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Rice Cultivars with Higher Sucrose Synthase Activity Develop Longer Coleoptiles under Submerged Conditions

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Abstract: Sucrose synthase, which catalyzes uridine diphosphate (UDP)-dependent cleavage of sucrose into fructose and UDP-glucose, is induced by oxygen deficiency in rice seedlings and is considered to play an important role in energy production under hypoxic conditions. In this study, we analyzed the relationship between coleoptile elongation and sucrose synthase activity in rice (*Oryza sativa* L.) cultivars under submerged conditions. We also analyzed the activity of α -amylase, which digests starch reserves in the endosperm and is considered to be important for energy production in young seedlings. The results indicated that different rice cultivars had different sucrose synthase and α -amylase activities under submerged conditions. Moreover, sucrose synthase activity in whole seedlings was significantly correlated with coleoptile length under submerged conditions, whereas the correlation between α -amylase activity and coleoptile length was low. Sugar content of shoots differed with the cultivar. Correlation analysis demonstrated that sucrose content was highly correlated with coleoptile length and sucrose synthase activity, but not with α -amylase activity.

Keywords: [\$\alpha\$ -Amylase](#), [Coleoptile length](#), [Rice \(*Oryza sativa* L.\)](#), [Submergence](#), [Sucrose synthase](#)



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