Application of Organic Fertilizer to Ameliorate and Increase the Fertility of Saline Soils for Mung Bean Plants

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ABSTRACT

Introduction: Soil salinity is a key ecological encounter that is harming agriculture across the world ultimately threatening global food security (Balasubramaniam *et al*. 2023). Matters with soil salinity are intensified by natural environment deterioration, deprived irrigation applications, 'and climate changes. Salinity stress harmfully influences plants by delaying seed germination, growth and development, and flowering and fruiting (Zhao *et al*. 2021). Pakistan, due to the unpredictable rainfall forms carried on by climate change, farmers have turned to groundwater for irrigation purposes (Ahmad *et al*. 2023). The structural stability of soil can be improved by the addition of organic supplies (Haque *et al*. 2021). Organic fertilizers have the capability to recover soil physicochemical properties and role to agricultural waste reserve retrieval.

Mung bean, *Vigna radiata* (L.) R. Wilczek is cultivated in the warmer zones of the world and is one of the greatest significant legume crops (Dialta *et al*. 2024). It is a short period (65–90 days) grain legume having extensive adaptability and little input necessities. The present research had been performed to observed the performance of mung bean in salt stress condition.

Objectives:

- Suitable application of fertilizers.
- To reduce the effects of salinity.
- To evaluate the effects of organic amendments on soil salinity.

Methodology: The present research work conducted in greenhouse of Department of Botany, Jinnah University for women in complete randomized block design. Four treatments of different concentrations of NaCl were used for irrigation to execute salt stress (Table, **1**). Each treatment had three replicates. *Vigna Radiata* was used as experimental plants.

Table 1. List of Treatments.

Treatments	Concentrations
T1	0mM NaCl (Control)
T2	50mM NaCl
T3	75mM NaCl
T4	100mM NaCl

After 12 days of sowing, plants were harvested for physical and biochemical analysis. Root & shoot lengths (cm), fresh &dry weights (gm.) and leaf area (cm^2) were measured as physical parameters while % carbohydrate (Yemm and Willis 1954), % protein (Lowry *et al*. 1951) and proline contents (Bates *et al*. 1973) were estimated as biochemical parameters. Outcomes of this experiment are stated as mean ± standard deviation (SD).

Result: The results indicated that various concentration of NaCl reduced the physical and biochemical parameters of mung plants when supplied without organic fertilizer. All treatments decreased shoot and root lengths, fresh and dry weights, leaf areas of experimental plants as compared to control. Maximum inhibitions were observed when treated with 100mM NaCl after 12 days of growth as compared to control. All biochemical parameters were also inhibited with the treatments of salt concentrations.

The inhibition in the physical and biochemical parameters of mung plants were decreased when different concentrations of salt applied with organic fertilizers as compared with control.

Conclusion: Decrease saline water practice, use desalted, rain-harvested water. Enhance organic matter and manure to retain moisture and decrease irrigation.

Keywords: Biochemical Parameters, Organic Fertilizers, Poor Irrigation Practices, Salinity Stress, Vigna Radiata.

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