COMPARATIVE PERFORMANCE OF DIFFERENT RICE CULTIVARS UNDER SALINITY AND AMELIORATIVE ROLE OF SULFUR (S) IN MITIGATING SALT STRESS

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Extended summary

Salt stress is one of the major environmental stresses that limits growth and yield of a wide variety of crops including rice. Rice is considered as salt-sensitive crop, and growth and yield of rice are greatly affected by salinity. In recent decades, researchers have developed various approaches toward making salt-tolerant rice varieties. Exogenous use of protectants is effective in conferring salt tolerance to rice plants. Among the macronutrients, sulfur (S) not only plays essential roles in plant growth and development but also useful in reversing the adverse effects of abiotic stress. Considering this hypothesis, an experiment was conducted at the experimental shed and Plant Physiology Laboratory of the Department of Agricultural Botany, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh from November 2018 to May 2019 with the objective of assessing the effects of different salinity levels on the morphological, physiological and yield performance and the role of sulfur in improving the above mentioned traits of rice under salt stress. *Oryza sativa* L. *cv.* BRRI dhan67 and cv. BRRI dhan29 were used as test crop plants (*cv.* BRRI dhan29 was considered as check and cv. BRRI dhan67 was the salt tolerant cultivar) under various levels of salinity (0, 8, 12 dS m^{-1}) and sulfur (0, 3, 6 Kg S ha^{-1}) with three replications. Treatments were given at 45 days after transplanting and maintained throughout the growing period. Salt stress increased root and shoot Na content, decreased relative water content (% RWC) and altered proline content; highly increased membrane lipid peroxidation and decreased membrane stability index (MSI%). Ascorbate (AsA) content decreased and glutathione (GSH) content increased under salt stress. Different growth parameters like leaf area, plant height, dry weights, number of tillers decreased under salt stress. Yield attributes (panicle length, spikelet fertility, no. of effective tiller, no. of filled spikelet's $panicle^{-1}$, 1000 grain wt.) and yield (grain and straw yield) were decreased due to exposure to salt stress. In contrary, exogenous S application with salt stress decreased the Na accumulation in root and shoot, improved all the physiological and growth parameters, compared to salt stress alone. As a result, S treated rice plants showed improved yield attributes and higher yield under salt stress.

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