Effects of different substrates and salinity on growth and yield of broccoli (*Brassica oleracea* var. italica) in soilless culture

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Abstract

Salinity is a very serious problem for agricultural development, especially in arid and semi-arid regions. On the other hand, many benefits of soilless culture have caused the expansion of these systems in these areas. In this research, in order to investigate the effects of different substrates and salinity stress on physiological characteristics and yield of broccoli, an experiment was conducted as factorial, in which the main factor was substrate (cocopeat, perlite, sand, 25% cocopeat+75% perlite, 25% perlite+75% cocopeat and 50% peat+50% pumice) and the sub factor was salinity stress (0, 100 and 150 mM NaCl) with 4 replications. Results indicated that substrate, different levels of salinity and their interaction had significant effects on morphological characteristics, days to flowering, fresh and dry weight of leaves, nutrients concentration and weight of the broccoli head. Maximum values of the aforementioned factors were observed in the zero salinity level and 50% peat+50% pumice substrate. This means that substrate can be effective on the effect of salinity on plants. High levels of salinity caused a reduction in growth and yield of broccoli and this growth reduction was accompanied by the reduction of chlorophyll and content of Ca, K, and Fe and increased Na and Cl concentration in leaf tissue. The best growing medium, either in saline or non-saline conditions, was 50% peat+50% pumice. Although broccoli growth was not suitable in perlite medium, this substrate caused its early maturing. In this experiment, salinity treatment reduced the head weight of broccoli, in addition to decreasing the quality of yield. According to the results, 50% peat+50 pumice is recommended as a proper substrate for production of broccoli.

Keywords: Salinity stress, Substrate, Pumice, Perlite.

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