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MINERAL NUTRITIONAL STATUS OF PLANTS OF A PUBLIC PARK UNDER LONG-TERM IRRIGATION
WITH TREATED SEWAGE EFFLUENT

by

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Date & Venue

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Abstract

Treated sewage effluent (TSE) is widely used for irrigation of public urban greenery in the UAE. This recycled water contains significant amounts of elements that can serve as nutrients for plants, but little is known about the long-term impact of TSE irrigation on the nutritional status of plants growing in urban parks and gardens.

In the present study, the Sulaimi Park in the center of Al Ain served as study site. The park is under exclusive TSE irrigation since several years. Based on element analysis of TSE samples and estimation of irrigation water supply rates, the total annual element intake into the park was estimated and compared with likely nutritional requirements of the present vegetation. The results revealed that significant amounts of nutritional elements are brought into the park with the TSE used for irrigation. These cover the N, K, Ca, Mg, Cu and Zn requirements of the existing vegetation. However, Na intake with the TSE was in a high range compared with K, requiring additional K input for equalization and prevention of Na toxicity and/or K deficiency in trees. The P intake was below required amounts, and a decline in P concentrations in the TSE was observed between 2020 and 2021. Additional P fertilization might thus be needed in the future to prevent P deficiency.

In accordance with calculations of element intake, the analysis of the plant nutritional status revealed that most plants had K/Na ratios below the recommended range for moderately salt tolerant species. Except for turfgrass, all analyzed plants showed low levels of P in their leaf tissues, confirming that additional P supply might be required to sustain sufficient supply.

Heavy metal concentrations in the analyzed TSE samples were in a very low range, and it is unlikely that TSE is a source of heavy metal contamination of public urban greenery. However, date palm leaves showed high levels of Ni, and turfgrass plants had elevated concentrations of Cd. Future studies will need to identify the sources of these contaminants.

Keywords: Treated sewage effluent; Irrigation; Date palm; Public park; Mineral nutrient budgets