

Toxic effects of phenanthrene on physiological parameters of maize (*Zea mays* L.)

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Polycyclic aromatic hydrocarbons (PAHs) are an important group of pollutants which are released into the environment mainly due to the incomplete combustion of organic materials. These compounds could reduce the growth of plants and affects their different physiological aspects. In this study, *Zea mays* plants were grown hydroponically and treated by different concentrations of phenanthrene (0, 25, 50, 75 and 100 ppm) and its effects on some physiological and biochemical parameters were evaluated. The results showed that the increase in phenanthrene concentration reduced all studied growth parameters and significantly increased H₂O₂, Chlorophyll a, and carotenoids contents of plants. Also, an increased trend was observed in anthocyanin's content compared to the control and the highest value (118.44%) was recorded at the level of 100 ppm, but there was no significant difference between plants treated. Therefore, these findings supported the concept that phenanthrene toxicity induced oxidative stress in the plant as was shown by H₂O₂ accumulation in the plant being physiological reasons for plants growth reduction in phenanthrene contaminated environments.

Keywords: Growth parameters, Phenanthrene, *Zea mays*

Evaluation of arsenate induced physiological responses in alfalfa (*Medicago sativa* L.)

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Arsenic (As) is a ubiquitous environmental toxic metalloid that exists in both organic and inorganic forms and its concentration in the environment increases due to both industrial and agriculture activities. The excessive presence of Arsenic in the environment is a serious threat to the ecosystems and human health in many regions of the world. This metalloid has not the specific nutritional role and some studies have reported its toxic effects on plants. Arsenic entrance into crops such as alfalfa can lead to a threat to consumers of plant products including human. In order to evaluate the physiological responses of alfalfa to arsenic toxicity, in the present research, effects of different concentrations of sodium arsenate solution (0, 10, 15 and 20 ppm) on growth, photosynthetic pigments as well as soluble and insoluble sugars contents in shoots and roots of alfalfa plants was investigated in the hydroponic culture and under controlled conditions. Results indicated that all concentrations of arsenate led to a significant reduction ($P \leq 0.05$) in growth parameters, contents of photosynthetic pigments, soluble and insoluble sugars in roots and shoots compared to the control. Concerning the results, it seems that arsenate caused growth and development disruption in alfalfa via inducing phytotoxicity by interaction with physiological activities and damaging photosynthetic apparatus.

Keywords: Arsenic, Phytotoxicity, Alfalfa