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## Protective role of *Terminalia arjuna* bark extract over nickel induced toxicity in rice plants

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Tickel (Ni) is an essential micronutrient important for normal growth and development of plants. In recent years anthropogenic and industrial activities have led to addition of large amount of Ni to the soil environment. High Ni content in the soil causes problem for the cultivation of rice crop in many areas of the world. Excess Ni in plants directly promotes uncontrolled generation of reactive oxygen species (ROS) leading to oxidative damage to biomolecules. The toxic effects of high Ni concentrations in plants include retardation of germination, growth, yield, induction of leaf chlorosis, disturbance of photosynthesis, inhibition of CO<sub>2</sub> assimilation and diminution in stomatal conductance. The influence of excess Ni on photosynthesis is multidirectional; Ni damages the photosynthetic apparatus on almost every level of its organization. Terminalia arjuna (Ta), a medicinal plant is a deciduous tree belonging to Combretaceae family. It contains natural antioxidants in the form of phenolic compounds, such as phenolic acids, flavonoids, phenylpropanoids, tocopherols etc. These compounds have reducing properties and react with ROS and quench the radical to their less toxic forms. Four sets of experiments were conducted where (i) rice seedlings raised in hydroponics for 8 days in a green house in Yoshida nutrient solution served as control, and (ii) nutrient solution containing Ta extract only (iii) nutrient solution containing 200 µM NiSO, and (iv) nutrient solution containing Ta + 200 µM NiSO, served as treatment solutions. Photosynthesis is highly sensitive to disturbances in gaseous exchange through the stomata. Our results showed that presence of Ta extract reduced Ni induced damages in rice seedlings. Ni toxicity to rice plants caused excessive generation of reactive oxygen species (ROS), induction of oxidative stress, proteolysis and increase in activity of many antioxidative enzymes. Contrary to this when Ta bark extract was supplemented with Nickel, toxicity level of ROS were low indicating protective role of Ta against Ni induced damages. These finding showed that high antioxidative values of Ta extract lead to alleviation of Ni induced damage to rice seedling on biochemical levels.

## **Biography**

Ritika Rajpoot has done her Masters in Bioinformatics from Banaras Hindu University and at present she is pursuing her PhD from Department of Biochemistry under the supervision of Prof. R.S.Dubey (Vice-Chancellor, Tilka Manjhi Bhagalpur University), Banaras Hindu University, Varanasi, Uttar Pradesh, India. Her area of research is Plant Stess biology.

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