University of Zabol
Graduate school
Faculty of Agriculture

The Thesis Submitted for the Degree of M.Sc
In Agronomy

Title:

Effects of lead nitrate and salicylic acid on growth and some physiological characteristics of basil *(Ocimum basilicum)*

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Abstract

Lead is toxic heavy metal and its toxicity usually appears at concentrations obove than 30 µg gram^{-1} of leaf and leads to a reduction in chlorophyll synthesis and therefore vegetative growth reduction. Ggreenhouse studies were conducted at Zabol University during 2013. The experiment consisted of four levels of lead nitrate 0, 100, 200 and 300 mg kg^{-1} of soil as the first factor, and three levels of salicylic acid: 0, 50 and 100 ppm as the second factor. The results showed that lead nitrate had significant effect on leaf area, fresh and dry weight of shoot and root and decreased them. The relationship between the activities of catalase antioxidant enzyme (Cat) and peroxidase (Pox) and soluble carbohydrates in leaves of basil is associated with increased levels of lead nitrate. In addition to lead nitrate the also have a significant effect on the amount of chlorophyll a, b and carotenoids ($p<0.01$). The use of salicylic acid as a growth regulator in medium containing lead, basil decreased physiological traits such as carbohydrates and enzymes catalase and peroxidase and increase photosynthetic chlorophyll a, chlorophyll b and carotenoids, and also increased morphological traits including: leaf area, fresh and dry weight of shoot and root dry weight ($p<0.01$) respectively. The results showed that application of lead nitrate and salicylic acid treatment increases growth and psychological characteristics, as well as reduces carbohydrates and antioxidant enzyme activities of catalase and peroxidase of what ($p<0.01$) and the level ($p<0.05$), while the attribute on the root dry weight was not significant statistically.

Keywords: basil, lead nitrate, salicylic acid