

Effects of NaCl salinity on leaf water status, proline and mineral ion content of four Cucurbitaceae species

ABSTRACT

Members of Cucurbitaceae are salt-sensitive plants and continuous fertilization without sufficient leaching may create saline environment that consequently reduce their growth and yield. A study was carried out to evaluate the physiological responses of four selected Cucurbitaceae species to NaCl salinity stress. Four types of Cucurbitaceae viz. cucumber (*Cucumis sativa*), squash (*Cucurbita moschata*), bitter melon (*Momordica charantia*) and bottle melon (*Lagenaria siceraria*) were subjected to four levels of NaCl (0, 25, 50, 75 mM) and data on leaf relative water content, proline content and concentration of Na⁺ and Cl⁻ for leaf, stem and root were collected. Given that the dominant salt in saline soils is NaCl, both Na⁺ and Cl⁻ ions will occur naturally in high concentrations. However, degree of increment was different between species. As salinity levels increased from 0 to 75 mM, Na⁺ concentrations in roots in bitter melon had the highest increase; while in leaf had the lowest increase compared to other species. Increment of Cl⁻ in leaf, stem and roots was the lowest in bitter melon and highest in cucumber. Increase of proline content in cucumber was 3.55 times higher compared to control whereas in squash, bottle melon and bitter melon, the increase were respectively 2.00, 1.47 and 2.03 higher compared to their respective control. Proline content in cucumber was negatively correlated with relative water content, RWC ($r = -0.83$, $p \leq 0.01$), whereas in other species no correlation was recorded. In conclusion, based on Na and Cl ion concentration, RWC and proline content, bitter melon was least salt-sensitive while cucumber was most salt-sensitive Cucurbitaceae species.

Keyword: Salinity stress; Osmotic stress; Ionic stress; Proline; Salt tolerance; Cucurbitaceae