

Effect of irrigation by domestic wastewater on quantity and quality characteristics of safflower (*Carthamus tinctorius* L.), alfalfa (*Medicago sativa* L.) and rose (*Rosa hybrida* L.) under lysimeter conditions

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Summary

In order to determine the effect of irrigation by domestic wastewater on quantity and quality characteristics of safflower (*Carthamus tinctorius* L.), alfalfa (*Medicago sativa* L.) and rose (*Rosa hybrida* L.) under lysimeter conditions, this experiment was carried out in Iran at Varamin. In experimental field were 15 lysimeters, on which were cultivated safflower (*Carthamus tinctorius* L.) in 1 to 5 lysimeters and irrigated by domestic wastewater and primary drainage water were accumulated. On the 6 to 9 lysimeters were cultivated alfalfa (*Medicago sativa* L.) and irrigated by primary drainage water and then, secondary drainage water were accumulated. On 10, 11 and 12 lysimeters were cultivated rose (*Rosa hybrida* L.) and irrigated by secondary drainage water. In order to compare plants characteristics, in 13, 14 and 15 lysimeters were cultivated safflower (*Carthamus tinctorius* L.), alfalfa (*Medicago sativa* L.) and rose (*Rosa hybrida* L.) and irrigated by fresh water. The results showed that plant height, Boll number, seed number in Boll, seed yield and biological yield in Safflower increased with domestic wastewater in ratio to fresh water. Protein percentage reached from 17.9 to 19.2 percent but oil percentage reduced from 28.4 to 27.3 percent. The use of primary drainage water in alfa alfa increased dry weight yield, Protein percentage (from 15.8 to 17.4 percent) and plant height. As finally stem number and length after harvesting of Rosa increased with secondary drainage water. Quantity and quality characteristics of safflower, alfalfa and rose were improved under irrigation by secondary drainage water in comparison to irrigation by fresh water. The applied effluent contained higher levels of Na, Cl, HCO₃⁻¹, P, K, NH₄⁺¹, NO₃⁻¹, Ca+Mg, B, Mn, and Fe than the local potable water used as a control and reduced in primary and secondary drainage water, that were characterized by higher values of electrical conductivity (EC), pH, and sodium absorption ratio (SAR).

Key words: Domestic wastewater, safflower (*Carthamus tinctorius* L.), alfalfa (*Medicago sativa* L.), rose (*Rosa hybrida* L.).