

Table 1 Biochemical properties functions of plant PAPs

Protein	Species	Optimum substrate	Function	Subcellular localization	Reference
<i>AtPAP2</i>	<i>Arabidopsis thaliana</i>	Undetected	Carbon metabolism	Chloroplast, plasma membrane and mitochondria	(Sun et al., 2012a)
<i>AtPAP10</i>	<i>Arabidopsis thaliana</i>	Adenosine triphosphate	Primary wall synthesis	Root surface bonding	(Wang et al., 2014)
<i>AtPAP12</i>	<i>Arabidopsis thaliana</i>	Phosphoenolpyruvate	Phosphorus metabolism	Secretion	(Wang et al., 2014)
<i>AtPAP15</i>	<i>Arabidopsis thaliana</i>	Phytate	Response to abiotic stress	Undetected	(Zhang et al., 2008)
<i>AtPAP25</i>	<i>Arabidopsis thaliana</i>	Phosphoamino acids and Phosphoproteins	Phosphorus metabolism	Cell wall	(Del Vecchio et al., 2014)
<i>AtPAP26</i>	<i>Arabidopsis thaliana</i>	Phosphoenolpyruvate	Phosphorus metabolism	Vacuole and cell wall	(Vasko et al., 2006)
<i>GmPAP3</i>	<i>Glycine max</i>	Undetected	Response to abiotic stress	Mitochondrion	(Li et al., 2008)
<i>GmPAP4</i>	<i>Glycine max</i>	Phytate	Response to abiotic stress	Plasma membrane or cytoplasm	(Kong et al., 2014)
<i>TaPAPhyb1</i>	<i>Triticum aestivum</i>	Phytate	Response to abiotic stress	Plasma membrane	(Zhao et al., 2013)
<i>NtPAP12</i>	<i>Nicotiana tabacum</i>	Phosphotyrosine peptide	Primary wall synthesis	Cell wall	(Kaida et al., 2010)
<i>PvPAP3</i>	<i>Phaseolus vulgaris</i>	Adenosine triphosphate	Phosphorus metabolism	Plasmalemma and apoplast	(Liang et al., 2010)
<i>CaPAP7</i>	<i>Cicer arietinum</i>	Phytate	Response to abiotic stress	Cytoplasm	(Bhadouria et al., 2017)