

Supplementary Materials

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CsMPK3-3 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----IAG : 15
CsMPK3-4 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----CSPLVTC : 24
CsMPK3-5 : --MLWSMGSASPNTGCDPVYVUSTPLQCGPTTPNSRDNGIAGWHTLIQHQQWPFSESRRLN-GPIPAATQSTQSPRRCKDRRTGTCTGTMTG : 90
CsMPK3-2 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----DADNYTDKOTLREIKLKR--HLSHEN : 81
CsMPK3-1 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----MADSMHNIFC-NLFEITAKYRSPIMP : 81
CsMPK6 : QPYDTVMSEAAYNIFC-NLFEITAKYRSPIMPGRGAYGIUCS-ALDSENEHQAIRKIA-N-ADNMKIDAKRTLREIKLRHMDHENVITVA : 89
CsMPK4-4 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----LFEIRFDIMLTYCC-ATLSEKKEB : 71
CsMPK4-2 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----HTPFFFS--FENFSA-AV : 58
CsMPK4-1 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----MTAKVLSGRKRNAITCGNATPATNEL : 92
CsMPK4-3 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----MSEGNIAC---FEVSRKYIPP--- : 75
CsMPK7 : --MATLVEPPNYYSMWQILFEIDTKYVP- : 85
CsMPK1-2 : RQMATQVEPPNYYSMWQILFEIDTKYVP- : 87
CsMPK1-1 : --MATPVEPPNYYSMWQILFEIDTKYVP- : 85
CsMPK20 : LKGRILVECHRSTEMDFSEYCDANRYKIQEV : 88
CsMPK19-1 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----MDFFTEYGD : 74
CsMPK19-2 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----PKEMDFTEYGD : 77
CsMPK16-2 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----MQPDQRSVDVDFTEYGC : 83
CsMPK16-1 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----PTPCGVKSDQRAADVFTEYGC : 88
CsMPK9-1 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----MLDKKFFTEYGCASRYQ : 77
CsMPK15 : CVRRWFQRRPSTLDTFFTEYGCASRYQ : 88
CsMPK9-2 : -----*-----20-----*-----40-----*-----60-----*-----80-----*-----TVIDYFLTS-STLDTFFTEYGC : 87

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CsMPK3-3 : IRDVVPPFLQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 105
CsMPK3-4 : IRDVVPPFLQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 115
CsMPK3-5 : IRDVVPPFLQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 181
CsMPK3-2 : IRDVVPPFLQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 172
CsMPK3-1 : IRDVVPPFLQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 172
CsMPK6 : IRDIIIPPLQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 180
CsMPK4-4 : IKDIIIRPPEQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 162
CsMPK4-2 : IKDIIIRPPEQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 149
CsMPK4-1 : IKDIIIRPPEQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 184
CsMPK4-3 : IKDIIIRPPEQRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 166
CsMPK7 : LKDVMMSPQMSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 176
CsMPK1-2 : LKDVMMSPQMSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 178
CsMPK1-1 : LKDVMMSPQMSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 177
CsMPK20 : IKHIMLPPSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 179
CsMPK19-1 : IKHIMLPPSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 165
CsMPK19-2 : IKHIMLPPSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 168
CsMPK16-2 : IKHIMLPPSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 174
CsMPK16-1 : IKHIMLPPSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 172
CsMPK9-1 : IKHIMLPPSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 168
CsMPK15 : IKHIMLPPSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 179
CsMPK9-2 : IKHIMLPPSRELSQVYVATELMDTDLHQIIPSKQSLSEEEHCQ-YFLVQI-LRCLKYIHSANVPHRDLKPSNLLANANCDLKI : 178

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64 66 Pp f D6Y EL6 3DLh 6I L H 5f6 Q LR h AN6 HRDLKP N61 NAIC LKIcDFCLAR

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CsMPK3-3 : ET---*---QSETEYVTRWRYRAPEL : 192
CsMPK3-4 : ET---*---QSETEYVTRWRYRAPEL : 202
CsMPK3-5 : ET---*---QSETEYVTRWRYRAPEL : 254
CsMPK3-2 : ET---*---QSETEYVTRWRYRAPEL : 259
CsMPK3-1 : EN---*---ECSETEYVTRWRYRAPEL : 259
CsMPK6 : ET---*---DSETEYVTRWRYRAPEL : 266
CsMPK4-4 : ET---*---DSETEYVTRWRYRAPEL : 249
CsMPK4-2 : ET---*---DSETEYVTRWRYRAPEL : 236
CsMPK4-1 : ET---*---DSETEYVTRWRYRAPEL : 271
CsMPK4-3 : ET---*---DSETEYVTRWRYRAPEL : 253
CsMPK7 : DNG---*---QSETEYVTRWRYRAPEL : 264
CsMPK1-2 : GKD---*---QSETEYVTRWRYRAPEL : 266
CsMPK1-1 : GRC---*---QSETEYVTRWRYRAPEL : 265
CsMPK20 : SDTPTTIFGDDYATRWRAP : 221
CsMPK19-1 : NDPTTIFGDDYATRWRAP : 257
CsMPK19-2 : KDPTTIFGDDYATRWRAP : 260
CsMPK16-2 : NDPTTIFGDDYATRWRAP : 266
CsMPK16-1 : NDPTTIFGDDYATRWRAP : 264
CsMPK9-1 : SDAPSTIFGDDYATRWRAP : 261
CsMPK15 : NEAPSALIFGDDYATRWRAP : 271
CsMPK9-2 : NDAPSALIFGDDYATRWRAP : 270

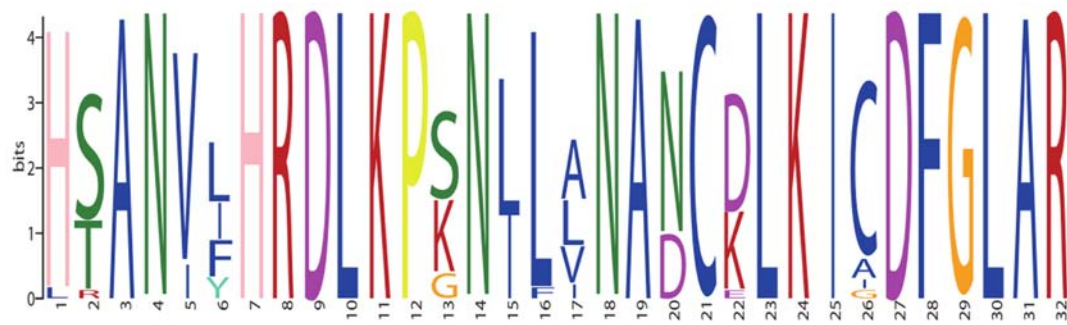
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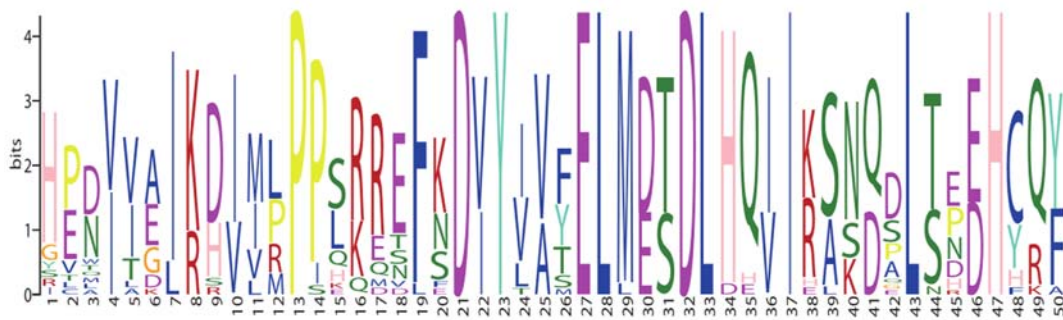
Motif 1



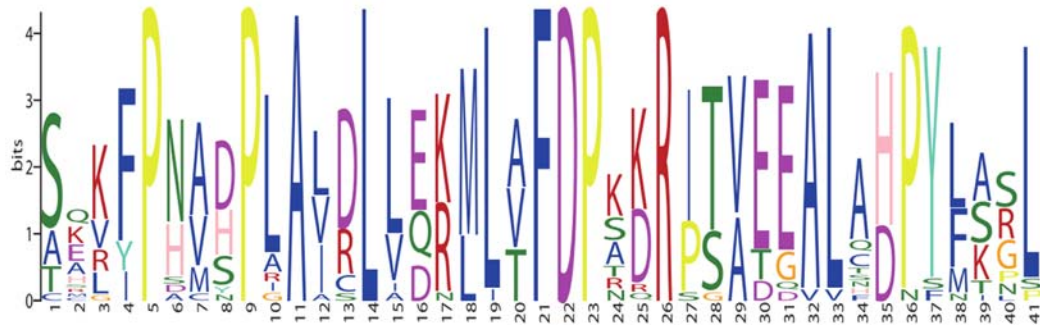
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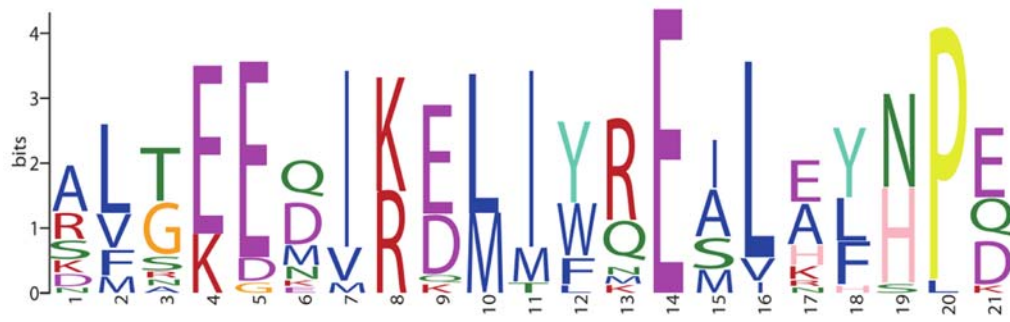
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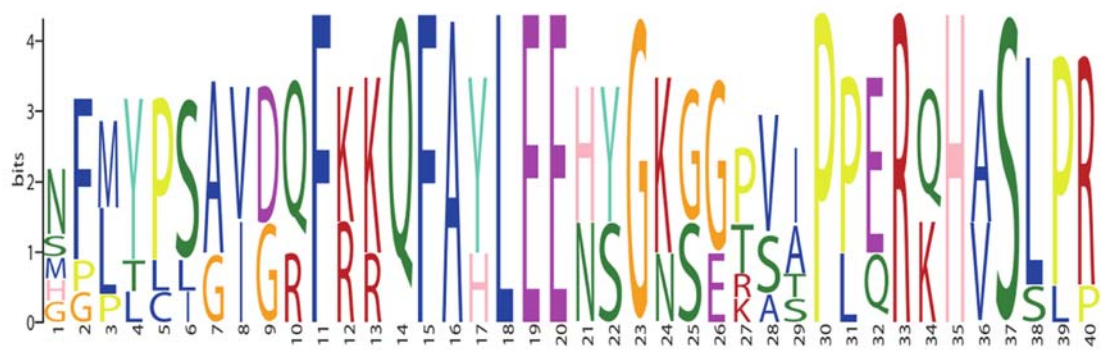
Motif 4



Motif 9



Motif 10



Motif 11

**Figure S2:** The sequence information of 11 conserved motifs of CsMPKs in tea plant detected by the online tool MEME. (Color figure online).

Table S1: The protein sequences of CsMPKs in tea plant

>CsMPK3-3

MAYKSNYQHRLTIAGIRDVPPPLQRELSDVYIATELMDTDLHQIIRSKQSLSEEHCQYL
 YQILRGLKYIHSANVIHRDLKPSNLLVNANCDLKICDFGLARPTSETQFMTEYVTRWYR
 APELLLNSSDYTAIDVWVSGCIFMELMNRKPLLAGKDHVHQLRLLIELLGRTRTESDIGF
 IRSIDARSYICQLPQHPRQLAKVFPVHPLAVDLVDKMLTFDPAKRITVEEALAHPYLA
 RLHDAADEPVCLEPFSDFEQALGEEQIKDMIYQEALALNPEYA

>CsMPK3-4

MRRIGSVRSVLADRYIRCSPLVTGIRDVPPPLKREFSDVYIATELMDTDLHQIIRSKQS
 LSEEHCQYFLYQILRGLKYIHSANVIHRDLKPSNLLVNANCDLKICDFGLARPTSETQFM
 TEYVTRWYRAPELLLNSSDYTAIDVWVSGCIFMELMNRKPLLAGKDHVHQLRLLIELL
 GTPTESDIGFIRSKDARSYICQLPQHPRQLAKVFPVHPLAVDLVDKMLTFDPAKRITV
 EEALAHPYLARLHDAADEPVCLEPFSDFEQALGEEQIKDMIYQEALALNPDSVTLASQG
 WYNNLIVFLIGQFNKVINATQIFNVINGCVTMFPILGAIVADSFLGFFVIWISSLISV
 LGIILLISATLDSLPPPCGNGSNLCITPSKQFAVLYLGITLATIGAAGTRFTLGAMG
 ADQFDNPKHQGSYFNWIFITLYMASIISSTAIYVEDSVSFGGLGFLCAAANVIGLVIFV
 LGKRFYRHVKPQGSPTSLARVFVAIRKRKILLSQRSEDYNNKIHDGVTMMAVTPTKT
 FNFLNRAALKTEGDIRADGSIAKLWNLCTVQQVEDLKALIKIAPLWSSGIFLSTPLAIQY
 SLATLQALTMDRHLGPHFKIPPGSMAVFIMIATCITIVLLDRFLYAAWQKLSRFPTPLQ
 RVGVGHVLCVLSMALSAIVESKRLKIARSHNLQDQSVLIVPMSAFWLVPQLALAGIGEAF
 HFPGNTALFYQEFPMCLKSTAMVAMFVGIAYVSTALVSGVQRTTGWLPNNINHGRMD
 NMYWLLFVIGVVNFGYFVCAWLYKYQGVAKVVDENPSSDDK

>CsMPK3-5

MLWSMGSASTGPGTGTGMVLVRTAIERRPNTGGDPVYPVSTPLQGPTPLNSRDNGIAGW
 SALFVGKHTLIQHSQWFLSERRLNGDPIPAATQSTQSPRRCKDRRTGTGTMTGIRDV
 VPPPLQREFSDVYIATELMDTDLHQIIRSKQSLSEEHCQYFLYQILRGLKYIHSANVIHR
 DLKPSNLLVNANCDLKICDFGLARPTSETQFMTEYVTRWYRAPELLLNSSDYTAIDVW
 SVGCIFMELMNRKPLLAGKDHVHQLRLLIEQRCKKLYLSTTPTSSAAVSKGFPACHPLAV
 DLVDKMLTFDPAKRITVEEALAHPYLARSHDAADEPVCLEPFSDFEQALGEEQIKDMTY
 QEALALNLEYA

>CsMPK3-2

MTDVNSAGGELVHGGQFIRHNVSGLFEITAKYRPPIMPLGRGAYGIVCSMLNSETNEMI
 AMKKISDAFDNYDAKRTLREIKLLRHLHENVTGIRDIVPPPLKREFFDVYIATELMDT
 DLHQIIRSKQSLSEEHCQYFLYQILRGLKYIHSANVIHRDLKPSNLLVNANCDLKICDFG
 LARPTSETQFMTEYVTRWYRAPELLLNSSDYTAIDVWVSGCIFMELMNRKPLLAGKDH
 VHQLRLLIELLGRTPTESDIGFIRSKDARSYICQLPQHPRQLAKVFPVHPLAVDLVDKM
 LTFDPAKRITVEEALAHPYLARLHDAADEPVCLEPFSDFEQALGEEQIKDMIYQEALAL
 NPEYA

>CsMPK3-1

MADSNTVAGQFPEFPAIPTHGGQFIQHNIFGNLFEITAKYRSPIMPIGRGAYGIVCSVMN
 SETNEMVAIKKIANAFDNFMDAKRTLREIKLLRHLHENVIAIRDVIPPPLRQEFSDVYI
 AMELMDTDLHQIIRSNQGLSEEHCQYFLYQILRGLKYIHSANVIHRDLKPSNLLVNANCD
 LKIIDFGLARPTSENEGMEYVTRWYRAPELLNLSSEYTAIDVWVSGCIFMELMNRKP

(Continued)

Table S1: Continued

LFPGNDHMHQMRLLIELLGTPTESDLEFIRSEDARRYLRQFPQHPRQQLAMVFPVHNPLA
 IDLIENMLTFDPSKRITVEQALAHPYLARLHDIADPEVCTESFSDFEQAMGEEQIKDMI
 YQEAIALNPEFA

>CsMPK6

MDASAPYDTVMSEAAPPPQSDPPPQPPPAAGIEHIPATLSHGGRFIQYNIQNFIFEVT
 AKYKPPIMPIGKGAYGIVCSALNSETNEHVAIKKIANAFDNKIDAKRTLREIKLLRHMDH
 ENVINFGSSFPKMTLNVNSFTQCCERRSEVQAVRLKGPKARLQPHSITTYIIQPNLNQST
 QIPNLSKKSVSLSPLGSSLSISTSISIEVSSPPPPPPPLLLCWSLVAGCWVVAIRDIIIP
 PPQRESFNDVYIAYELMDTDLHQIIRSNQALSEEHCQYFLYQILRGLKYIHSANVLRDL
 KPSNLLLNNANCDLKICDFGLARVTSETDFMTEYVVTRWYRAPELLLNSSDYTAIDVWSV
 GCIFMELMDRKLFPGRDHAHQRLMLMELIGTPSEAEFGFLNENAKRYIRQLPPFHRQSL
 TEKFPVHHPAAIDLVEKMLTFDPRQRITVEGALAHPYLTSLHDISDEPICLTPFSDFEN
 HALSEEQMKELIYREALAFNPEYQIM

>CsMPK4-4

MTLFSLPSFKCLFEMRFDIMLTCCATNSETKEEVAIKRIANAFDNRIDAKRTLREIKLL
 CHMDHENTTIVQVIKIDIRPPEKDEFNDVYIAYELMDTDLHQIHSSELTDHDCQYF
 LYQLLRGLKYIHSANVLRDLKPSNLLLNNANCDLKICDFGLARTTSETDFMTEYVVTRWY
 RAPELLNCSEYTAADIWSVGCILMEILKREPLFPGKDYVQQLLITELGSPPEESDLG
 FLRSENARKYVKQLPCVPKPFSHKFPDASPIAIDLAERMLVDFPSKRITVEEALNHPFL
 SGLHEINEEPTCPSPFIDFEQSSLEEDIKELIWRESLNFSPDEFFNVLTCWEAVVVG
 IILGLCFILSSRVCMMNLYAKKKKSDLKIQGAKKKAMRFSQIFVKASSSSSHSRNRSAS
 ASSLLLSTASRSFSLRSPSQRPSFGIAFDIDGVILRGNTPIGGSPQALGRLYHDSFGTL
 KVPYVFLTNGEPFVSSCYTRPYTFQTAGKERSYFMGTKEVLLVDVAVVRFENDLIIAVG
 KGEPATVMSEYGFKNASIDEYASCFDNIDPLAQFKKWTGHVNQNNITRSTACTQRVHA
 AFIVSDSVDWSRDIQVLCILRTGGFPGREIAHQPSLYFANDDLEYQAVFSPERLGMGAF
 RIALESIFNSIHPNALEYTSFGKPNPSVFRNAETVLMETVPSSYQSANHVTTGGNHVFRTL
 YMIGDNPSVDIKGAKQAGHPWFSILTRTGVFKGKKNHAEHPADLVGELTLYICSNFSFKF
 HFSLETIILLSTFASQT

>CsMPK4-2

MTPFFFSNFSAAVNSETHEEIAIKKIGNAFDNQIDAKRTLREIKLLCHMDHENILAIK
 DIIRPPKKQVFNDDVYIVSELMDTDLHQIIRSNQPLTDHDCQYFMYQLLRGLKYVHSANV
 HRDLKPSNLFNANCDLKIADFLARTTSETDFMTEYVVTRWYRAPELLNCSEYTAAD
 VWSVGCILGEIATREPLFGRDYAEQLRLITELGSPNDTCLGFLRSDNARRYVKQLPRY
 PKQQFSARFPNMSPLAIDLLEKMLVFDPTKRITVDEALCHPYLSSLHDINDEPICPSPFS
 FDFEQPAFNEEKIKDLIWMESLKFNPDPH

>CsMPK4-1

MMLHIRRQMKMEMKVVEGGKSAEEDDEDDVAKSVEGSINGNHTVEGLSDDVDGGQSLERQ
 QQPYPLADDALGELKVAYEALKEHNISSEANIEVIIYEFIKQHVCIDIEAKKGELLGL
 YEAVRQHSTILGAENSELVKGLGDYQPRISVLDRLQDEMHSSEDEMASSISNQVEVLHKE
 VAERASILEQEWNSTVAQVQVTEKLDALIRSLFSTASVDAATKVIDNLQEKLEASGKDH
 TAMCSSYKDMIEKFNDLHRKNELAIQVHGVHGNLQRLVNDSCQHVEQSQIINQENLID

(Continued)

Table S1: *Continued*

PLHLDNYDTLMEQLAVLLGERLQFKSMNDKLNLELIDMAKEMEKLKKTGLDSDTILKLVE
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 VSALQEKLVEKEHPSDSLEILTRDYDEVSEKAVHFELKNDKLQKEVSALQEKLVEKEHPS
 DSLEILTRDYDEVSEKAVQFELQNDKLQKEVSALQEKLVEKEHPSDSLEILTRDYDEVSE
 KAVQFELQNDKLQKEVSALQEKLVEKEHPSDSLEILTRDYDEVSEKAVQFELQNDKLQKE
 VSALQEKLVEKEHPSDSLEILTRDYDEVSEKAVQFELQNDKLQKEVSALQEKLVEKEHPS
 DSLEILTRDYDEVSEKAVQFELQNDKLQKEVSALQEKLVEKEHPSDSLEILTRDFDKVSE
 KVVQFELENDKLEEVSALEKLVEKVRNQEHEGIEIRRELDLVHDLKDSVTEDVVSAG
 SSTKCLEQLLKKLSEKYTALALEKPILVDSADEKNTKTRPRPMTAKVLSGRKRSTRVRG
 RTLKGGVQKRIARKKGEKLVVYVNRVLNAITGGNATPATNELGLQIRRLCPLQSVKSWTK
 INESTKDAVIQADKFVIGDDFDNDEQAQQILDRKAYLLYKDWRYNLKQEFLEEEKGVDD
 PYSHPSPGVSLDDWRYLIDVAWKDESHLKEEGCTFKPEWAVAYEALKEHNISSEANIE
 VIILYEFIKQHVCDIEAKKGELLGLYEAVRQHSTILGAENSELVKKGDYQPRISVLDRQ
 LDEMHSSEDEMASSISNQVEVLHKEVAERASILEQEWNSTVGVVQTVKLDALIRSFLL
 AWTYVAVIAIKDIIRPPLKENFNDVYVYELLDLHLHQIIRSNQPLNDDHCRALYTASGN
 ELFVKGYVSFFIHQGDVRNLTSMQSVCVNMTSVRADCIVHLIDSSILLMQYFLYQILRG
 LKYVHSANVLRDLKPSNLLLNCANCDLKIGDFGLARTTSETDFMTEYVTRWYRAPELLL
 NCSEYTAIDIWSVGCILGEIMTRQPLFPQKDYVHQLRLITELIGSPDDASLGFLRSDNA
 RRYVRQLPQYPRQFSARFPNMSPGAADLLEKMLVFDPNKRITVEGALCHPYLAPLHDIN
 EEPVCPRPFSDFEQPSFTEENIKELIWRESVRFNPDPPIH

>CsMPK4-3

MSEGNIAIGIPHTGGRYVQYNVYGTLEFVSRKYIPPIRPVGRGAYGIVCAAVNSEETREEVA
 IKKIGNAFDNRIDAKRTLREIKLLLHMDHENVIAIKDIIRPPQKENFNDVYTVSELMDTD
 LHQIIRSNQQLSNDHCRYFLYQLLRGLKYVHSANVLRDLKPSNLLLNCANCDLKIADFL
 ARTTSETDFMTEYVTRWYRAPELLLNCSEYTAIDIWSVGCVFGEIMTRQPLFPGRDYV
 HQLRLITELIGSPDDASLGFLRSDNARRYVRQLPQYSRQFSARFPNMSPAADVLEKML
 VFDPNRRITVDGALSHPYLAPLHDINEEPVCPRPFNDFEQPSFTEENIKELIWRESVKF
 NPDPIH

>CsMPK7

MATLVEPPNGVVKPLGKHYYSMWQILFEIDTKYVPIKPIGRGAYGVVCSINRETNEKVAI
 KKINNVFGNRIDALRTLRELRLLRHIRHENVIALKDVMMPSQRMSFEDVYLVYELMDTDL
 HHIKSSQPLSNDHCKYFIQLLRGLRGLYLSANILHRDLKPGNLLVNANCELKICDFGLA
 RTSRDNGQFMTEYVTRWYRAPELLLCCDNYGTSIDVWSIGCIFAELGRKPIFPGSECL
 NQLKLIINVLGSQCEADLEFIDGQKARRFIKSLPYARGVQLSSLYPHADPLAVDLLQRML
 VFDPKRVITVEALHHPYMSSLYDPSRNPQAQVEINLDIDENMGEGMIRQLMLREMLHYH
 PEACANT

>CsMPK1-2

MLKDLKNVIARQMATQVEPPNGIKSVGKHYSMWQTLFEIDTKYVPIKPIGRGAYGIVCS
 SINRETNEKVAIKIHNVDNRIDALRTLRELKLLRHLRHENVIALKDVMMPIHRRTFKD
 VYLVYELMDTDLHLQIKSSQALTDHQCQYFLFQLLRGLKYLHSANILHRDLKPGNLLINA
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(Continued)

Table S1: Continued

GRKPVFPGTECLNQLKLIINILGSQREDDIEFIDNPKARKYIKSLPCSPGTPFSCLYPNA
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HQIHKSSQALTNDHCQYFLFQEDSVVLLKVMKDSVNGQTFGLDLCDRDSGALGQNMEVTT
IGKSNGNFPEQLLRGLKYLHSANILHRDLKPGNLLINANCDLKICDFGLARTSSGRGQFM
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S
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LREIKLLRLLRHPDIVEIKHIMLPPSRREFKDIYVVFELMESDLHQVIKANDDLTREHYQ
FFLYQLLRALKYIHTANVYHRDLKPKNILANANCKLKICDFGLARVAFSDTPTTIFWTDY
VATRWRAPELCGSFFSKTGVISSFSWAFGMSLLILLHHLHFPKN
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YQMLRAMKYMHTANVYHRDLKPKNILANANCKLKICDFGLARVAFNDTPTTIFWTDYVAT
RWYRAPEL CGSFFSKYTPAIDIWSIGCIFAELTGKPLFPGKSVVHQDLITDLLGTPSS
DTISGVRNEKARRYLTGMRKKQPVLFSEKIPNADPLALRLLQRLAFDPKDRPTAEEALA
DPYFKGLAKAEREPSCQPISKLEFEFERRRVTKEDIRELIFREILEYHPQLLDYLAGNE
GPNFLYPSAIGQFRKQFAYLEENSGKSGPVIPPERKHVSLPRSTVNSSTVPPRTNQNLAS
CGSRQVTEESCNSIRVTD AISGGNFVKPSRPPKVPAAKPGRVVGPVLPYENGRNINDVY
DARAFLRNGVVPQGISPQYAARTNTVNHAKSSTEIDRNSAQARQLPAQCNGVTKQSPQIA
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ENTSDAIRVLEVKLLRLLRHPDIVDIKSIMLPPSRREFKDIYVVFELMESDLHQVIELN
DDLTHDHRFFLYQMLRAMKYMHTANVYHRDLKPKNILANADCKLKICDFGLARVAFKDT
PTAIFWTDYVATRWRAPELCGSFFSKYTPAIDIWSVGCFAEVLTGKPLFPGKNIVHQL
DLITDLLGTPSSDTISVVQNEKSRRLTSMRKKQVPVSEKIPNADPLALRLLQRLAFD
PKDRPTAEEALADPYFKGLAKVEREPSCQPISKLEFEFERRRVTEEEIRKLIFREILEYH
PQLLYLAGNEGANFLYPSAVGQFRKQFAYLEENSGKSGPVIPPERKHVSLPRAVGQFR
KQFAYLEENSGSGPIIPPERKHYPYPAIDIWSIGCIFAELTGKPLFPGKSVVHQDLIT
DLLGTPSSDTISGVRNEKARRYLTGMRKKQPVLFSEKIPNADPLALRLLQRLAFDPKDR
PTAEEALADPYFKGLAKAEREPSCQPISKLEFEFERRRVTKEDIRELIFREILEYHPQLL
KDYLAGNEGPNFLYPSAIGQFRKQFAYLEENSGKSGPVIPPERKHVSLPRSTVNSSTVPP

(Continued)

Table S1: *Continued*

RTNQNLASCGSRQVTEESCNSIRVTDASGGNFVKPSRPPPKVPAGMVDLVKTHELKGLI
 LKETELGPEKRKQVGRLVESIGFILGWINTVLLCRPLRNALTVSNGDLKRHEVPARADPV
 VRVVSNPNSFSP
 >CsMPK16-2
 MQPDQRKKVYVSSSMPMFSSNLGPSKGYVLHGSDVDVDFTEYGEGRYRIEEVIGKGSYG
 VVCSAYDSDLGKVAIKKINDIFEHVSDATRILREIKLLRLLRHPDIVEIKHILLPPSRR
 EFKDIYVVFELMESDLHQVIKANDDLTPEHYQFFLYQLLRGLKYIHTANVFHRDLKPKNI
 LANADCKLKICDFGLARVAFNDTPTAIFWTDYVATRWYRAPELCSFFSKYTPAIDIWSI
 GCIFAELLTGKPLFPGKNVVHQDLMDTLLGIPSPESIARIRNEKARRYLSSMRKRPIP
 FCQKFPNADPRALCLEKMLAFDPKDRPSAEALADPYFKNLARVERESSAQPVTKMEFD
 FERRRVTKEDVRWKYLLAKLAVAFLLVFQEDSMGMTCIAVDQFKKQFAYLEEYHNGGT
 VAPPERQHASLPRPCVLYSSDNSMQSSAEVTNDLTCCIKEVEKPHVDRISGIPKTRPLPL
 QVPPTVGVNFFYDHRFSGAAAARPGKVVGSVLRYNCGAELEHRRMVRNPAVPTQYAVS
 TSTRNPGSKNERREDGVEGSSVLQPKPPQYVSRKVAQAQGGSGSHWH
 >CsMPK16-1
 MGLLRTFLPTPGCVKSDQRASISDLVWISDDSIKFRKHGCHRRMLSDSARTLLGFAVR
 NLSLKMEIASPTERENRRRRRGNEIIIAKNPNYKELETQFKSTSRNPNEQKWKVWIER
 KGIGMSEVAADVEFFTEYGEGRYRIEEVIGKGSYGVVCSAYDTHLGEKVAIKKINDIFE
 HVSDATRILREIKLLRLLRHPDIVEIKHILLPPSRRREFKDIYVVFELMESDLHQVIKAND
 DLTPEHYQFFLYQLLRANVFHRDLKPKNILANADCKLKICDFGLARVAFNDTPTAIFWTD
 YVATRWYRAPELCSFFSKYTPAIDIWSIGCIFESELLTGKPLFPGKNVVHQDLMDTLLG
 TPSPEGIARIRNEKARRYLSSMRKKKPIPTQKFPNADPLALRLLERMLAFDPKDRPSAE
 EALADPYFKNLARVEREPSAQPVTKMEFEFERRRVTKEDVRELIYREILEYHPKMLKEYL
 EGEEPTGFMYPYSAVDQFKKQFAYLEEYHNGGTAAPPERQHASSLPRACVLYSDNSAQNS
 TEVTNDLSKCCIKEVERPHMDRTSGIPMTRMPPQVPPSIQAGGAARPGKVVSSVLRYNNC
 GAAAAAAETVEQRRMVRNPVPTQYAVSSSSYARRNSACKNERGGEDGVEGSNGLQPKPQ
 YMPRVAAAQGGSGSQWLCTSLTRSDLNLRICPQKFTNPLSVFHSKPKQLNRNCFKSPFQ
 SSISATHRLISSIYRMGDSRRPPTVPIPDVEIADKSELYRAEASLGSSFSNPLAPNPN
 PLIIVISGPSVGKDAVIKGLREVREGIHFVVTATSRARPEGEVGDYFFVSKKEFLSM
 VERDELLEYALVYGDYKGIKQIREFMAKGHDIVLRVDIQGAATLRRILGNSAVFIFLV
 AESESALVKRLIGRKTETKETLLVRVATAREEVKHLRNFYVVVNAEGKLESVAVKLVESI
 IDAEKAKVWQRTAVI
 >CsMPK9-1
 MLDKEFFTEYGEASQYEQEFVKGKSYGVAAAVDTHTGERRVAIKMNNVFEHVSDAIRI
 LREIKLLRLLRHPDIVEIKHIMLPPSRRREFKDIYVVFELMESDLDEVIKANDDLTPEHFQ
 FFLHQLLRALKYIHTANVFHRDLKPKNILANADCKLKICDFGLARVSFSDAPSTIFWTDY
 VATRWYRAPELCSFFSKVTQSGFNLSHCIVCSNPVSCSGWLSEPHSEQPIQLEHVLN
 LYTPAVDIWSIGCIFAEMLTGKPLFPGKNVVHQDLIITDLLGTPSSESIARIRNEKARRY
 LNSMRKKPPVPSQKFPNADPLALSLLERLLAFDPRDRSSAEALADPYFSSLANVEDEP
 SAQPISKLEFEFERRKLTKDDILEYHPQMLQEYLDGVDRTSFMYPRSVLCGLRFSFDPRI
 YAVFEKVNPPAVRFAPTSLDLRIRGKKVILTGFPNHSKKGIRLLMQLILPLMLLSQR
 ILPMECNREPEIRCEQSVGAELRAFTFYISKASHL

(Continued)

Table S1: *Continued*

>CsMPK15
MGSQFVDFGRRWFQRRPSSPQPNNTQNLNNSQPLVSGFQGEDHLNVVEDFDFSGLKIIK
VPKRINFHPTSMDPQKKTTLDTEFFTEYGEASRYQVEVVGKGSYGIVGSATDHTGERV
AIKKINDVFDHVS DATRILREIKLLRLLRHPDIVEIKHIMLPPSRREFKDIYVVFELMES
DLHQVIKANDDLTPEHYQFFLYQLLRGLKFIHTANVFHRDLKPKNILANADCKLKICDFG
LARVSFNEAPSAIFWTDYVATRWRAPELCGSFFSKYTPAIDVWSIGCIFAEMLTGKPLF
PGKNVVHQDLMTDFLGTAPESIARIRNEKARRYLSMRKKSPVPFSQKFPNADPLALR
LLERLIAFDPKDRPSAEDALDTPYFTGLANADREPASAQPISKLEFEFERRKLTKDDVRE
LIYREILEYHPQMLQEYLRGGDQTSFMYPGIDRFKRQFAHLEEYHGKGEKSTPLQRQHA
SLPRERVCQGKDETISQNDLEKRTAASVATTIQSSPKESESEENANTNAQSGLNKPNYS
ARTLLKSASISGSKCVVQAKKDSKEEPIAEHEEVDLQKLAAINS

>CsMPK9-2
MTQTVIDYFLTSSAPCGLDCLSYSTGYTLDEFFTEYGEASRYQIQEVVGKGSYGVVG
SAIDHTHTGERVAIKKINDVFEHVSDATRILREIKLLRLLRHPDIVEIKHIMLPPSRREFK
DIYVVFELMESDLHQVIKANDDLTPEHYQFFLYQLLRGLKYIHTANVFHRDLKPKNILAN
ADCKLKICDFGLARVSFNDAPSAIFWTDYVATRWRAPELCGSFFSKYTPAIDIWSIGCI
FAEMLTGKPLFPGKNVVHQDLMTDLLGTPSPESTARIRNQKARRYLSMRKPPVPFTH
KFPSVDPLALCLLERLLAFDPKDRPSAEVVFHNSNILPLALADPYFHGLANVDREPATQ
PISKLEFEFERRKLAADDVRELIYREILEYHPQMHEYLCCGGDQTSFMYPRLDPLLLCA
SAILAFVLAVHPPLLGVDRFKRQFAHLEEYHGKGERSSPLQRQHASLPRERVCVPKDEA
TSQNNDFEVRTTASVATTLKSPSENANTDAQNGPSKPNYSARSLLKSASISASKIGAK
GRKDSEGEIEAQNEEVDASSQKVAALCA

Table S2: The primer sequences of the CsMPK genes in tea plant for quantitative RT-PCR

Name	Forward primers (5'to 3')	Reverse primers (5'to 3')
<i>CsMPK4-2</i>	TTCCAATTCAGTGCTGCTG	TGAAGATCGGTGTCATCAA
<i>CsMPK3-1</i>	ACCCACTGAATCGGATCTTG	GACCGGTTTCGTCAGCTATGT
<i>CsMPK19-1</i>	CGAAATGAGAAGGCAAGGAG	GTCGCCTCTCGAACTCAAAC
<i>CsMPK4-1</i>	TTCCACAATACCCACGACAA	TCAGTGAATGATGGCTGCTC
<i>CsMPK9-1</i>	CCACAGATGCTGCAGGAGTA	GTTCCGAAACCCAGTGAGAA
<i>CsMPK6</i>	CTTCAGCTCAGCCCTACGAC	GAATTCAAAGCCGAGCAGAC
<i>CsMPK15</i>	ACAGTTTGCCCATCTTGAGG	TGATTCCTCGGATTCTTTGG
<i>CsMPK19-2</i>	GCAGGAATGGTTGATCTGGT	GAGGCCGACATAAAAGGACA
<i>CsMPK16-2</i>	GTGGAACTGTTGCTCCACCT	AGCACCTGAGAAGCGATGAT
<i>CsMPK7</i>	ATCTCAACCGCTTTCCAATG	TAGCCCGAAGTCGCATATCT
<i>CsMPK3-3</i>	CTTGCGGGTAAAGACCATGT	GATGGACATGTGGAAAACC
<i>CsMPK3-2</i>	CTTGCGGGTAAAGACCATGT	GATGGACATGTGGAAAACC
<i>CsMPK20</i>	GTGGAGTGCATGAGGGATCT	TCAATGGCTGAGCAAACAAC
<i>CsMPK4-3</i>	TATACGCCCTCCACAAAAGG	CAATTTGCATTGAGGAGCAA
<i>CsMPK1-2</i>	CCTGGGAACCTTCTCATCAA	AAAGATGCATCCGACAGACC
<i>CsMPK9-2</i>	ATCAGCTTCTTCGTGGCCTA	AGCACGATACCATCGGGTAG
<i>CsMPK4-4</i>	GAGTCTGCCCATGATGAAT	AGCGAAGGTGTGAGAAGGAA
<i>CsMPK16-1</i>	GTCAGCTCAGTTGCGGTA	TTGGATCCTTCGACTCCATC
<i>CsMPK1-1</i>	CCAGAGCTCCTCTGTGTG	CCTTGCTTTCGGGTATCAA
<i>CsMPK3-4</i>	CTTGCGGGTAAAGACCATGT	GATGGACATGTGGAAAACC
<i>CsMPK3-5</i>	CTTGCGGGTAAAGACCATGT	AGCTGCGTCATGTGATCTTG
<i>Actin</i>	GCCATCTTTGATTGGAATGG	GGTGCCACAACCTTGATCTT

Table S3: The number and composition of promoter elements of each CsMPK gene

	ABRE	TGACG-motif	CGTCA-motif	TCA-element	ERE	GARE-motif	P-box	LTR	MBS	MYB	MYC	ARE
<i>CsMPK1-1</i>		3	3					1		1	1	1
<i>CsMPK1-2</i>	1				1		1	1	1	4	2	
<i>CsMPK3-1</i>	2				2					4	2	
<i>CsMPK3-2</i>				1	2			1	1	3	1	2
<i>CsMPK3-3</i>	1				2						2	3
<i>CsMPK3-4</i>	6	1	1		1	1				3	4	2
<i>CsMPK3-5</i>	1	1	1	1				1	1	6	2	1
<i>CsMPK4-1</i>	2	2	2	1		1			1	4	3	1
<i>CsMPK4-2</i>		1	1	1						2	3	6
<i>CsMPK4-3</i>	2	2	2		5			1	1	2	5	2
<i>CsMPK4-4</i>									1	1	2	1
<i>CsMPK6</i>					3		1	1		4	7	1
<i>CsMPK7</i>					3					1	4	
<i>CsMPK9-1</i>				1				1	2	6	3	4
<i>CsMPK9-2</i>	1	1	1							3	2	6
<i>CsMPK15</i>				2	1		1			6	1	4
<i>CsMPK16-1</i>		1	1		2					4	5	1
<i>CsMPK16-2</i>	2	1	1		1					4	3	1
<i>CsMPK19-1</i>				2			1			4	2	3
<i>CsMPK19-2</i>		2	2	1				2	1	1	3	
<i>CsMPK20</i>					4		1			3	2	5