Isolation, similarity and subcellular localisation of transaldolase from sugarcane (Saccharum officinarum)

ABSTRACT

This study focused on isolation, cloning of TAL from sugarcane. Transaldolase is one of the enzymes of the Pentose Phosphate Pathway (PPP). Transaldolase in non-oxidative phase of OPPP transfer a three carbon dihydroxyacetone moiety from sedoheptulose-7-phosphate and glyceraldehyde-3-phophate to produce Erythrose-4-Phophate (E4P) and fructose-6-phophate. E4P is the precursor for many secondary metabolic pathways including aromatic amino acids, lignin and flavonoid synthesis. Earlier studies revealed that OPPP is incomplete in the cytosol of plants as no genes encoding for a cytosolic TAL. Moreover, there is no study about the TAL genes from sugarcane until to date. Thus, the objective of this study is to isolate TAL gene from sugarcane, to compare its similarity with other plants, to determine its subcellular localization. A total of 1601 bp of TAL has been isolated by PCR. Similarity, studies by ClustalW revealed that TAL show highest similarity (75%) with Zea mays. Analysis of subcellular localization by using Target 1.1 revealed that of TAL from sugarcane was not located in the plastidic.

Keyword: The oxidative pentose pathway; Transaldolase; Subcellular localisation; E4P; TAL gene.