

Amelioration of Cadmium (Cd) Stress in Rice (*Oryza sativa* L.) by using Selected Soil Amendments and Aquatic Plants

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Heavy metal contamination in paddy soil, particularly Cadmium (Cd) has become a serious issue with the potential risk of transferring Cd to the human food chain. Rice plants exposed to high Cd, encounter deleterious effects on growth and yield. This necessitates the need to identify effective and feasible remediation measures to ameliorate Cd stress in rice. Therefore, the efficacy of using selected soil amendments and floating aquatic plants to ameliorate Cd stress in rice was evaluated in this study under controlled environmental conditions using rice variety Bg 250. The experiment was laid out in a Complete Randomized Design with six treatments replicated thrice. Water lettuce (*Pistia stratiotes*), duckweed (*Lemna minor*), partially burnt rice husk (RH), and rice straw (RS) were evaluated as the amelioration treatments under two soil Cd contamination levels (5 and 8 ppm). The control was maintained with the only Cd without any amelioration. RH and RS were separately incorporated to Cd treated soil and mixed well at two levels (soil: RH or soil: RS, 1:1 and 2:1 v/v). Upon transplanting of rice, the aquatic plants were introduced to Cd treated pots. Growth and yield parameters were measured at 45 and 75 days after transplanting. Rice grown in the soil medium amended with RH (1:1 v/v) showed significantly higher values for plant height (43 ± 0.2 cm), the number of tillers (3.67 ± 0.03), root length (24.33 ± 1.2 cm), root volume (13.33 ± 0.7 cm³), root dry weight (3.17 ± 0.2 g plant⁻¹), shoot dry weight (7.44 ± 0.07 g plant⁻¹) and seed dry weight (3.12 ± 0.15 g plant⁻¹) compared to the control under 5 ppm Cd level. A similar pattern was observed in the other Cd level as well. Interestingly, the aquatic plants reduced the growth and yield of rice possibly due to competition for resources. In conclusion, RH has the potential to be used as an effective soil amendment to ameliorate Cd stress in rice. Field investigations are suggested for making a general recommendation.

Keywords: Aquatic plants, Cd stress, Growth and yield, Rice, Soil amendments

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