

Growth, ion contents and photosynthesis of salt-sensitive and less salt-sensitive cucurbits treated with silicon

ABSTRACT

A study was carried out to evaluate the role of silicon in alleviating NaCl salinity effects on both salt-sensitive (cucumber) and less salt-sensitive (bitter gourd) cucurbit. The species were subjected to two levels of NaCl (0, 50 mM) and three silicon concentrations (0, 50, 100 mg L⁻¹ sodium silicate) and data on growth, Na and Cl concentration of leaves, net photosynthesis (P_n) and stomatal conductance (g s) were collected. When treated with 100 mg L⁻¹ silicon, growth of salt-stressed and non-salt stressed plants for both species was significantly improved, with more beneficial effects recorded on the salt-stressed plants and salt-sensitive species. Plants treated with 50 mg L⁻¹ silicon had 11.11% significantly lower Na⁺ ion in leaf compared to 0 mg L⁻¹ silicon, regardless of species and salinity condition. Treatment of silicon at 100 mg L⁻¹ also significantly increased net photosynthesis and stomatal conductance by 12.13 and 30.14%, respectively. However, no significant beneficial effect of silicon in reducing Cl concentration was recorded. In conclusion, application of silicon can alleviate salinity stress in both salt-sensitive species (cucumber) and less salt-sensitive species (bitter gourd) by reducing sodium toxicity and increasing photosynthetic activity which evident in improvement of growth parameters.

Keyword : Salt stress; Silicon; Cucurbitaceae