

(a)									
<i>CsATG8e</i>	MAKSSFKSEHLERRQAEASRIE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	--GAEKAIFFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGSI--	119				
<i>AtATG8a</i>	MAKSSFKINPLEARMSESSRIE	KYPRIPVIVEKAGQSDVPIDKKKYL	PADLTVGQFVYVVRRIKL	--GAEKAIFFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGSLTV[1]	122	85.25%			
<i>AtATG8b</i>	MEKNSFKLNPLEMRMAESTIRIA	KYPERVPVIVEKAGQSDVPIDKKKYL	PADLTIGQFVYVVRRIKL	--GAEKAIFFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGGSFY[1]	122	79.51%			
<i>AtATG8c</i>	MANSSFKLEHLERRQIESRIE	KYPRIPVIVEKAERSDVPIDKKKYL	PADLTVGQFVYVVRRIKL	--SAEKAIFFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGLV--	119	89.08%			
<i>AtATG8d</i>	MAISSFKHEHLERQAEASRIE	KYPRIPVIVEKAERSDVPIDKKKYL	PADLTVGQFVYVVRRIKL	--SPEKAIFFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGIFF--	120	86.67%			
<i>AtATG8e</i>	[114]LSELTFKSEIVAKLAREHVVVL[12]	KVDRIETLMNPKGLCCVTHVESKAVLA[5]	PGQVQVHDLRMVVKIFKAhdSAIACMTLTDGSL	LATASTKGTIRIFNAVDGTLQEFRRGVERAEIYN[120]	374	4.28%			
<i>AtATG8f</i>	MAKSSFKQEHDLKRRAEARIRE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	--SAEKAIFFVDNVLPPAGALMSVYEEKDDGFLYVTYSGENTFGFGSP	121	80.99%			
<i>AtATG8g</i>	MSNVSRQDHDFKRAEALRIE	KYSDRPVIVEKESKSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	--SAEKAIFFVDNVLPPGAMMSIYDENKDEGFLYVTYSGENTFGSSMT	121	76.03%			
<i>AtATG8h</i>	[2]IVVSKFQDFSSDERLKESNNIIA	KYPRIPVIVEKYSNADLPDMENKYL	PRDMTVGHFIHMLSKRMQL	--DPSKALFVFNHNTLPQTASRMDSLYNTFKEEDGFLYMCYSSEKTFG----	119	49.59%			
<i>AtATG8i</i>	--MKSFKQYTLDERLAESREIIA	KYPRIPVIAEKYKTDLPALAEKKFLV	PRDMSVGQFIYILSARLHL	--SPGKALFVFNHNTLPQTALMDSVYESYKDDGFLYMCYSSEKTFG----	115	52.10%			
(b)									
<i>CsATG8e</i>	MAKSSFKSEHLERRQAEASRIE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	GAEKA IFIFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGSI---	119				
<i>CsATG8a</i>	MAKSSFKLEHLERRQAEASRIE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	SAEKA IFIFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGSL---	119	91.60%			
<i>CsATG8b</i>	MAKSSFKLNPLEMRMAESTIRIA	KYPERIPVIVEKERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	SAEKA IFIFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGSIQTQ[2]	124	86.29%			
<i>CsATG8c</i>	MAKSSFKLEHLERRQAEASRIE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	SAEKA IFIFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFGSF---	119	95.80%			
<i>CsATG8d</i>	MAKSSFKHEHLERRQAEATRIE	KYPRIPVIVEKADRCIPIDKKKYL	PADLTVGQFVYVVRRIKL	SPEKA IFIFVKNTLPPTAAMMSAIYEENKDEGFLYMTYSGENTFG----	117	89.92%			
<i>CsATG8f</i>	[11]MTKIFYQEHDFKRAEASRIE	KYSDRPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	SAEKA IFIFVDNVLPTTGALMSIYDEKDEGFLYVTYSGENTFG-----	128	74.62%			
<i>CsATG8g</i>	MAKSLFKQEHDLKRRAEAGRIE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	SAEKA IFIFVDNVLPTTGSIMSIYDEKDEGFLYVTYSGENTFGTRFYC[2]	124	79.84%			
<i>CsATG8h</i>	M--SSFKQEHDFKRAEASRIE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	SAEKA IFIFVDNVLPTTGGIMSIYDEKDEGFLYVTYSGENTFGQLILH	120	77.05%			
<i>CsATG8i</i>	M--SSFKQEHDFKRAEASRIE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	SAEKA IFIFVDNVLPTTGGIMSIYDEKDEGFLYVTYSGENTFGQLILH	120	77.05%			
<i>CsATG8j</i>	MAKSSFKQEHDLKRRAEAGRIE	KYPRIPVIVEKAERSDIPIDKKKYL	PADLTVGQFVYVVRRIKL	SAEKA IFIFVDNVLPTTGGIMSIYDEKDEGFLYVTYSGENTFGDQILL	122	82.79%			
<i>CsATG8k</i>	[5]----SFQKQFSEERSEESRDIK	KYPRIPVIVEKYSNADLPDMENKYL	PRDMSVGQFIHILSARLAPGA	LFVFNHNTLPQTSSLMESYKTFKEEDGFLYMCYSSEKTFGCGNSQ[7]	130	45.38%			
<i>CsATG8l</i>	[5]----SFQKQFSEERSEESRDIK	KYPRIPVIVEKYSNADLPDMENKYL	PRDMSVGQFIHILSARLAPGA	LFVFNHNTLPQTSSLMESYKTFKEEDGFLYMCYSSEKTFGCGNSQ[7]	130	45.38%			

Figure S1. Amino acid sequence alignment of *CsATG8e* and ATG8 members in *Arabidopsis* and tea plant. (a) Comparison between *CsATG8e* and ATG8 members in *Arabidopsis*. (b) Comparison between *CsATG8e* and ATG8 members in tea plant. The number on the right is the identity with *CsATG8e* of the corresponding gene on the left side in one role.

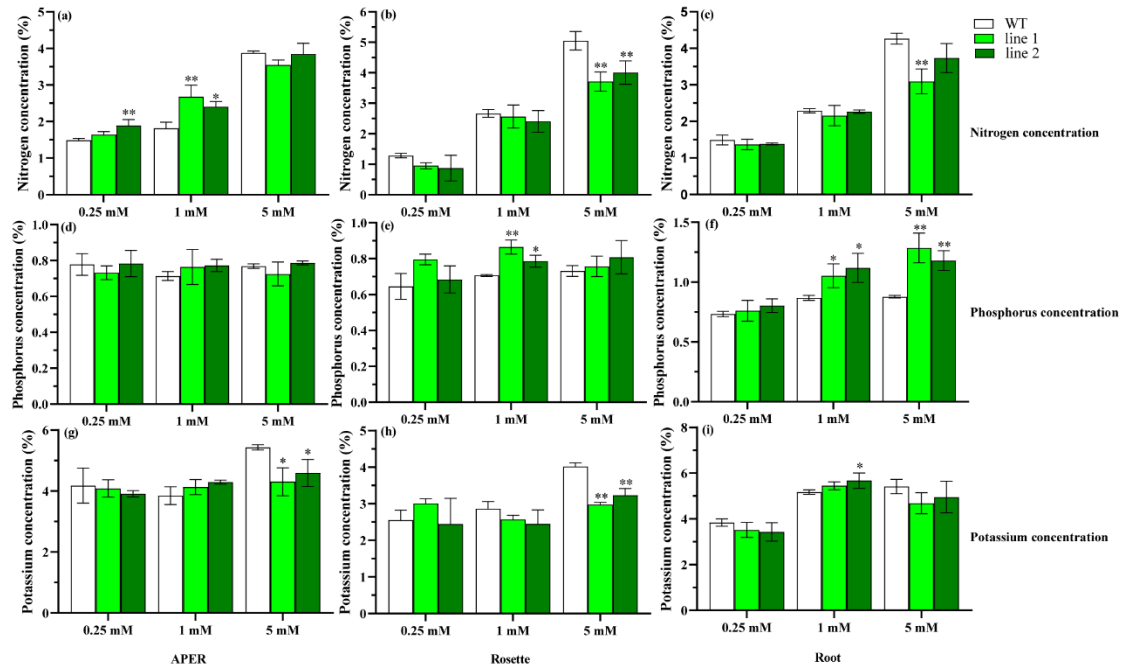


Figure S2. The concentration of N, P and K in overexpression *Arabidopsis* (OE) and wild type (WT) under three N regimes. (a-c) N concentration in aerial part excluding rosette (APER), rosettes (Rosette) and roots (Root) of OE and WT under 0.25 mM, 1 mM and 5 mM N treatments. (d-f) P concentration for APER, Rosette, and Root of OE and WT under 0.25 mM, 1 mM and 5 mM N treatments. (g-i) K concentration for APER, Rosette and Root of OE and WT under 0.25 mM, 1 mM and 5 mM N treatments. 0.25 mM N, 0.125 mM NH_4NO_3 ; 1 mM N, 0.50 mM NH_4NO_3 ; 5 mM N, 2.50 mM NH_4NO_3 . Values are means \pm standard (SD) ($n = 4$). Asterisks indicate significant difference between WT and two OE lines (line1, line2). * $p < 0.05$; ** $p < 0.01$ (t -test).

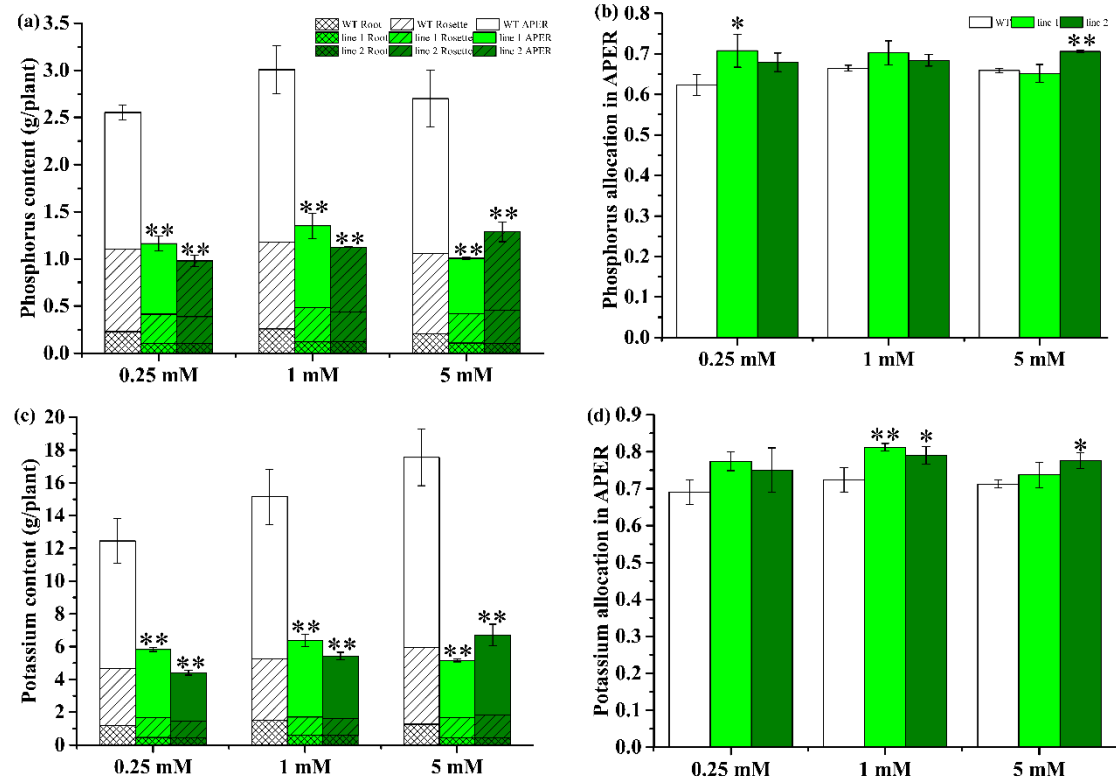


Figure S3. Analysis of P and K content and allocation in overexpression *Arabidopsis* (OE) and wild type (WT). (a) and (c) The composition of P and K in OE lines and WT. (b) and (d) The N and K allocation in aerial part excluding rosette (APER). Values are means \pm standard (SD) ($n = 4$). Asterisks indicate significant difference between WT and two OE lines (line1, line2). * $p < 0.05$; ** $p < 0.01$ (t -test).