

# EFFECTS OF TREATED WASTEWATER IRRIGATION IN LEMON TREE

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## ABSTRACT

Arid and semiarid countries are increasing the use of treated wastewater in agricultural irrigation, and thus the effects of treated wastewater in soils and plants must be studied. This research is focused on evaluating the effects of applying treated wastewater on citrus trees. Two experimental plots irrigated with two different treated wastewater effluents were compared. The experimental sites were located in Murcia, in the south-east of Spain. The first experimental plot was in Cartagena, in the south-east of Murcia, where the treated wastewater comes from a secondary treatment plant and the soil was a silt-loam. The second experimental plot is Campotejar, where the treated wastewater comes from a tertiary treatment plant and the soil was silt-clay. The climate conditions in both localizations were very similar. Soil, leaf, and water chemical and microbiological analyses were performed in order to detect the effects of reclaimed water use. Treated wastewater in Cartagena has high levels of Ca, Mg, K, P, S, B, and chlorides. The physical parameters pH, electrical conductivity (EC), turbidity and total dissolved solids (TDS), are higher in Cartagena's treated wastewater than in Campotejar's, which has higher levels of nitrates, sulphates and suspension solids (SS). High accumulation of K, Fe, P and some heavy metals like Ni, and Pb in Cartagena's soil were incorporated in the leaf mineral status, whereas high accumulation of chlorides in Campotejar's soil were reflected in this site's leaf mineral status. The microbiological analysis revealed an absence of E.Coli and helminth eggs in the treated wastewaters and soils, but in Cartagena's treated wastewater fecal coliforms exceeded health standards. The biomass yield was higher in Cartagena than Campotejar. Some negative effects were observed in the plants canopy due to salinity from the application of treated wastewater.

### Keywords:

treated wastewater  
reuse, irrigation, plant  
and soil effects