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## Effects of Anoxia on Amino Acid Levels in Rice Coleoptiles

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**Abstract:** Effects of anoxia on the levels of free-amino acids were investigated in the coleoptiles of rice (*Oryza sativa* L.) seedlings. Rice coleoptiles are able to grow in extremely low oxygen conditions. Anoxic stress increased the concentration of total free-amino acids in the coleoptiles. Alanine (Ala) and  $\gamma$ -aminobutyric acid (Gaba) were the main amino acids accumulated. After 48 h, Ala and Gaba concentrations in anoxic coleoptiles were 3.4- and 11.2-fold greater than those in non-stressed coleoptiles, respectively. Ala and Gaba represented 19 and 23 % of the amino acid pool in anoxic coleoptiles, respectively. Submergence stress also increased Ala and Gaba concentrations in rice coleoptiles. Since Ala and Gaba are bio-compatible solutes and their accumulation is known to stabilize osmotic potential and/or cytoplasmic pH in plant cells, these stress-induced amino acids may allow rice coleoptiles to make biochemical adjustment that enable them to cope with the stress conditions. Therefore, the ability to increase the concentrations of Ala and Gaba may be important for anoxic and submergence stress tolerance of rice seedlings.

**Keywords:** [alanine](#), [amino acid](#),  [\$\gamma\$ -aminobutyric acid](#), [anaerobiosis](#), [anoxia](#), [fructose](#), [glucose](#), [Oryza sativa](#) L.

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