

Effect of Salt on the Organic Acids and Proteins of Tomato Root

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Abstract

Tomato is a salt-tolerant crop. However, its physiology on salt-tolerance has not been clearly understood. The purposes of this research are conducted to evaluate changes of organic acids and proteins in tomato grown in environment of different NaCl concentrations and to provide a reference for improving crops cultivated in salt polluted environment. Tomato was cultivated in hydroponic solution separately at 0, 0.25% and 0.5% NaCl for two weeks. Then the roots were extracted for analyses of organic acids and proteins in order to understand the salt effects on root secretion of organic acids and proteins in roots. Compared with 0 and 0.25% NaCl treatment, the roots in 0.5% NaCl apparently secreted more oxalic acid, malic acid and fumaric acid, and 10 proteins in which P69C, Cytochrome P450 proteins, Luciferase protein, phototropin-1 and Retrotransposon gag protein, showed upregulated effects on salt tolerance, so that root growth was not inhibited. However, there were some proteins were inhibited. ATP synthase beta subunit protein might provide root respiration in the TCA cycle, in which citric acid and succinic acid were quickly converted to malic acid, fumaric acid and oxalic acid resulting in their large accumulation. Among the proteins which was inhibited by 0.5% NaCl, TNF receptor-associated factor (ISS) and pr1-like protein were secreted less than they were in 0 and 0.25% NaCl solutions. This will require further investigation. This research confirms that tomato grown in different NaCl concentration environments, its root will produce different organic acids and proteins whose salt-tolerance mechanisms require further investigation.

Key words: Tomato; Salt tolerance; Physiology; Organic acids; Proteins

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