

Abstract

Project Code: MRG5080119**Project Title:** mRNA differentially display in leaf and storage root of *Manihot esculenta* Crantz**Investigator:** Dr. Punchapat Sojikul

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Cassava (*Manihot esculenta* Crantz) is an important food crop in Thailand for exporting and utilizing in starch processing industries. The different starch compositions, granule size, and crystalline structure were observed in cassava root that harvested at different ages. Gaining information in the groups of gene expression at different stages of storage root development would lead to the thorough understanding of genes involving in controlling; the storage root formation & development, starch biosynthesis, and crystalline formation. To unravel genes associated with storage root formation, cDNA-Amplified Fragment Length Polymorphism (cDNA-AFLP) was employed. The gene expression profiles were compared among fibrous roots and storage roots (cortex and parenchyma) of cassava cultivar Kasetart 50 (KU 50) at different developmental stages and the expression profiles of leaf were used as a control. From 64 primer combinations, 100 transcript-derived fragments (TDFs) were sequenced, characterized, and then classified into 11 groups by their functions based on deduced amino acid sequences. The 3 main groups were: no similarity (26%), cellular metabolism and biosynthesis (18%) and hypothetical or unknown protein (15%). The differential expressions of 5 storage roots specific TDFs were confirmed by semi-quantitative RT-PCR on 12 week-old wet crop samples: TDFD82 (sulfite reductase), TDFD83 (calcium-dependent protein kinase), TDFD102 (mitotic checkpoint protein), TDFD106 (*ent*-kaurene synthase) and TDFD154 (hexose transporter). They exhibited significant expression in storage roots especially in the initiation and early developmental stages. TDFD106 and TDFD154 may involve in transiently induction of TDFD83 expression, which might play important role in signaling pathway of storage root initiation. TDFD82 potentially played role in cyanide detoxification, which may lead to biosynthesis of aspartate that involved in storage root development. TDFD102 might involve in maintaining genomic DNA integrity via mitotic checkpoint mechanisms during cell division especially at the storage root initiation stage. The full-length gene of these 5 TDFs will be cloned for further functional analysis.

KEY WORDS: CASSAVA / cDNA-AFLP / MANIHOT ESCULENTA / STORAGE ROOT DEVELOPMENT