

EFFECT OF LOW QUALITY IRRIGATION WATER ON SPINACH YIELD AND SOME SOIL CHEMICAL PROPERTIES

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ABSTRACT

The increasing demand for water in arid areas requires looking for secondary water resources for irrigation, and this is the main goal of this study. For this purpose, pot experiment was carried out in the experimental greenhouses of the soils Dept., Fac. of Agriculture, Mansoura Univ., Egypt during the winter season of 2007/2008 to assess the quality of different irrigation water resources, i.e. fresh water from the River Nile as the control treatment, groundwater, drainage water and blended drainage water with fresh water. This is to evaluate the effect of irrigation with these water resources on quantitative and qualitative yield characteristics of spinach (*Spinacia oleracea*), and soil chemical properties at the end of the experiment.

Results indicated that, the quality of irrigation water varied among the studied water resources, and the quality of the River Nile water was the highest. Consequently, it could be used for irrigating different field crops, with different soil conditions without any limitations. The SAR values of secondary water resources allow the irrigation in most soil conditions, but the sensitive plants for salinity, boron and chloride should be excluded from irrigation with the secondary water resources, even it was blended with fresh water.

Spinach yield quantity, chlorophyll content and nutrients concentration insignificantly decreased through irrigation with secondary water resources, whereas sodium concentration significantly increased.

On the other hand, soil salinity, soluble cations and anions were high significantly increased through irrigation with the secondary water resources, whereas soil pH was insignificantly increased.

Keywords: Irrigation; River Nile; Groundwater; Drainage water; Spinach; Soil chemical properties

INTRODUCTION

With increasing global population, the gap between supplies and demands for water is widening and is reaching such alarming levels that in some parts of the world it is posing a threat to human existence. For human life, water scarcity is not only about droughts or rivers running dry, above all, it is about guaranteeing the fair and safe access they need to sustain their lives and secure their livelihoods.

The River Nile is the main source of water in Egypt, with an annual allocated flow of 55.5 Pelion $m^3 yr^{-1}$ under the Nile Waters Agreement of 1959 between Egypt and Sudan. However, the Egyptian population has increased rapidly to reach about 70 million at the beginning of the year 2007, while the water income didn't change. Consequently, Egypt became under water poverty limit.

Egyptian scientists are working on new ways of conserving water and looking for additional water supplies, hence it is an opportune time, to refocus on the secondary water resources such as groundwater and drainage water.