

Study of growth and defense response of root sunflower plant under pyrene and phenanthrene stress

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PAHs are of the most important environmental pollutants, which enter into the environment from various sources. The presence of these compounds in the soil creates a variety of stresses in plants which is unfavorable for plant growth and development. This study was conducted to evaluate the effect of pyrene and phenanthrene concentrations (50 and 100 mg/l) on germination, growth, accumulation, and induction of oxidative stress in sunflower root. The results showed that increasing the pyrene and phenanthrene concentration reduced root growth indices (fresh and dry weight and root length) but they have no significant effect on germination. On the other hand, the amount of malondialdehyde of the root that is the index of the membrane peroxidation of root cells in both concentrations increased significantly in comparison with the control. This is indicative of oxidative stress.

Keyword: *Helianthus annuus*, Oxidative stress, Growth indices

Effect of magnetic field on lipid peroxidation, proline and hydrogen peroxide contents of *Silybum marianum*

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Silybum marianum is a medicinal plant belonging to *Asteraceae* family. The magnetic field is an abiotic stress and is used for the growth and secondary metabolite induction. In this study, the effect of magnetic field on H₂O₂, proline and lipid peroxidation were studied in leaves and roots of *S. marianum* seedlings. After seed germination, seedlings were exposed under different magnetic field (0, 2, 4 and 6 mT) for 1 hour. Seedlings were cultured in Hoagland medium and were placed in greenhouse conditions for daily 16/8 h light-dark photoperiod, and day/night temperature regime of 20/18°C. The seedlings were harvested for physiological analysis and growth after 4 weeks. Results showed that the magnetic field increased significantly lipid peroxidation at 6 mT, while decreased this parameter at 2 and 4 mT. Proline content decreased significantly in root and leaf with an increase of magnetic field intensity. The H₂O₂ level was decreased at 2 and 4 mT and increased to 6 mT. It seems magnetic field at proper intensity can decrease free radicals by induction of antioxidant activity.

Keyword: *Silybum marianum*, Magnetic field, Lipid peroxidation, Proline, Hydrogen peroxide