

High Quality Tomato Production by a Suitable Application of the Concentrated Deep Seawater

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The deep seawater is a profitable natural resource with the stable advantages of low temperature, nutrient-rich and purity which have been applied to many kinds of industries and products. In the processes producing articles such as mineral-enriched table salt and drinking water from the deep seawater, the concentrated deep seawater has been abundantly discharged, which is highly enriched in not only Na but useful minerals such as Mg, K and Ca etc. Therefore, the concentrated deep seawater is expected to be applicable to the production of high quality tomatoes enriched in sugar, acid, minerals and other useful compounds. The present study deals with a suitable application of the concentrated deep seawater to tomato production on the basis of physiological analyses of phloem transport to fruits, root absorption, leaf gas exchange and fruit quality.

In the NFT system, the short-term salt stress was induced by applying the concentrated deep seawater. For only two weeks at the stage of rapid fruit growth, electric conductivity (*EC*) of the nutrient solution in the NFT beds was increased to 13.5 dSm^{-1} by adding the concentrated deep seawater to the standard nutrient solution with an *EC* of 1.2 dSm^{-1} . Physiological effects of the short-term salt stress with the concentrated deep seawater were analyzed with special reference to expression of the osmoregulation in phloem transport to fruits by applying the newly developed method to evaluate fluxes and concentrations of soluble solids in phloem sap.

From the physiological analyses, it was verified that the short-term salt stress treatment with the concentrated deep seawater at the stage of rapid fruit growth can induce the osmoregulation in phloem transport and results in production of high quality tomatoes enriched in sugar, acid, minerals and good flavor without occurrence of extremely small-sized fruits and blossom-end rot.