

Effect of Waste Wool Sheep on the Growth and Antioxidant Activity of Lettuce on Boron Toxicity

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Abstract : Boron (B) toxicity an important agricultural problem as a limiting factor on yield, which is especially arid and semi-arid region. Big amounts of waste wool need to use an alternative, which is rich in protein such as collagen, elastin and keratin. Amino acid has a fundamental role on protein, which is an essential element in biological parameters materials and changes in its availability and metabolism. Therefore, this study aimed to study the effect of waste wool sheep hydrolysate to evaluate and compare for its boron toxicity on lettuce (*Lactuca sativa* L. Semental). Boron was applied at 20 mg B kg⁻¹ (Boron) from H₃BO₄ and 250 mg N kg⁻¹ from waste sheep wool hydrolysate (AA) to the soil. Dry weight of lettuce was increased by AA treatment. Boron (B) concentrations of inner leaf was decreased by AA treatment, and similar result was found for outer leaf, and moreover by the Boron+AA treatment, B concentrations was lower than the Boron treatment. Nitrogen concentrations of outer leaf was the highest at the Boron+AA and AA treatments. H₂O₂ content of lettuce was not statistically significant. But superoxide oxidase (SOD, EC 1.15.1.1) activity was higher at the Boron treatment, ascorbate peroxidase (APX, EC 1.11.1.11) and catalase (CAT, EC 1.11.1.6) activity of plant was highest at the AA treatment. Similarly, relative chlorophyll was highest AA and then, Boron+AA, control, respectively. Our results indicate that these parameters can be used to evaluate the stress level as well as to develop models that could help prevent the damage inflicted by B toxicity in lettuce plants. When the compare of the Boron and Boron+AA, due to the AA application, plant weight was increased, whereas B concentration was decreased due to the effect of amino acid. Amino acid treatment had positive effect on the boron stress condition, that the antioxidant defense system was supported our results.

Keywords : waste seep wool hydrolysate, boron, lettuce, antioxidant enzyme activity

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