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Effects of Saline Groundwater on Crop Yield of Bitter-Gourd (Momordica charantia L.) under Drip System of Irrigation

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Abstract : Water scarcity has exacerbated in the last couple of decades; it is incumbent on agriculture to maximize the use of water of all qualities. The drip irrigation system practice has shown a vast increase in profit and research interests in the last two decades. However, the application of this system is still limited. The two years field experiment was conducted with three replications at Malir, Karachi (a semi-arid region) in Pakistan. The aim was to evaluate the effects of two qualities of irrigation water IT1 (EC 0.56 $dS.m^{-1}$) and IT2 (EC 2.89 $dS.m^{-1}$) on water use efficiency. To achieve the aim, bitter gourd was grown under the drip irrigation system in 2016-17. The uniformity co-efficient (UC) ranged from 93 to 96%. Water use efficiency, of 1.60 and 1.21 $kg.m^{-3}$ under IT1 was recorded higher in season 1 and 2. Using t-test at 5% significance level, the crop yield was higher in both seasons under IT1 compared to IT2. Using pairwise t-test at 5% significance level, the parameters related with the quality of fruit, like length, weight, and diameter, were higher in IT1 than IT2 in all plants; and in both seasons. A correlational study was also conducted to observe the trends in the variables associated with both irrigation treatments for the two seasons. Results showed that most of the parameters exhibited a similar linear trend in both the seasons. The study concluded that bitter gourd crop could be grown successfully in sandy loam using drip irrigation system, supplying saline ground-water. The sustainable use of saline irrigation water should be utilized for vegetable cultivation to meet the food demand in the rural areas of Pakistan.

Keywords : uniformity co-efficient, water use efficiency, drip irrigation, ground-water, t-test, correlation
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