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Molecular cloning and characterization of three cDNAs encoding peroxidase from fibrous root of sweetpotato treated with drought stress

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Objectives

Plant possess a large set of the class III peroxidase (POD E.C. 1.11.1.7). It have been known that plant POD exist as a large family of isoenzyme such as 73 genes of arabidopsis genome and 112 genes of rice genome. Therefore, roles of diverse POD isoenzyme have been implicated in broad range of physiological processes. In the previous studies, ten cDNAs for six anionic (*swpa1-6*), three basic (*swpb1-3*) and one neutral (swpn1) PODs were isolated from suspension cultures of sweetpotato, and their expression was investigated with a view to understand the physiological function of PODs in terms of environmental stresses. In this study, we have cloned three new POD genes from fibrous root of sweetpotato treated with dehydration stress. To analyze the roles of three POD genes in adaptation to stress in sweetpotato, it's expression level were examined under various abiotic stresses.

Materials and Methods

1. Material: Sweetpotato (*Ipomoea batatas* L. Lam. cv. White star) plant.
2. Contruction of cDNA library:
   -mRNA from dehydration treated fibrous root of sweetpotato.
3. Methods: cDNA library screening, expression analysis by northern blot and RT-PCR

Results and Discussion

Three new POD genes (*swpa7, swpb4* and *swpb5*) were isolated from fibrous root of sweetpotato treated with dehydration stress by cDNA library screening. They could be divided into two groups, one anionic and two basic POD on the basis of pI values of mature proteins. *Swpa7* and *swpb5* had signal sequences for targeting to endoplasmic reticulum (ER) membrane and extra cellular compartment, respectively. The amino acid sequences of three PODs showed 40-50% homology between them, and they had three highly conserved domains which are common to all plant PODs. The expression levels of three PODs under drought stress condition were analyzed to identify it's roles in adaptation to drought stress on the basis of isoenzyme.

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