World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:19, No:08, 2025

Effects of Foliar Application of Glycine Betaine under Nickel Toxicity of Oat (Avena Sativa L.)

Authors : Khizar Hayat Bhatti, Fiza Javed, Misbah Zafar

Abstract : Oat (Avena sativa L.) is a major cereal plant belonging to the family Poaceae. It is a very important source of carbohydrates, starch, minerals, vitamins and proteins that are beneficial for general health. Plants grow in the heavy metals contaminated soils that results in decline in growth. Glycine betaine application may improve plant growth, survival and resistance to metabolic disturbances due to stresses. Heavy metals, like nickels, have been accumulated for a long time in the soil because of industrial waste and sewage. The experiment was intended to alleviate the detrimental effects of heavy metal nickel stress on two oat varieties 'Sgd-2011 and Hay' using Glycine betain. Nickel was induced through soil application while GB was applied as foliar spray. After 10 days of nickel treatment, an exogenous spray of glycine betaine on the intact plant leaves. Data analysis was carried out using a Completely Randomized Design (CRD) with three replications in this study. For the analysis of all the data of the current research, Mini-Tab 19 software was used to compare the mean value of all treatments and Microsoft Excel software for generating the bars graphs. Significant accelerated plant growth was recorded when Ni exposed plants were treated with GB. Based on data findings, 3mM GB caused significant recovery from Ni stress doses. Overall results also demonstrated that the sgd-2011 variety of oats had the greatest outcomes for all parameters.

Keywords : CRD, foliar spray method, glycine betaine, heavy metals, nickel, ROS
Conference Title : ICAB 2025 : International Conference on Agriculture and Biotechnology
Conference Location : Dublin, Ireland
Conference Dates : August 23-24, 2025