Isolation, cloning, and sub-cellular localization of transketolase from Amaranthus tricolor L.

ABSTRACT

Transketolase (TK) is one of the key enzymes that involved in the Oxidative Pentose Phosphate Pathway (OPPP), and produce erythrose-4-phosphate which is the precursor for many secondary metabolites such as aromatic amino acids, lignin and flavonoid. The OPPP is composed of two functionally-connected phases, the oxidative and non-oxidative phase. The complete OPPP is localized in cytosol of animal and prokaryotic. However, in plant, the first phase is localised in cytosol but the sub-cellular localization of the second phase of OPPP is still under debate. There is no study available on transketolase in Amaranthus tricolor till to day? Therefore, the objectives of study are to isolate TK gene from Amaranthus tricolor, to compare its identity with other plant species and to determine its sub-cellular localization. The full length of 2021bp nucleotide sequence of TK had been isolated from A. tricolor by RT-PCR. ClustalW revealed that A. tricolor TK sequences showed high similarity (more than 81 %) within plants' other species. Subcellular localization by using TargetP 1.1 and ChloroP revealed that of A. tricolor TK was located in the plastid. Thus it can be concluded that the OPPP is incomplete in the cytosol.

Keyword: A. tricolor; Transketolase; Oxidative pentose phosphate pathway; Subcellular localization.