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Magnetic Field Effects on Seed Germination of Phaseolus Vulgaris, Early Seedling Growth, and Chemical Composition

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Abstract : In order to study the effects of magnetic field on the root system and growth of Phaseolus vulgaris, an experiment was conducted in 2012. The possible involvement of magnetic field (MF) pretreatment in physiological factors of Phaseolus vulgaris was investigated. Seeds were subjected to 10 days with 1.8 mT of magnetic field for 1h per day. MF pretreatment decreased the plant height, fresh and dry weight, length of root and length of shoot, Chlorophyll a, Chlorophyll b and carotenoid in 10 days old seedling. In addition, activity of enzymes such as Catalase and Guaiacol peroxidase was decreased due to MF exposure. Also, the total Protein and DPPH content of the treated by magnetic field was not significantly changed in compare to control groups, while the flavonoid, Phenol and prolin content of the treated of the treated by magnetic field was significantly changed in compare to control groups. Lateral branches of roots and secondary roots increased with MF. The results suggest that pretreatment of this MF plays important roles in changes in crop productivity. In all cases there was observed a slight stimulating effect of the factors examined. The growth dynamics were weakened. The plants were shorter. Moreover, the effect of a magnetic field on the crop of Phaseolus vulgaris and its structure was small.

Keywords : carotenoid, chlorophyll a, chlorophyll b, DPPH, enzymes, flavonoid, germination, growth, phenol, proline, protein, magnetic field
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