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Root Osmotic Adjustment under Osmotic Stress in Maize Seedlings. 2. Mode of Accumulation of Several Solutes for Osmotic Adjustment in the Root

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Abstract: The changes in the accumulation of compatible solutes in the seminal root and leaves of maize were examined under four osmotic stress conditions to elucidate the expression pattern of osmotic adjustment. Maize seedlings were exposed to different intensities of osmotic stress for 1, 3, 5, 10, and 20 minutes, and 2, 6, 12, and 24 hours using polyethylene glycol 6000. Segments were obtained from the elongating zone of the root, elongated zone of the root and mature part of leaves. The concentrations of potassium ion and some amino acids under osmotic stress began to increase within 20 minutes after the onset of stress treatment in the root elongating zone. From hour 2, reducing sugars contributed mainly to the change of osmolarity. The amino acids that responded most quickly to the osmotic-stress treatment were Asp, Glu, Asn and Thr, which started to increase within 20 minutes, followed by Ser and Ala, which increased from hour 2 to 6, and Pro which increased from hour 12 to 24. Moreover, in the roots at hour 24, the proportion of potassium ion to total solutes decreased with the increase in the stress intensity. The proportion of amino acids to total solute in the root elongating zone was higher in the -0.13 MPa treatment group and that of the reducing sugars in the root elongated zone was higher in the -0.13 MPa and -0.41 MPa treatment groups than in the -0.08 and -0.89 MPa treatment groups. These results suggested that the kinds of solutes that contributed to osmotic adjustment differed depending on the duration and intensity of osmotic stress.

Keywords: [Amino acid](#), [Osmotic adjustment](#), [Osmotic stress](#), [Potassium ion](#), [Reducing sugars](#), [Root](#), [Zea mays L.](#)

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