

# Amending Sand with Isolite and Zeolite under Saline Conditions: Leachate Composition and Salt Deposition

1. [Y.L. Qian](#),
2. [A.J. Koski](#) and
3. [R. Welton](#)

## ± Author Affiliations

1. *Department of Horticulture and Landscape Architecture, Colorado State University, Fort Collins, CO 80523-1173*

## Abstract

Understanding the possible influence of inorganic soil amendments on salt leaching and deposition is helpful in selecting soil amendments when salinity is a problem. Greenhouse experiments were conducted to: 1) evaluate the effects of isolite and zeolite on turf quality of Kentucky bluegrass (*Poa pratensis* L.) under three salinity levels; and 2) determine if soil amendments affected leachate composition, salt deposition, and soil sodium absorption ratio (SAR). 'Challenger' Kentucky bluegrass was grown in columns filled with 100% sand, 50 sand: 50 isolite, and 50 sand: 50 zeolite (v/v). Irrigation waters with three levels of salinity [0.25 (control), 3.5, or 6.5 dS·m<sup>-1</sup>] were applied daily for 3 months in Study I and for 6 months in Study II. Saline water reduced turf quality compared with control. Amendment of sand with isolite increased turf quality only during the third month of treatment with the most saline water in Study I. However, zeolite increased turf quality during both the second and third months at both salinity levels in both studies. The beneficial effects of zeolite on turf quality diminished 5 and 6 months after salinity treatments. Amending sand with zeolite reduced leaching of Na<sup>+</sup> and K<sup>+</sup>, but increased the leaching of Ca<sup>2+</sup> and Mg<sup>2+</sup>. Amending sand with zeolite increased SAR values by 0.9, 1.6, and 6.3 units in Study I and 0.9, 3.6, and 10.9 units in Study II, under control, 3.5, and 6.5 dS·m<sup>-1</sup> salinity treatments, respectively. Isolite increased SAR by 1.1-1.6 units with 3.5 dS·m<sup>-1</sup> and by 2.5-3.5 units with 6.5 dS·m<sup>-1</sup> salinity treatments. Results indicate that amending with zeolite may buffer soil solution Na<sup>+</sup> concentration in the short-term. In the long-term, however, a substantial amount of Na<sup>+</sup> may be retained concurrent with Ca<sup>2+</sup> and Mg<sup>2+</sup> exchange, thereby increasing sodicity and salinity problems.