

## Protein sequences of CtCYP81E members identified from safflower genome.

>CtCYP81E1

MEVFLYLFISILLSSYLFTRRKIPNLPPSVFPSLPLIGHLYLLKPPLYRTFAKIASKSGPVLLRL  
GSRRVLLVSSPSAAEECLTTNDVVFANRPRMLFGKIIGMNYTSLAWSPYGDNWRNLRRIAAT  
EILSIHRLNEFHDIRVDESRLVRKLMIPFSIPNSYSSSSSSCSHVNMKSAFYEFTLNVMRMIS  
GKRYFGGDIPAVEEEGRRFREILDFTLLAGAANVG DYLPVLGWLG VKGLEKKLIRLQEKRD  
VFFQGLIEQLRKSKGGESENKSKRKTMI EVLLSLQESDPEYYTDAMIRSFVLVLLSAGTDT SAGT  
MEWAMTLLNNPHVLRKAQNEIDKKIGNDRLVDES DIADLPYLRGIINETLRLYPPGPLLVP  
HESDDCVVAGYNIPSGTMMLVNQWAIHHD PNLWTEPERFNPERFDGLEGTRDGFKLMPFG  
SGRRSCPGEGLAVRVLGSTLGLLIQC FDWERTSDKMIDMTEAPGLTMPKAEPLVAKCQPRLE  
MQNLLSQL

>CtCYP81E2

MEISYLYISFLLLLASYLFTFHFRRRISNLPPTVFPSLPLIGHLYLLKPPLYRTLAKLSSKHGPILHL  
RFGSRRVILVSSPSLVEECLMKNDIVFANRPRMLFGKIIGQNYTTLVWSPYGDNWRNLRRIASI  
EILSIHRLNEFHDIRVEEGRLIRKLLSNSSPVNLKLVFYELTLNVMMRMISGKRYFGGDKLEEE  
GKQFRAILNDAFMLAGAANMG DYLPILSWLRVNGLEKKLIALQERRNVFFQRLIDQLREGN  
GNQAGNKRKTMI ELLSLQESDPEYYTDAMIRDFVLVLLAAGTDTSSGTMEWTMSLLLNHP  
HILKKAQEIDRNVGKDRLVDES DIPNLPYLRCIINETLRLYPAGPMLIPHESHD CVVGGYNIP  
RGTMLLVNQWAIHHD PKLWSEPERFDPERFEGLEGTRDGFKLMPFGSGRRSCPGEGLAVRM  
VGVTLGSIQC FDWERMSDAMVDMSEGPGLNLPKAEPLVKCKPRLEVQNLLSQLM

>CtCYP81E3

MEISYLYISFLLLLASYLFTSHFRRRISNLPPTIFPSFPIIGHLYLLKPPLYRTLAKLSRKHGPIHLR  
FGSRRVVLVSSPSAVEECFTKNDIVFANRPRMLFGKIIGLNYTTLAWSPYGDNWRNLRRIASIEI  
LSIHRLNEFHDIRVEEGRLMIRKLLSGSDPVNVKL VFYELTLNVMMRMISGKRYFSGEKLEEEG  
KEFREILNDTFILVGASNIG DYLPILSWLG VNRLEKKLIALQERRDVFFQRLIDQLRKGNQQA  
GNKRKTMI EVLLSLQESDPEYYTDAMIRNFVLVLLAGGTD TSSGTMEWTMSLLLNHPQVLEK  
AQNEIDRNVGKDRLVDES DIPNLPYLRCIINETLRLYPPGPILIPHESDDCVVGGYNVPRGTM  
LLVNQWAIHHD PKLWSEPERFNPERFEGLEGTRDGFKLMPFGSGRRSCPGEGLAVRMVGVT  
LGSIIQC FDWERMSEAMVDMSEGPGLTLPKAEPLVAKCKPRLEMQNLLSQLT

>CtCYP81E4

MTNGMMESISLLDYATRSFRMTTGEPDLGYFMPILKLLGLNGLEQRSKQLQKKGDLLMDNLI  
EDLRTTMLEFSDGSGDRREEKVLEFLLARQKDDPKRYPDEIIRGLVLVLMASGTDTSAGTMEW  
AFSLLLNHPEALQKAQNEIKNYVGS DRFLEQSDIEHLPYLCIVKETMRMYPVAPFLVPHESS

KECKIGGYNVPKGTMLMVNVWAVQSDPNIAEPTKFKPERFEKVVGGERDGFKLMSFGYGR  
RSCPGKHMAVRVISLALGSLIHFFDWERVSEKTVDLTEETGLALLKAQPLVAIGRVFEESAVKP  
KNGSKEDVGEAWTSIEDGGKCLKSELF

>CtCYP81E5

MDKVYLFFISLLSLLSIILLFKPFTPRKRRNLAPSPPSLPVIGHLHLIGEPFHRLHHLSSKYGPV  
MSLRFGSRPVLVVTSPSAVEECFTTHDIVLANRPLLSGEYLDYDHTTMGSAPYGRLWRDLRR  
IATLELFSAAARKAYMGVRHDEARSLVKSLSQDVSHDFTRVEMKSRIEGLSYNIIMRIVADKRF  
YGTEVDGFEERARKFKDLIREIFEVSGASNAGDFIPFLRWMDFQGLEKKLRKLQTESDSFIQRLIE  
ERRSKRDSTSSCDGKAKTFIDAMLSLQSESEPEYYTDDIIKGNMLTMLIAGTDTSSVTIEWGMSL  
LLNHPDVLNRARAEIDEHIGHERLVEETDLPNLPYIQCIVHETLRLFPAAPLLVPHEPSEDCTI  
GGFHVARGTIVLVNAWAIHRDPQLWDEPLSFKPERFEEIGNMGYRFVPFGMGRRQCPCGAGF  
ANRVVATVLASLIQCFEWKRVGDELVDLSEGKGLTMPKEKPLEAMCKVRQRMSRVLSGL

>CtCYP81E6

MDKVYLFFISLLSLLSIILLFKPFTPRKRRNLAPSPPSLPVIGHLHLIGEPFHRLHHLSSKYGPV  
MSLRFGSRPVLVVTSPSAVEECFTTHDIVLANRPLLSGEYLDYDHTTMGSAPYGRLWRDLRR  
IATLELFSAAARKAYMGVRHDEARSLVKSLSQDVSHDFTRVEMKSRIEGLSYNIIMRIVADKRF  
YGTEVDGFEERARKFKDLIREIFEVSGASNAGDFIPFLRWMDFQGLEKKLRKLQTESDSFIQRLIE  
ERRSKRDSTSSCDGKAKTFIDAMLSLQSESEPEYYTDDIIKGNMLTMLIAGTDTSSVTIEWGMSL  
LLNHPDVLNRARAEIDEHIGHERLVEETDLPNLPYIQCIVHETLRLFPAAPLLVPHEPSEDCTI  
GGFHVARGTIVLVNAWAIHRDPQLWDEPLSFKPERFEEIGNMGYRFVPFGMGRRQCPCGAGF  
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>CtCYP81E7

MSLRFGSRQILVVTSPSAVEECFTTNDIVLANRPLLSGKYLDYDHTTMGAAPYGRLWRDLRR  
VATLELFSAAARKGYMAVRQDEVRSLSLSDACRGFTRVEVRSRIQGLSFNVIMRIVADK  
RFYAGVDDVQEARRFKDVMEVFESVSNPGDFIPFLRWVDFQGLEKKLQKLQAKFDSFS  
EALIEERRSKREGSSGESEAKTYIDALLSLQSESEPEHYTDNIIKGNILTLLAGTDTSSVTIEWAM  
SLLLNHPEVLKRARAEIDEHIGHERLVEETDLPNLPYIQCIVHETLRLFPAAPLLVPHEPSEDCT  
IGGFHVSRGTMVLVNAWAIHRDPQLWDEPLSFKPERFEKTENMGYRFIPFGTGRRQCPCGSGL  
ANRVVTSALASLIQCFEWEVGEEMVELLEGKGLSMPKKKPLEAMCKARQRMSHLLKEL

>CtCYP81E8

MMRMISGKRYYYDVDDVLITVEEKEKADWFQELVTEIFEVMGATNVGDYLPMMRWLGVSK  
LEKRMIRLQAKRDLFMQELVEELKRGLNKGSTDDQEKKKKKKKRRNNMIDMLLSLQKTEPEF  
YTDEMIRSIMLVMLAGGTQTSISTMEWTMSLLLKNPSVLKKAQAEIDKYVGPDHLIQESDIPN

LPYLGCIKETMRMFPAGPLLPHESTKDCKVGGYHIPGGTMLLVNVWAIQNDPTIWGDPKTF  
RPERFEGLEGYTDGFKFMPFGFGRRSCPGEGMAKRMVALGLGSLIQCFDWERTSESEVDLSEG  
TGVSMPKAINLVANCVPRSTMLNLLSHL

>CtCYP81E9

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REELDRVIDCKMAGYDITKGTIALVNAWSIGHDSHDWDDPEDFRPERFLGRI

>CtCYP81E10

TSSVNSPPRPFFSLPIIGHLYLLNQPLHRTLAKISNCYGPVVFLELGSRPVLLVSSPAAAEDCFTT  
NDLTFANRPKLLVGKHLGYNYTTLTWASYGPHWRNLRRRIATLEILSANRIQKFTGIRRDEIISL  
VSNLFAGSRKDRFVVADMKSCFFKVTLNTIMMMISGRRCYGEDMEGPVAGKLQEMVEETFR  
LSGSTSNIGDFLPLAKWVGLNSMEKKMEELNLKKDSAMQEMIEWHRRMRSDSACL

>CtCYP81E11

MAINELENKVGSSRLMNDSDLSNLPYLHGVINETFRMCPAAPLMAPHESTKECFVSGFRVPA  
GTMLLVNLWAIQNDPKLWKEAERFKPERWIEVEGQRDGFKFMFGSGRRGCPGEGLAMRM  
VGLSLGMLLQCFEWERIGVEKVDMSEGFGLTMPKASPLVAKYQPRPHMVDLLSRI

>CtCYP81E12

MLLRFGARRVLVVTSPSAVEECFTKGNDIVFANRPFAAFGKYLNNDNTTMGFAPYGHHWRA  
LRRVAASELLSTAHLDDTTTSREHEVKLCCREIVRESLSSQKIELRSRFSGLVNNITTMAMMGK  
RYYGDGVEKGDERSAAIYREIMREMFKFIHTQNLGDFLPILGWVDFGGTKKKMVSLMKRVDE  
FLDEVIEVRRRIGRCGSGIMVDKLELQEEVPEIYTDQFIKGLILIMLVAGTETPYSTLEWAMSL  
LLNNPKAIEKIKNEIDTHIGSNRLLQENDLEKLSYLRNFIIETLRLYPTLPLLLPHSASKDCKIGG  
YLVPGGTMLIVNAWAIHRDPILWDKPEEFIPERIEGTCDQDIKYKMLPFGVGRRGCPGNRLGF  
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>CtCYP81E13

MLLRFGVQRVLVVTSPSAVEECFTKGNDIVFANRSLSALGKYLNNDYTTMGFAPYGHHWRA  
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RYYGDGIEKGDERSAVIYREIMGEMFKFIHTQNLDFLPILGWVDFGGTKKKMVSLMKRVDEF  
LDEVIEVRRRVGRGSGIMVDKLELQEEVPEVYTHQFIKGLILVMLVTGTETPYSTIEWAMSL  
LLNNPKAMKKIKNEIDTHVGSNRLLQENDLGKLSYLNFINETLRLYPILPLLLPHRASKDCKI  
GGYIVPSGTLLMVNAWAIHRDPILWDKPEEFMPERFEGTCDQDIKYKMLPFGVGRRGCPGIN  
LGLRVLGLTLGTLIQAFWEKIGNEDVDMIAFYGTSM SKLKPLQALCKPRPIMAHFSKV

>CtCYP81E14

MDYYLFLTLLLIILLPFFLAAHFRRKTQNLPTIFPTLPIIGHLHLLKTPIHRTLAAISAEHGPIIL  
LIRRVLLVSSPSAAEECFTKNDIVFANRPRLLAGKILGFNYTSIGWAPYGDHWRNLRRIAAIEIF  
SSHRLNDFHDARADEGRLLIQKLVSDCSSPARANLCRDQIHHSVPVNLKSVFQELTLNVMM  
RMISGKRYFNEEMDDEEGRRFREIVKETFVVGGASNLVDHLPVLSWLGVKRFEKKLVSLQKK  
RDSFVQDLIDQFRNAKPKDINDNKKKTMI EVLLMLQETDPDYYTDELIKAFVLNLLTAGTDTS  
STTMEWAFSLLL NHPDVLKKAQNEIDTHMMNHNQINRLVDESDMASLPYLR CILNETLRMY  
PAGPLLVPHESSDCVVGGYHIPRGTM LLVNQWAIHHDPALWSEPGRFDPERFQGV EGT RD  
GFRFMAFGFGRRSCPGEGLAMRMVGLTLGLLIQCFDWERVSEEMVDMSEGAGLTMPKAQP  
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>CtCYP81E15

MTIFTLQFGSYPVLILSSPSTVEECFTKNDVSEDRPRLITRKIMKYDYTSIIAAPFGPYWRKLRRIT  
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ELNDLKEEINFRDMITEILKVGRGSYRSDLFPFLRWIDFQGMKMTLSRIKAKRDAFLDENG VK  
DGVSNKMKMIDAMLSLHESKPESYSDQILKGIILTILLVCTDSSAVTIEWAMSLLL NHPHVLQKA  
RTEVDEHVGQGHM IQEHELHKLRYLQNIVNETLRLFPTTPLFVPHESSKDCTIGGYRIPRGTM  
LLVNTWAIHYDPKVWDDPTSFRPERFEKPVGEGYNYIPFGMGKRQYPGAGLANREVG MAL  
AAMVQCFEWD RVTEKMVDLNEGKGLIMPKNEPLEAMC RTRESMVNVLSKL