

Integrative NPK soil and foliar application improves growth, yield, antioxidant, and nutritional status of *Capsicum annuum* L. in sandy soils under semi-arid condition

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Soils of arid and semi-arid environments are characterized by scant moisture conditions, low clay and organic matter contents, low water holding capacity and low inherent fertility, and hence various management practices including foliar fertilization is essential. The present study aims at assessing the effect of integrated soil and foliar application of nitrogen, phosphorus, and potassium (NPK) fertilizers on growth, yield, and contents of some osmoprotectants, antioxidant, and nutritional status of *Capsicum annuum* (L.) in sandy soil under semi-arid condition. A pot experiment was conducted with five NPK application treatments: 100% added to the soil 0% foliar spray, 75% soil 25% foliar spray, 50% soil 50% foliar spray, 25% soil 75% foliar spray, and 0% soil 100% foliar spray. The results of the study indicate that the integrated treatment of 50% soil 50% foliar spray proved to be the best treatment compared with other treatments. This treatment significantly increased growth components (leaf area plant⁻¹, shoot fresh and dry weights) and yield (number of fruits plant⁻¹, average fruit weight, and fruits weight plant⁻¹), and the contents of soluble sugars, free proline, and nutrients (NPK); while significantly reduced the contents of ascorbate and glutathione compared to other treatments, including the control. The combined treatment of 75% soil 25% foliar spray was the second-best treatment with respect to all tested parameters. The study concludes that the recommend integrated treatment of 50% soil 50% foliar spray minimizes nutrient loss and achieves higher growth and yield of pepper plants under semi-arid condition.