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**The Thesis Submitted for the Degree of M.Sc in the field of  
Biology- Plant physiology**

**Effect of bacterium, vermicomposting  
and iron nanoparticles synthesized  
from saffron extract on quantitative  
and qualitative properties in *Aloe vera***

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## **Abstract**

The production of biological agricultural products is one of the strategies to preserve the environment, food safety and health. In order to establish a sustainable agricultural system, the use of biological fertilizers is very important. Therefore, in order to study the effect of iron nanoparticles synthesized from saffron extract, azotobacter and vermicompost on the quantitative and qualitative traits of the medicinal plant *Aloe vera*, an experimental design was conducted in the form of a factorial design ( Iron nanoparticles synthesized from saffron extract (0, 125 and 250 ppm), Azotobacter (0, 200 and 400 ppm) and vermicompost (0, 1.5 and 2.5 (tons per hectare)) based on completely randomized blocks with 9 treatments in three replications in the research greenhouse of Zabul University Agricultural Research Institute. The results showed that among the different concentrations of iron nanoparticles saffron extract, 250 ppm concentration, alone or in combination with Azotobacter and vermicompost has a more effective role on most of the morphological, physiological and phytochemical traits. Also, 400 ppm Azotobacter and 1.5 tons per hectare of vermicompost obtained better physiological and phytochemical results than the other concentrations. Therefore, according to the presented results, the combined treatment of 250 ppm of iron nanoparticles saffron extract along with 400 ppm of Azotobacter and 1.5 tons per hectare of vermicompost for studies The future is suggested.

**Keywords:** Soil fertility, Free radical scavenging percentage, Flavonoids, Bio fertilizers, Sustainable agriculture, Medicinal plants.