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Molecular characterization and expression of cytosolic OASTL control cysteine metabolism in *Mimosa pudica* L.

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Abstract

In plants, cysteine(Cys) is decisive for protein and glutathione that acts as an indispensable sulfur grantor for methionine and many other sulfur containing secondary products. Cys formation is involved in the consecutive two reactions using two enzymes-serine acetyl transferase (SAT) and O-acetylserine (thiol)lyase (OASTL) and appeared in plant cytosol, chloroplast and mitochondria. OASTL is able to produce mimosine with 3-hydroxy-4-pyridone (3H4P) in lieu of H_2S for Cys. In this report, we describe the first time cloning, purification and characterization of cytosolic(cy)OASTL from *M. pudica* and its expression in *Escherichia coli* and try to find out the cross link between this OASTL and the mimosine formation and to elucidate the metabolic role of cy-OASTL in *M. pudica*. The purified recombinant protein was 34.7 KDa. The optimum reaction pH and temperature was 6.5 and 50^0C, respectively. The Michaelis constant (Km) and the Vmax value of the enzyme was 252±25 µM and 57±3 µM cysteine min^{-1}µg $protein^{-1}$for sulfide and 159±21 µM and 58±2.4 µM cysteine min^{-1}µg $protein^{-1}$for OAS subsequently. After cleaving the His-tag, we tried to observe cy-OASTL to form mimosine with appropriate substrate but it was not successful. It may be concluded that cy-OASTL of the present study is only Cys specific, not mimosine.

Keywords: non protein amino acids, mimosine, cysteine, O-acetylserine (thiol) lyase

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