

Influence of salinity and supplementary calcium on vegetative growth, fruit yield and concentration of some nutrients in hydroponically-grown strawberry

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Abstract

Optimum level of calcium (Ca) in saline soils is a critical factor in controlling the toxic effect of some ions, especially in plants sensitive to sodium (Na) and chlorine (Cl) damage. To evaluate the effect of salinity and supplementary calcium (S-Ca) on vegetative growth, fruit yield and concentration of some nutrients in roots, shoots, and fruits of strawberry (*Fragaria ananassa* Duch) cv. Selva, a greenhouse experiment was carried out in 5×3 factorial experiment arranged in a completely randomized design with three replications. Treatments included three levels of salinity (0, 20, and 40 mM as NaCl) and five levels of supplementary Ca (0, 5, and 10 mM added to nutrient solution, 0.5 and 1% foliar application as CaCl₂). The results showed that addition of NaCl to nutrient solution, negatively affected root and shoot dry weight and fruit fresh weight. Reduction of shoot dry weight and fruit fresh weight were higher than those of roots. Application of S-Ca not only did not improve the vegetative growth and fruit yield, but rather decreased them. Salinity (NaCl) treatments increased the concentration of Na in roots, shoots and fruits but application of 5 and 10 mM S-Ca levels decreased Na concentration in roots. By addition of NaCl to nutrient solution, the shoot Ca concentration was decreased in some treatments, but roots and fruits' Ca concentration was not affected. Application of S-Ca increased Ca concentration in all organs of strawberry plants. By application of NaCl, potassium (K) concentration was decreased in roots, but increased in fruits and was not affected in shoots. K concentration did not change in roots in the S-Ca applied treatments, but decreased in shoots and increased in fruits. Simultaneous application of salinity and S-Ca decreased roots' magnesium concentration in all treatments and shoots and fruits' concentration in some treatments. In general, although supplementary Ca increased its concentration in different plant organs, but was not effective in alleviation of the negative effects of salinity on vegetative growth and fruit yield of strawberry plants.

Keywords: Strawberry, Soilless culture, Sodium chloride, Macro nutrients.

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