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"Solidarity in a competing world — fair use of resources"

Mechanisms of Resistance and Alteration of Chemical Compositions of the Potential Cash Crop *Halophyte leptochloa* Fusca L. Kunth under Salinity Stress

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Abstract

Fresh water resources both for domestic and agriculture use are constantly depleting and crop yield suffer from a steady increase in water salinity, particularly in arid and semi-arid regions. Climate change is expected to lead to reductions in water supply worldwide and to major concern for prospective development. A burgeoning population in most developing countries is a further threat not only to sustained food supply but also affect other resources like fodder and fuel wood. Hence efforts are needed to find alternate solution to utilising saline lands and water for economic benefits. Cash halophyte crops can grow using land and water unsuitable for other conventional crops and provide food, fodder, fuel, medicines, landscaping. One of these plants is Kallar Grass (*Leptochloa fusca* L. Kunth). It is a fast growing, perennial herbaceous, and can be utilised as forage, bioreclamation of saline soil, phytoremediation and carbon sequestration. A sustainable use of *Leptochloa fusca* at high salinity cannot be predicted without a detailed knowledge about its mechanisms of resistance and they closely depend on the ability to cope with (I) water deficit due to a low water potential of the soil, (II) restriction of CO_2, (III) avoidance of ion- toxicity and ion-deficiency. Therefore osmotic potential, Na and K contents, transpiration rate, stomatal conductance, were determined of plants irrigated with nutrient solution containing 0, 20 %, 40 %, 60 %, 80 %, 100 % sea-water-salinity (sws). Increasing NaCl significantly decreased shoot growth yield. The transpiration rate and stomatal conductance showed a linearly reduction by rising salinity levels and that was associated with decreasing of leaves osmotic potential. Concerning chemical compositions of shoot, salinity led to an obvious increase in protein, ash, fat and carbohydrates contents, while fiber content was decreased as compared to non-saline treated plants.

Keywords: Chemical compositions, Halophytes, *Leptochloa fusca*, osmotic potential, salinity, stomatal conductance, transpiration rate

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