used to increase plant growth, increase plant resistance to various diseases. The aim of this study was to synthesize manganese-cerium ferrite nanoparticles (mn-ce) (to evaluate their efficiency as a growth stimulant for wheat (*Triticum aestivum* L.). Manganese-cerium nanoparticles were synthesized using sol-gel method. For this purpose, after synthesis of compounds, melting point, IR spectrum and NMR spectrum were taken, and the effect of these compounds in different concentrations on germination, growth and physiological parameters of wheat, including total phenols and flavonoids was investigated. The amount of total phenol compounds was measured by Folin Siocalcium method and the amount of flavonoid compounds was measured by aluminum chloride colorimetric method. Manganese-cerium ferrite nanoparticles at all three concentrations (200, 100 and 500 ppm) increased root length, stem length, root length, stem length, total phenol content, flavonoids and antioxidant activity compared to the control, which in concentration 200 ppm This increase was further observed. Also germination, root and shoot dry weight, shoot, root and stem increased at low concentrations (100 and 200 ppm) and decreased at high concentrations (500 ppm). Manganese-cerium ferrite nanoparticles can be proposed for wheat breeding applications and as a delivery system for chemical products. However, the potential negative effect of manganese-cerium ferrite nanoparticles due to its potential transfer from plants to animals through the food chain must also be considered.

Keywords: Manganese-Cerium Ferrite Nanoparticles (Ce-Mn), Nano Fertilizer, .Physicochemical Properties, Wheat