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A rice mutant with a T-DNA insert deficient in acyl-coA oxidase activity

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Acyl-CoA oxidase (ACX) catalyzes the first reaction of β-oxidation in plant peroxisomes and glyoxysomes and is responsible for the conversion of reserve oil to sucrose during germination and subsequent seedling growth in higher plants. We analyzed a rice T-DNA inserted mutant of ACX (*acx1*) and demonstrated that storage lipids also play an important role in seedling growth of rice, which is a non-oil seed plant. Sequencing of the T-DNA insertion site confirmed that it interrupted the 5'-UTR region. Comparison of phenotypes of the wild type (WT) and the mutant revealed that organogenesis of *acx1* was processed later than that of wild type from seed germination to stem and root formation. The growth of *acx1*seedling was enhanced by sucrose addition in the medium, while that of WT was normal regardless of the presence or absence of sucrose. The mutant was resistant to 2,4-dichlorophenoxybutyric acid, which otherwise would be converted to 2,4-D by ACX activity and inhibit root elongation. The use of specific fatty acid molecules of the storage lipids will be discussed on the basis of gas chromatographic analysis.

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