Tissue Specific Expression of α-amylase and Proteinase Genes in Germinating Water Spinch Seeds (*Ipomoea aquatica* Forsk)

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ABSTRACT

Differential expression of α-amylase and proteinase genes in relation to the physiological function of different tissues in the seed of water spinach during germination were studied. High levels of α-amylase activity and its mRNA were detected in the endosperm of 0.5 day germinating seeds, but both of them decreased rapidly during germination. This enzyme and its mRNA are most likely to have been produced during seed maturation. Unlike endosperm, α-amylase mRNA was not detectable in either cotyledon or embryo axis during seed germination. These results indicate that the α-amylase genes are repressed in all tissues of water spinach seed during the observed period of germination. Similarily, proteinase mRNAs in the tissues of endosperm and embryo axis also decrease rapidly during germination, although the proteinase gene expresses in the germinating cotyledon.

The activities of α-amylase in endosperm and cotyledon were not affected by treatment of either benzyladenine or gibberellic acid. A temporary increase in proteinase activity was observed by treatment with benzyladenine in germinating cotyledon which might be concerned with the growth and development of the tissue. Southern blot analysis indicates that the genome may contain a single copy for both α-amylase and proteinase genes.

Key words: Seed germination, α-amylase, Proteinase, Gene expression

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