Salinity and specific ion effects on onion establishment in relation to disposal of desalting concentrates

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ABSTRACT

Concentrate from nanofiltration (NF) is usually enriched with divalent ions, and low in proportions of monovalent ions. Therefore, its disposal to irrigation water may not be deleterious, especially for growing crops susceptible to specific effects of Na and/or Cl. This possibility was examined in a greenhouse by observing effects of four levels of salinity and ion composition of irrigation solutions on seedling emergence and growth of onions (sensitive to Cl ions) in loamy sand and silt loam. Seedling emergence from surface-irrigated loamy sand was excellent, regardless of the saline solutions used. In subirrigated silt loam, however, seedling emergence was reduced by increasing initial soil salinity and salinity of irrigation solutions, but not by the ion composition. Seedling growth was reduced by increasing Cl to SO\textsubscript{4} ratio only when the Cl concentration of irrigation solutions exceeded a concentration between 10 and 20 me L\textsuperscript{-1}. The Cl effect seems to appear after seedling growth is first reduced by salinity. The addition of Ca and SO\textsubscript{4} to the irrigation solution reduced seedling growth. The disposal of NF concentrates into irrigation water, and associated impacts on establishment of crops sensitive to osmotic stress should be evaluated mainly by considering an increase in salinity, soil types, and cultural practices.

Keywords: Concentrate disposal; Desalting; Irrigation; Nanofiltration; Onion; Salinity

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