

Effects of Nitrogen and Arsenic on Antioxidant Enzyme Activities and Photosynthetic Pigments in Safflower (*Carthamus tinctorius* L.)

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Abstract : Nitrogen fertilization has played a significant role in increasing crop yield, and solving problems of hunger and malnutrition worldwide. However, excessive of heavy metals such as arsenic can interfere on growth and reduced grain yield. In order to investigate the effects of different concentrations of arsenic and nitrogen fertilizer on photosynthetic pigments and antioxidant enzyme activities in safflower (cv. Goldasht), a factorial plot experiment as randomized complete block design with three replication was conducted in university of Zabol. Arsenic treatment included: A1= control or 0, A2=30, A3=60 and A4=90 mg. kg⁻¹ soil from the Na₂HASO₄ source and three nitrogen levels including W1=75, W2=150 and W3=225 kg.ha⁻¹ from urea source. Results showed that, arsenic had a significant effect on the activity of antioxidant enzymes. By increasing arsenic levels from A1 to A4, the activity of ascorbate peroxidase (APX) and gayacol peroxidase (GPX) increased and catalase (CAT) was decreased. In this study, arsenic had no significant on chlorophyll a, b and cartoneid content. Nitrogen and interaction between arsenic and nitrogen treatment, except APX, had significant effect on CAT and GPX. The highest GPX activity was obtained at A4N3 treatment. Nitrogen increased the content of chlorophyll a, b and cartoneid.

Keywords : arsenic, physiological parameters, oxidative enzymes, nitrogen

Conference Title : ICCMB 2015 : International Conference on Cellular and Molecular Biology

Conference Location : Paris, France

Conference Dates : April 27-28, 2015