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Use of Treated Municipal Wastewater on Artichoke Crop

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Abstract : Results of a field study carried out at Trinitapoli (Puglia region, southern Italy) on the irrigation of an artichoke crop with three types of water (secondary-treated wastewater, SW; tertiary-treated wastewater, TW; and freshwater, FW) are reported. Physical, chemical and microbiological analyses were performed on the irrigation water, and on soil and yield samples. The levels of most of the chemical parameters, such as electrical conductivity, total suspended solids, Na+, Ca2+, Mg+2, K+, sodium adsorption ratio, chemical oxygen demand, biological oxygen demand over 5 days, NO3 –N, total N, CO32, HCO3, phenols and chlorides of the applied irrigation water were significantly higher in SW compared to GW and TW. No differences were found for Mg2+, PO4-P, K+ only between SW and TW. Although the chemical parameters of the three irrigation water sources were different, few effects on the soil were observed. Even though monitoring of Escherichia coli showed high SW levels, which were above the limits allowed under Italian law (DM 152/2006), contamination of the soil and the marketable yield were never observed. Moreover, no Salmonella spp. were detected in these irrigation waters; consequently, they were absent in the plants. Finally, the data on the quantitative-qualitative parameters of the artichoke yield with the various treatments show no significant differences between the three irrigation water sources. Therefore, if adequately treated, municipal wastewater can be used for irrigation and represents a sound alternative to conventional water resources.

Keywords : artichoke, soil chemical characteristics, fecal indicators, treated municipal wastewater, water recycling
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