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Sucrose Metabolism for the Development of Seminal Root in Maize Seedlings

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Abstract: The objective of this study was to elucidate the roles of sugar in the formation of root systems. Several parts of the seminal root were investigated to determine their sucrose, glucose and fructose contents, and the activity and the *in situ* localization of the activities of two kinds of metabolic enzymes, invertase and sucrose synthase, which hydrolyze sucrose. The sucrose, glucose and fructose concentrations in the 0-1 cm section from the root apex were three to five times those in the other sections. The invertase and sucrose synthase activities were also higher in the apical section. The *in situ* localization of invertase activity was detected in the cell elongation zone of the seminal root using histochemical method. The sucrose synthase activity was detected in the cell elongation zone of the seminal root and the root apices of lateral roots. These results suggested that sucrose is transported to the root elongation zone and the surrounding tissue of the lateral root primordia, and is cleaved into glucose, fructose, and UDP-glucose by invertase or sucrose synthase. This suggested that sucrose contributes to root formation by serving as the energy source, the carbon source for cell wall synthesis, and as a compatible solute for cell elongation.

Keywords: [Enzyme localization](#), [Fructose](#), [Glucose](#), [Invertase](#), [Root development](#), [Sucrose](#), [Sucrose synthase](#), [Zea mays](#)

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