

REGULATION OF NITRATE REDUCTASE ACTIVITY IN COTTON ROOTS

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Abstract

The induction of nitrate reductase activity in root tips of cotton (Gossypium hirsutum L.) was sensitive to several amino acids and to ammonium. Glycine, glutamine, and asparagine strongly inhibited induction by nitrate. Many other amino acids either weakly inhibited induction or had no effect. Ammonium also decreased induction in root tips at high pH. Aspartate and glutamate strongly stimulated induction, but the physiological significance of this response is unknown. The amino acid effects on induction of nitrate reductase activity were independent of nitrate uptake. These results were in contrast to those obtained with green cotyledons or leaf discs, in which no regulation by reduced nitrogen compounds could be demonstrated. The differential regulation of activity in shoots and roots provides a scheme to account for the relationship between plant nitrogen status and the division of nitrate reductase activity between shoot and root.