Type of the Paper (Article)

*In silico* analysis of P450s and their role in secondary metabolism in the bacterial class *Gammaproteobacteria*

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**Supplementary Dataset 2:** Gammaproteobacterial species P450 sequences identified in this study. Each P450 sequence is presented with its assigned name, protein code (in parenthesis) and species name. Full-length P450 sequences along with P450-fragment and false positive hit proteins were presented.

**P450s**

>CYP102J4(PC1\_0268)Paectobacterium carotovorum subsp. carotovorum PC1

MSGKTAVPQPPIKPVIGNLADVDPRNSIDSLMKLAKTYGPFFKMRIFSDEFYVASSQELVNELSDESFFEKKLSAELLELRYLGGDGLFTAHTHEPNWGKAHRILMPALGPLGVRSMFDKMLDISEQMFLRWERFGPDVDIDVADNMTRLTLDTIALCGFDYRFNSFYRDDLLPFVKAIVGSLKEAGLRVRRPGIVNKLMIPSTRQYRTDKALMYSVVEQLIAARKMDPKASEKNDLLNRMLNGVDPQTGEKLSDENIAHQMLTFLVAGHETTSGMLSFTVYFLLKNPNVLNKARAIVDEVLGDEIPRIEHLAQLRYLEQILMESLRMWPTAGGHVVSPTQDTILAGKYPLTPKDSIVILQPQLHRDVKAWGDDANLFKPERFGPDNAENLLPNSWQPFGSGKRACIGRMFAMQEAQLVLAMMLQRFDFELSDPSYELKIVEHLTIKPDNLKIRIRVRKPSKTLARGVTPKETSNKMAVMPVAKAQHHQDLIPLLVLHGGNTGSSEAFANRIAADAQRYGFASTLAALDDYAEKLPQTGALIVITASYEGMPPNNARHFVPWVEGLADDALSGLKFSVFGCGNLQWVRTYQAIPKRVDLALEHAGGERIHERGVADSGGDFFGNFDDWYTKLWPALTTAFGRQGAVAEDATELELEFVHTDRVSTLQIPDMGRGVVVENRELVDMTSPFARSKRHIEIRLPEGMAYRAGDYLAVLPRNSDDQIDRVLRRFGLSPDMMLVINQAPDVTGLPIGQPISCAELLGNYVELSQPATRAQVAALAAATRCPPEKMELEKLATEHYENDVLAPRLSVLDLLYRFQSCPTDFRRYLTMLPSIKARQYSISSSPAWKPDHVTLTVAVVDSPALSGIGRYKGVASNYLASLKPDDRIAIVVRPSSPFFHLPDDPSIPIILIGAGSGIAPFRGFLQERALQQAAGVRVGPALLFFGTGHPDVDYLYRDELAAWEKSHIVTVLPAFSHQPDGEVTFVQHRVWADRERIKTLFCNGGSLFVCGDGLRMVPEVRDMLLRIYREATGSNETDAMLWADKLEREQGRYVVDMFI

>CYP105BQ1(SerAS9\_0528)Serratia plymuthica AS9

MMLSSDANATPHLECLPTRRTCPFNPPEEYRFIRQECPVVRVKTPRGDFAWLVTRHQDVKKALSDKRLSSDPRSAGFPTYISGEVPPPPGFFLQLDAPDHTRLRKAVTEEFLNAHVEKLKPQMTAIIQRQLDELLSMQPPVDFVKAFAIPASAKIICELLGTPVEDHPFVQSRTDTVLDRSSPPELAEQAAIELMGYFDRIVTEKERAPGDDLLGRLIHKAQQAHQPSHEEIVGLAALLLLSAYDTMALAMGLGVVTLLNNPAQLQAFLADIDLGNDLVYELVRYLTINHAGLPRAALEDTEIGGQQIKAGEGVLIMLSSANRDEEIFEQPDVFNLHRREKTQLGFGHGIHKCLGMHFARAELTIAFHAIFTRIPSLAIAVPQETLTYRDEMVLYGLKALPVSWQPA

>CYP105BQ1(M621\_02405)Serratia plymuthica S13

MMLSSDANATPHLECLPTRRTCPFNPPEEYRFIRQECPVVRVKTPRGDFAWLVTRHQDVKKALSDKRLSSDPRSAGFPTYISGEVPPPPGFFLQLDAPDHTRLRKAVTEEFLNAHVEKLKPQMTAIIQRQLDELLSMQPPVDFVKAFAIPASAKIICELLGTPVEDHPFVQSRTDTVLDRSSPPELAEQAAIELMGYFDRIVTEKERAPGDDLLGRLIHKAQQEHQPSHEEIVGLAALLLLSAYDTMALAMGLGVVTLLNNPAQLQAFLADIDLGNDLVYELVRYLTINHAGLPRAALEDTEIGGQQIKAGEGVLIMLSSANRDEEIFEQPDVFNLHRREKTQLGFGHGIHKCLGMHFARAELTIAFHAIFTRIPSLAIAVPQETLTYRDEMVLYGLKALPVSWQPA

>CYP105BQ1(SerAS12\_0528)Serratia sp. AS12

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>CYP105BQ1(SerAS13\_0528)Serratia sp. AS13

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>CYP126C1(VW41\_14105)Klebsiella michiganensis RC10

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>CYP126C1(AW19\_789)Yersinia frederiksenii

MSEAIINSEQAAQLWPLPDVDLTNLDLFSRGFPHQVFTDLRRHRGALFHPRTALTPDGEGFWVFTRYHDIAAIAKDNDTFSSAGGGDRQGGGTMIEDLPREMGPGSVINMMDDPRHKALRRLIAPAITNARVAAMEDVLFAAAGSAVQAALQQERVDFVSAIAAELPLFAIASLVGIPHDDRHQIFAWINAVLDYSDRQLGETSISSQQGMQNFMAYGHKFVEEKRQNPGSDIVSLAVTGELAKGLGKLTPLEQLMVFSVVMVAGLETTRNAIAGGILAFIHHPEQWLRLQQDRGLMNSALDEILRWTSPTPYNRRTATRDVIIGDRLIRRGEKVTLWWASANRDDAYYEQPFAFDIGRQKNQHMAFGGGGHSCLGAQLARLEMRVILHHLLEQVDGFRLDGDVNWVRSNKHTGIRSMPVRFVKR

>CYP126C1(CH54\_873)Yersinia kristensenii

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>CYP126C1(Pat9b\_4758)Pantoea rwandensis

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>CYP1278A2(Dd703\_3094)Dickeya dadantii Ech703

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>CYP133D1(Dd703\_1892)Dickeya dadantii Ech703

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>CYP134B1(plu0296)Photorhabdus luminescens

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>CYP153E1(Dda3937\_03358)Dickeya dadantii 3937

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>CYP153E1(LH89\_21620)Cedecea neteri

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>CYP153E1(Dd586\_1369)Dickeya zeae Ech586

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>CYP159B2(Pat9b\_5697)Pantoea rwandensis

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>CYP177E1(ECA2071)Pectobacterium atrosepticum SCRI1043

MPTKTQGRPLMFAHPERQDKYFPWADRLFRVNPYPWYDKVRAEHPVYRMENGEIVLTRYHDVMTWLKAPLGISNFGNGPWNNFDNTVLNCDPPEHTTLRRHSNKWFTPKLVNQYVTIATELAENALDRYSDGSVMDAFYELAVVPPHATMCRALGVPEDDAGLIYRHFLTCTDALGHGVGRDDTEKASQSFDYLFERCAHYIKEKRSNPNVGPQGLVDDFLKLADEGKLTERAVLETMVLFYGSGSPNPATVIASGLNHFAREPETFELYRTQPEERNAIINELTRLYPAEISMIRYATEDTEIDGIPVTKGTPVRAVIAAANRDPEFFENPHEFNHKRPPETSMNLTFGVGHHACAGQLISRSAVRSVFDAVAKKATRIQIAGEAGIAHTDRVRGYLSLPLRIY

>CYP177E1(GZ59\_25290)Pectobacterium atrosepticum 21A

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>CYP234A1(plu4183)Photorhabdus luminescens

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>CYP1049A3(D782\_1435)Enterobacteriaceae bacterium FGI 57

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>CYP1179A2(VY86\_10220)Photorhabdus temperate

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>CYP1200B1 (XPG1\_2637)Xenorhabdus poinarii

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>CYP1247A2(Pecwa\_3634)Pectobacterium parmentieri WPP163

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>CYP1247A2(A8F97\_00480)Pectobacterium parmentieri RNS08.42.1A

MRSIKRLPMPPTRGVLGHVDYLKRSDIHLQMLRWKAQYGRFYRLRLGLTPAVVIADTEWIRTIMKSRPGEFRRISSIESVFQEAGLNGVFSSEGERWENQRKLTEPMFQPAHLKYFYSSLRKVTSRLSNRFTMLAETGETIALVDEFKRYTVDITSLLAFGEDVNTLEQGDNPLSQSLRHLFPIINERCESPLPVWRYIRRARDKQFDASLNLIREYVDGFIYRQRQRIQLNPQLLDAPENMLQVMLAEQQKDGMLKDDDIVANAITLLIAGEDTTANTLTWMSFLLCSAPSVEACVFQECKEVTDSVEAILPWPLPRMPWLTAVMYESMRLKPVAPLLYLEPTKNTVIDDFLIKKGTPLLLMLNASGFDDELFQQPYDFMPERWLERGKAAFSDLQPFGGGPRMCPGRSLALMEIKLGFHALCSGFRVEAQQAASAVTESFAFTMTPSGFCVKLHKREQTQ

>CYP1247A2(A7983\_03310)Pectobacterium wasabiae

MRSIKRLPMPPTRGVLGHVDYLKRSDIHLQMLRWKAQYGRFYRLRLGLTSAVVIADTEWIRTIMKSRPDEFRRISSIESVFQEAGLNGVFSSEGERWENQRKLTEPMFQPAHLKYFYPSLRKVTSRLSERFTMLAEAGETIALVDEFKRYTVDITSLLAFGEDVNTLEQGENSLSQSLRHLFPIINERCESPIPVWRYIRRARDKQFDVSLSLIREYLDGFIYRQRQRIQLNPQLMDAPENMLQVMLAEQRNNGALKDEDIMANAITLLIAGEDTTANTLTWMSFLLCSAPSAEECIFQECKEAADGAGAILPWPLPRMPWLTAVMYESMRLKPVAPLLYLEPTKDTVIDDFLIKKGTPLLLMLNASGFDDELFQQPYDFMPERWLERGKAAFSDLQPFGGGPRMCPGRSLALMEIKLGFHALCSGFRVEAQQPASAVTESFAFTMTPSGFRVKLHKREQTQ

>CYP1247A2(EV46\_18180)Pectobacterium atrosepticum JG10-08

MRSIKRLPMPPTRGVLGHVDYLKRSDIHLQMLRWKAQYGCFFRLRLGLSSAVVIADTEWIRTIMKSRPDEFRRISSIESVFQEAGLNGVFSSEGERWELQRKLTEPMFQPAHLKYFYSSLRKVTSRLSERFTMLAEAGEAIALVDEFKRYTVDITSLLAFGEDVNTLEQGDNPLSQSLRHLFPIIHERCESPIPVWRYIRRARDKQFDASLNLIREYVDGFISRQRQRIQLNPQLLEAPENMLQVMLAEQQKDGTLKDDDIVANAITLLIAGEDTTANTLTWMSFLLCSAPSVEECVFQECKEAAEGVGAILPWPLPRMAWLTAVMYESMRLKPVAPLLYLEPTRDTVIDDFLIKKGTPLLLMLNASGFNDELFQQPYDFMPERWLERGKAAFSDLQPFGGGPRMCPGRSLALMEIKLGFHALCSGFHVEALQVASAVTESFAFTVTPSGFRVKLHKRELQQ

>CYP1247A2(Dd1591\_0711)Dickeya zeae Ech1591

MKSIKRLPTPPTRGLLGHVEYLKRHDVHLQLLRWKERYGPFYRLRLGWKPAMVIADAEWIRTIMKARPDEFRRRSSIESVFQEAGLNGVFSSEGTRWEHQRKLTEPMFQPAHLKYFYPSLRKITARLSERFARLAQTGEVFSLVDEFKRYTVDVTSLLAFGEDINIIEQGENPLSQSLRRMFPVINQRCGSPIPLWRYIRRERDKQFDASLSLIRERLYAFIDHQRERLERNPQLIDAPENMLQIMINEQKKDGALTDEDILANAFTLLLAGEDTTANTLAWMSFLLCTSPAVEEQVVRECRQATEDAEDILPWPLPRMPVITAVMYEAMRLKPVAPLLYLEPVKDTVVADFHIRKGTPLLLMLHASGFEEALFQQPRDFMPERWLERGQASFSDLQPFGGGPRMCPGRSLALMEIKLGFHALCSRFRVEAQQPASEVIESFAFTMTPAGFRVRLHKRP

>CYP1247A2(LH89\_16610)Cedecea neteri

MRSIKQLPAPPARSILGHVDYLKRPDIHLQMLQWKERYGLFYRLRLGFTPAMVIADSEWIRTIMKARPDDFRRRSSIESVFQEAGLNGVFSAEGARWMHQRKLTEPMFQPAHLKHFYPSLRKVTARLSERFAKLAETGEVVSLVDEFKRYTVDITSLLAFGEDINILEQGENPLSESLRRLFPVINERCGSPIPLWRYIKMARDKQFDASLKLIHDQLNEFICRQRERIQQSPQLMDAPENMLQIMIAEQQKDGTLTDADILANAFTLLLAGEDTTANTLAWMSFLLCSSPSVEAQVVRECHQATEEVGTGLPWPLPRMPLLTAVMYESMRLKPVAPLLYLEPVKDTVIADFLIKKGTPLLLMLNASGFDEALFHQPGDFRPERWLERGQASFSDLQPFGGGPRMCPGRSLALIEIKQGFHALCSGFRVEAQQPALDVMESFAFTVTPIGFRVRLHKRPQPDIAQHEV

>CYP1247A2(Dda3937\_03443)Dickeya dadantii 3937

MSFAIPSFFISSGSLNGCFFAGHLSPEQGRISRMRSINRLPMPPTRGLLGHVHYLKRHDVHLQLLQWKERYGPFYRLRLGLTSAMVIADSEWIRTIMKARPDEFRRRSIIESVFQEAGLNGVFSSEGARWGHQRKLTEPMFQPAHLKYFYPSLRTITARLSARFARLAETGEVVSLVEEFKRYTVDITSLLAFGEDINTLEQGENPLSQSLRRMFPVINERCGSPIPLWRYIKRARDKQFDASLSLIDDHLNAFIDHQRERIRQNPQLLDAPENMLQIMLAEQQKDGTLTDADILANAFTLLLAGEDTTANTLTWMSFLLCSAPSMEENVVDECRQASGGEGGFLPWPLPRMPLLTAVMYESMRLKPVAPLLYLEPVKDTVIADFLIRKGTPLLLTLHANGFEETLFHHPHDFMPDRWLERGQASFSDLQPFGGGPRMCPGRSLALMEIKLGFHALCSGFRVEAQQPASDVMESFAFTVTPTGFYVRLHKRHQSDIARHEA

>CYP1247A2(A4U42\_05050)Dickeya solani

MRSIKQLPMPPARGVLGHVHYLKRHDVHLQLLQWKERYGPFYRLRLGLASAMVIADSEWIRTIMKARPDEFRRRSSIESVFQEVGLNGVFSSEGARWMHQRKLTEPMFQPAHLKYFYPSLRKVTARLSERFSILAETGEVVSLVEEFKRYTVDITSLLAFGEDINTLEQGENPLSQSLRRMFPVINERCGSPIPLWRYIKRARDKQFDASLSLIYDHLNGFIDHQRERIRQNPLLLDTPENMLQIMLAEQQKDGTLTDADILANAFTLLLAGEDTTANTLAWMSFLLCSSPSMEEQVVDECSQVAEGSGRGLPWPLPRMPLLTAVMYESMRLKPVAPLLYLEPVKDTVIAGFLIKKGTPLLMMLHASGFEETLFHQPSDFMPERWLERGQASFSDLQPFGGGPRMCPGRSLALMEIKLGFHALCSGFRVEAQQPASDVIESFAFTVTPTGFRVRLHKQRQPDIAQHEA

>CYP1413A1(SerAS9\_1502)Serratia plymuthica AS9

MTLCPYTRAVTAVTSDNPRADYLQMAPMQFQAQLQSWVAASPLAVREALNNRDLGVRPTGEPIPTLLLNTPAQSIFGALVRMQDGEVHPQLKAAIRQALAGIDEILIQQTTLTVAREIAPCLPDANQITRFNYALPVCVMASLLGVGADEWAELADEVLDFSRCIAPGGSESQRGKGILAAGRLSARFENRRGPLWLSLQRACAIRDMGHHTVLSNAIGLMFQACEGTAGLIGQTLLLMRNHDGDTQALIEKVLSDTPPIQNTRRFALRDTLVAGYRVLAGQDILILLCAGDESFAFGDGAHRCPGANWAKIIARYGIQHLSALGVDPQALNSFHWRVSQNARVPEFYL

>CYP1413A1(SerAS12\_1502)Serratia sp. AS12

MTLCPYTRAVTAVTSDNPRADYLQMAPMQFQAQLQSWVAASPLAVREALNNRDLGVRPTGEPIPTLLLNTPAQSIFGALVRMQDGEVHPQLKAAIRQALAGIDEILIQQTTLTVAREIAPCLPDANQITRFNYALPVCVMASLLGVGADEWAELADEVLDFSRCIAPGGSESQRGKGILAAGRLSARFENRRGPLWLSLQRACAIRDMGHHTVLSNAIGLMFQACEGTAGLIGQTLLLMRNHDGDTQALIEKVLSDTPPIQNTRRFALRDTLVAGYRVLAGQDILILLCAGDESFAFGDGAHRCPGANWAKIIARYGIQHLSALGVDPQALNSFHWRVSQNARVPEFYL

>CYP1413A1(SerAS13\_1503)Serratia sp. AS13

MTLCPYTRAVTAVTSDNPRADYLQMAPMQFQAQLQSWVAASPLAVREALNNRDLGVRPTGEPIPTLLLNTPAQSIFGALVRMQDGEVHPQLKAAIRQALAGIDEILIQQTTLTVAREIAPCLPDANQITRFNYALPVCVMASLLGVGADEWAELADEVLDFSRCIAPGGSESQRGKGILAAGRLSARFENRRGPLWLSLQRACAIRDMGHHTVLSNAIGLMFQACEGTAGLIGQTLLLMRNHDGDTQALIEKVLSDTPPIQNTRRFALRDTLVAGYRVLAGQDILILLCAGDESFAFGDGAHRCPGANWAKIIARYGIQHLSALGVDPQALNSFHWRVSQNARVPEFYL

>CYP1413B1(Z042\_20910)Chania multitudinisentens

MMACPFSAATQQVVREALAHRDLGMRPPHEPVPAALLATPAQPLFAALVRMRDDAGHGELKAAISAALASFSDNELCQATHRVAQQLAPDMLTAEQLTRFNYALPIGVLADMLGVAYQERTVLVDNVLDFVRCIAPGGSEQQMARGVIAAGKLHEWMQAADGPLFIRLCQRIGDRSVAIANAIGLFFQACEGTAGLLGQTLLLMQKQDVTVEYGLSSVLQETPPIHTTRRFALRDTRLDGEPLVAGQTVLIALKTEGESFAFGYGSHQCPGSAWAHLIALGGIRHLLALNMESKLLTHFRWRVSQNAHVPEFFTAEEQ

>CYP1414A1(ECENHK\_05600)Enterobacter cloacae subsp. cloacae ENHKU01

MAYVEKALRFNPASPVFQENLHNVYHHMRNHQPVARIGKTWVLTRYQDVYQTLKERAFVSSGITEDVHSEMEKECFSLSPPIRDLLYGIVLFEDGNVHRAHRQALQALFTGESWAALTQLISDESHTLVAELTTTGTFDGIRQIAAPLWGKLFTAWLNLPEAQQEVVEQEKSAIRLLLDPSAIDREGLQRLIVALSRLDDSFRQLAQAHSQGYDSLFYRSLLKGYGGDRDALATRFSTDCVTMLIGGSETSEALTGNLVYMLAQHPELQACVRNNTLRMKDVVSETMRFESPLQMGRRKVVAPVQFLGRELKAGDNILVCLGSANRDESVFEEAWRFIPGRKNAQRQLGFGAGVHQCIGQLLAQCQAETLAMALCERGTLSLDGEAKWSTRSLILRTLETLPVKIT

>CYP1414A2(A3UG\_05565)Enterobacter cloacae subsp. dissolvens SDM

MAYVDKALRFNPASPVFQENLHNVYHHMRNHQPVARIGKTWVLTRYKDVYQALKERAFISSGIPEDVHRALEKERFSLSPPLLSLLYGIVLFEDGGVHRMHRQALQSLFMGESWEALTTIITRESQSLVAGLSTAYPFDGIRQIAAPLWGKLFSAWLNLPDELQAVVEEEKSAIRLLLDPSSIDRQGLERLLKALSHLDEGFSQLAQAHRKGYDSLFYRSLLNGYGGDDDALRERFSTDCVTMLIGGSETSEALTGNLLYMLAQHPELQERVQDNTVRMKDIVSETMRFESPLQMGRRKVAAPVEFLGRKLNVGDNVLLCLGSANRDETVFEEAGRFMPDRKNVQRQLGFGAGVHQCIGQLLAQCQAENLAMAVSERGIIALEDEAKWSNGSLILRTLESLPVKII

>CYP1414B1(AXX16\_3285)Serratia rubidaea

MNSANDRTLRFNPASPSFNQYIYQIYQRMRQQQPLLRIGRTWVLTRYQDVSAALRAPQLSCSGIPRHLTAEFARLQGGLAPELAMLVQEMALFQDNGTHRQHRKPLMALFSREPLAQLRRLVVDEINRSIAALAKTDRLDVIAQLARPLWPRLFARWLNLSPQQSQVIEQEKESIRLLLDPSAIDRAGLERLASALRRLDTLFSQLYQECADGRPSLFFAALAQGYGDQQALMQRYFSADCVTILIGGSETTEALIGNLMQVVAQDEPLQQQLRQHPQWIAQAVQETLRYESPLQMARRTVIQPWTLHGRTLREQDAVLLCLGAANRDETQFCDAQQFDLHRENNSRHLGFGGSAHLCAGQLLARFQAESVCAALLQHFPRLRPLEQAQWQTDSLILRSLKSLPLALG

>CYP1415A1(Rahaq\_4695)Rahnella sp. Y9602

MPDNAQAIPFFTPPSSQFARLGFLKIAEMACRQHGDKVWIGEKDNAVLLLAGARHVRLLIEQESQFVKEFEHLSSASTIGRILLGQSLTTSKEGEEWRLARKLTTPLVNPKSPLLKQSTDLSARWLLDILQDPQQTSLREICLHWALMCVAEGFFGREISLAQLNTLIGHFRDIYLQLIIAAPDADYEALCRHPALVAFRLEAESLLGPLLDDARGGNTTMLERLCQALSPGAHPEARERVISLLLGNLAASVDNTGIALLWTLTHLSQHLNYQHCVREEAAQGKRNMASAIVRESLRLTPVTAFFERRVAENIVVDDVVITAGTRVLFSPWLIHRHAACWAEPLCFRPERFLGEEKIAPEHFLPFSVGKRNCVGMTLALDQLTTAVATLCEHFQFSLAPSTSPAALTPLFALNVIPRGDLSFILASTNKAEQHDHIP

>CYP1415A1(Q7S\_23996)Rahnella aquatilis HX2

MPDNAQAIPFFIPPSSQFARLGFLKIAEMACRQHGDKVWIGEKDNAVLLLAGARHVRLLIEQESQFVKEFEHLSSASTIGRILLGQSLTTSKEGEEWRLARKLTTPLVNPKSPLLKQSTDLSARWLLDILQDPQQTSLREICLHWALMCVAEGFFGREISLAQLNTLIGHFRDIYLQLIIAAPDADYEALCRHPALVAFRLEAESLLGPLLDDARGGNTTMLERLCQALSPGAHPEARERVINLLLGNLAASVDNTGIALLWTLTHLSQHLNYQHCVREEAVQGKRNMASAIVRESLRLTPVTAFFERRVAENIVVDDVVITAGTRVLFSPWLIHRHAACWAEPLCFRPERFLGEEKIAPEHFLPFSVGKRNCVGMTLALDQLTTAVATLCEHFQFSLAPSTSPAALTPLFALNVIPRGDLSFILTSTNKAEQHDHIP

>CYP51B1(MCA2711)Methylococcus\_capsulatus

MSHPPSNTPPVKPGGLPLLGHILEFGKNPHAFLMALRHEFGDVAEFRMFHQRMVLLTGSQASEAFYRAPDEVLDQGPAYRIMTPIFGRGVVFDARIERKNQQLQMLMPALRDKPMRTYSEIIVAEVEAMLRDWKDAGTIDLLELTKELTIYTSSHCLLGAEFRHELNTEFAGIYRDLEMGIQPIAYVFPNLPLPVFKRRDQARVRLQELVTQIMERRARSQERSTNVFQMLIDASYDDGSKLTPHEITGMLIATIFAGHHTSSGTTAWVLIELLRRPEYLRRVRAEIDALFETHGRVTFESLRQMPQLENVIKEVLRLHPPLILLMRKVMKDFEVQGMRIEAGKFVCAAPSVTHRIPELFPNPELFDPDRYTPERAEDKDLYGWQAFGGGRHKCSGNAFAMFQIKAIVCVLLRNYEFELAAAPESYRDDYRKMVVEPASPCLIRYRRRDAPAAVDAKASAGEAPAETLRGAFRVTVDRDLCKGHGNCMAEAPEIFRVDEDGRLTLLSETPDPVLVGAALAAERFCPARAIKILPQRDPATRDRSLSPSGED

>CYP51B1(HDN1F\_11100)Gamma\_proteobacterium\_HdN1

MTAAQPLPAPEPDLLAPPKLKGGVPLLGHIFPFARNPFQFMKRVSDELGEIAQFRIFNQRMVLLTGDAASTLFYRSSDDVLDQSAAYKLMTPIFGEGIVFDAPNERKNQQLKMLMPSLRAEAMRHHSDKIVQEVEDLAQRWGEQGEVDLVAEMKRLTINTASHCLLGREFRYELTDEFASIYHDLEKGVNALAYSFPNLPIPAFRARDRARVRLHQLVSEIVKKRESQAHKPNDMFQSLIDTHYEDGSKLTTDEITGILIAAIFAGHHTSSGTAAWVLLELLKHPHHLREVRNELDQLFGSDGVVSFQTLREIPHLENVLKEVLRLHPPLIVLMRQVVEPIRFKGYRIEAGDMVWASPPVTHRMSQLFPNPEVFDPTRYEGDHAADKNLMAWQPFGGGKHKCAGNAFALFQIKAIFSVLLRKYDFELVNRPDTYVDDYGEMIVQPKSPCMVRYKRRLPNSFASKFGTHASAEPVAAECPMHARSAKIPVTAVPDAKPASPENEVQGIRTFSVRVDRQLCQGHAICMGEAPELFRVDQNGYNHILQAHLDSEQLQKALNAAKYCPNQAISIHEDVRKENPQCENTE

>CYP101M1(PCA10\_28250)Pseudomonas\_resinovorans

MTAPLSELPDHVPADLVRHFDLYEPIEGDDDYQTWFTKLQAAGTPDIFWTRHNGGHWVVTRGEDFDHVLKTPETYSSRINVVPRERLMPIVSKPIQLDPPDHTRYRNLLIPAFSPKAVVPLGEKARALTIELIEGSLARGRCEFVSEFARRLPIGIFMDMVALPTADREQLLEWVDEMIRPTQVDSLEAGNQLIRYAFDQLQERRAEPGSDLLSELTRAQVGGNPLQDEELVGMFFLLLLGGLDTVAAMLSFIIRHLASHPEARRELIEHPERIPAAAEELMRRFPISTLVRVVTRDHEYKGINFREGDLVLMQTSAHSVDDRLFNDPLAVDFERKVVFHGTFGSGAHRCIGSMLARVEVRVFLEEWLKRIPEFRLKPGQPLRVEPGMVLAMPRLELEWDITESRP

>CYP107E27(B5T\_02506)Alcanivorax\_dieselolei

MEPPLSYPFNRFDGLELSERYAQALSRTGLTRITLPFDGDAWLATRYEDVRLVLSDRRFSRAEATQRERVPRAFPRVAGGIVIMDPPELTRLRKLALQAFTVRRVEGLRPHVREVADGLIDDMLRRGAPADLVADYALPIPMSVICELLGVPLADQPRFKIWNDSLLSTNALSAEETQQNLGELSHYIMALIDERRARPRDDLISAMIQARDQDDRLSQGELVLLCIAILVAGYEGVSSHIPNFLYTLLSRPDTLDRLRSDPDRMADAVEELLRLIPLASAAMFVHFAREDVQVGDTLVRAGEAVFASVGAANRDPHRFHQPDHLDIDRDASGHFAFGHGMHHCIGAGLARVELQEALGVLLRRLPEIHLCGEIEWKTKTFFRGPRRMPVAW

>CYP107E28 (VO64\_5516)Pseudomonas\_fluorescens\_LBUM223

MTPLAYPFNAFTDLELAEPYRHAQQAPGLLRIQMPIGAPAWLATRYDDVRLVLGDRRFSRSEAFRRDDAPRAFPRIAGGIVMMDPPQLTRIRSRAAQAFTRRRVEALRPHARAYAHELIDRMLAAGPPADLVNDYALPLPLGLICELLGVPLQDRERFKLWNDSLLSTRPEDAALTQQHLGELAAYIKGLVAERRRQPQDDFMTALAQADDNGERLSEEQLLLLCIAILVAGYEGSASQIPNFIQVLLDNPAQWQQLKAHPEQIPQAVEELLRYIPLASAAMFVHYALEDIQVGETLVRQGEAVFASIGAANHDPARFADPQTLDLQRDASGHFGFGHGLHHCIGSALARVELQEALQALVERLPNLQRCGEVQWKTATFFRGAHCLPVTWS

>CYP107E29(PFLUOLIPICF724160)Pseudomonas\_fluorescens\_PICF7

MTPLDYPFNCFTDLKLAEPYRHAQQAPGLLRIQMPIGAPAWLATRYDDVRLVLGDRRFSRSEAFRRDDSPRAFPRIAGGIVMMDPPQLTRIRSRAAQAFTRRRVEALRPHARDYAHQLIDRMLAAGPPADLVNDYALPLPLALICELLGVPVQDRDRFKVWNDSLLSTRTEDAAQTQRHLGELAAYIKGLVAERRREPRDDFMTALTQTDDKGESLNEEQLLLLCIAILVAGYEGSAAQIPNFIQVLLDNPTQWQQLKADPEQIPQAVEELLRYIPLASAAMFVHYALEDIQVGETLVRQGDAVFASIGAANHDPARFENPQALDLHRDANGHFGFGHGLHHCIGSALARVELQEALHALVVRLPDLQRCGEVQWKTATFFRGAHCLPVTWS

>CYP107E30(PF1751\_v1c25740)Pseudomonas\_fluorescens\_PCL1751

MTPLDYPFNCFTDLKLAEPYRHAQQAPGLLRIQMPIGAPAWLATRYDDVRLVLGDRRFSRSEAFRRDDSPRAFPRIAGGIVMMDPPQLTRIRSRAAQAFTRRRVEALRPHARDYAHQLIDRMLAAGPPADLVNDYALPLPLALICELLGVPVQDRDRFKVWNDSLLSTRTEDAAQTQRHLGELAAYIRGLVAERRREPRDDFMTALTQTDDKGESLNEEQLLLLCIAILVAGYEGSAAQIPNFIQVLLDNPTQWQQLKADPEQIPQAVEELLRYIPLASAAMFVHYALEDIQVGETLVRQGDAVFASIGAANHDPARFENPQALDLHRDANGHFGFGHGLHHCIGSALARVELQEALHALVVRLPDLQRCGEVQWKTATFFRGAHCLPVTWS

>CYP107S1(PA3331)Pseudomonas\_aeruginosa\_PAO1

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(PLES\_17331)Pseudomonas\_aeruginosa\_LESB58

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(M062\_17795)Pseudomonas\_aeruginosa\_RP73

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(T223\_08690)Pseudomonas\_aeruginosa\_LES431

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(SCV20265\_1717)Pseudomonas\_aeruginosa\_SCV20265

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(AI22\_25195)Pseudomonas\_aeruginosa\_YL84

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(NCGM2\_4461)Pseudomonas\_aeruginosa\_NCGM2.S1

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEELLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(NCGM1900\_2945)Pseudomonas\_aeruginosa\_NCGM\_1900

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEELLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(PADK2\_07615)Pseudomonas\_aeruginosa\_DK2

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPANDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(PA1R\_gp1168)Pseudomonas\_aeruginosa\_PA1R

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDHLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(U769\_08190)Pseudomonas\_aeruginosa\_MTB-1

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEALLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIVQ

>CYP107S1(BN889\_03700)Pseudomonas\_aeruginosa\_PA38182

MLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEELLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPQQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(PA14\_20970)Pseudomonas\_aeruginosa\_UCBPP-PA14

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEELLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFGDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(PAM18\_1634)Pseudomonas\_aeruginosa\_M18

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEELLDAMADREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIAQ

>CYP107S1(G655\_08105) Pseudomonas\_aeruginosa\_B136-33

MPDRKLRLGEELISPLHALYDGLQVDGAPRPAHRAAEHPVWVVTRYRDARKVLNHPGVRRDARQAAELYAKRTGSPRAGIGEGLSHHMLNLDPPDHTRLRSLVGRAFTPRQVERLQPHIERITEELLDAMAGREQADLMADFAIPLTIAVIFELLGIPEAEREHARQSWERQAELLSPEEAQALADAQVDYLRVLLEAKRRQPADDVYSGLVQAADESGQLSEAELVSMAHLLMMSGFETTMNMIGNALVTLLVNPEQLALLRAQPELLPNAMEELVRHDSPVRASMLRFTVEDVELDGVTIPAGEYILVSNLTANHDAERFDDPDRLDLTRNTDGHLGYGFGVHYCVGASLARLEGRIAIQRLLARFPDLQLAVPHAELQWLPITFLRALISVPVRTGCSAPANTASHANPIERIVQ

>CYP107DJ1(PSEBR\_a5392)Pseudomonas\_brassicacearum\_subsp.\_brassicacearum\_NFM421

MAYERTLDLNSDAFRGEAYRHYAALRQASPVFFSQAEGQLPMWYVTGAREVEEVLLDNERFARDPSRIDAQFAAMLGGEQSIAFLNDHMLNRDGDSHRRLRRLVNKAFTLKAVNALRPRIEQIAETLLEPVRSSGQMDVVGQYAFPLSITVIAELLGVPAQDRDDFRRWSHMIVQQVGHDLSELQRCYNEFAGYMLALIDRRRAQPGDDLVSALAQVEEEGSMLSQSELCSMIALLIIAGHETSASMIANAVHMLVQHPKALARLRDEPALMPGAVEEFLRYDSSVERAMVRFVTRDTELAGQRLLRGQLLIAVVGSANRDEALCANPDTLDITRPACPHMSFGKGTHYCLGASLARQELEIALNTLLRCCPGLQLAVDPGAVRWRYVPNFRGPEALPVCWSVG

>CYP107DJ1(PSF113\_5612)Pseudomonas\_fluorescens\_F113

MAYERTLDLNSDAFRGEAYRHYAALRQASPVFFSQAEGQLPMWYVTGAREVEEVLLDNERFARDPSRIDAQFAAMLGGEQSIAFLNDHMLNRDGESHRRLRRLVNKAFTLKSVNALRPRIEQIAETLLEPVRSSGRMDVVSQYAFPLSITVIAELLGVPAQDRDDFRRWSHMIVQQVGHDLSELQRCYNEFAGYMLALIDQRRAQPGDDLVSALAQVEEEGSMLSQSELCSMIALLIIAGHETSASMIGNAVHMLVQHPKALARLRDEPALMPGAVEELLRYDSSVERAMVRFVTRDTELAGQRLQRGQLLIAVVGSANRDETLCANPDTLDITRPACPHMSFGKGTHYCLGASLARQELEIALNTLLRCCPGLQLAVDPGAVRWRYVPNFRGPEALPVRWSVD

>CYP107DJ2(NJ69\_15465)Pseudomonas\_parafulva

MANACTLDFNSDAFRSAAYQHYATLREAAPVFLSQPPGQLPIWYVTGAQDVETVLLDSERFARDPARISPQFAAMMGGDQSIAFLNDHMLNRDGERHRRLRRLVNKAFTLKAVNAMRPRIEQIAERLLDQAGPSGRLDVVSQYAFPLSIIVIAELLGVPAQDRDDFRRWSQLIVQQVGHDLSELQRCYAEFASYMLALIEQRRAAPTDDLVSALVEVEEDGNVLSSSELCSMIALLIVAGHETTASMIGNAVYLLLRHPHTLIQLRDSPDSMANAVEELLRYDSSVERAMVRFVTQDTELGGQRLQRGQLLMAVVGSANRDPALCAQPDILDVTRPACPHLAFGKGAHYCLGASLARQELEIALNTLLRRCPGLQLEGTPESVRWRYVPNFRGPQALPVRWSVA

>CYP107HT1(THITH\_13855)Thioalkalivibrio\_thiocyanoxidans

MIPIPATPATSQRVFDPRSPELVERPYDVYRHLRDEDPVHRSPFGMWVLSRYEDVYRALRDPRLSSKPSRYSVHAAHRNRSTPAAIAAQHMIMFLDAPEHTRLRGLLARVITDNLAANMRERIQKLVDDLLEGPLERGEMDIVRDLAIPLPLNVIAELLGIPAEDRSRLKEWSNWFFQIFSPVVSEEGRNRLNHAILEFREYLGALASERRRSPRQDIVSSLIAVSVDGDRLTDDEIFTSCLALFSNGQEALSHLVGNGMLALLQHPEQMRRLREDPGMIRNAVEELLRYDTPAQTVGRTATEAIELHGKVIPAGAPVYLLIGSANRDPCRFPNPDILDLSRPDCRHLSFGTGPHACLGAGLARVEAQAAILTLLTKTQDMELCGGPPTRLPNIFVRGLEALPVRFRAC

>CYP108R1(IMCC21906\_02686) Spongiibacter\_sp.\_IMCC21906

MNSETLKSVEPVVPEDIARIVVSGKSYAHDDVIYPAFKWLRGNMPLGKAYLDEYDPIWLVTKYDDVMEISRDADTYKNGIHNVLLQTRESDEFTRKMMNGKIRSLNSLAFMDAHEHKTYRDITAKWFMPNLIKRYEQRIREIAKESVDEFFALGGECDFVKDFALYYPLRVIMDLIGIPREDEAIMLKLTQELFAGEDPDERREGVDLGPDAVARAWHATMMEFYDYFRGLSAERQKNPKDDLISLIANHRVDGERIDEAHEFDYYIAVATAGHDTTSTAASGGVLGLIQYPEQFDLLKSDIGLVDKFVTESIRWTTPIKHFMRTASRDVELRGQLIHKNDRLMLCYPSANRDPDRFTDPDAFVIDRRPNQHLAFGNGLHMCLGQHLARLDMRILFQELIPRLNSIELTGTPKFIEATFTSGLKTMPVRYTGG

>CYP111A3(ACIAD1575)Acinetobacter\_sp.\_ADP1

MNIKEQGMSRIDLKDPDLYQQRVPHDLFAQLRKEQPVYWNDEVDGSGFWAVMKHKDICEVSRNPAVFSSAYENGGHRIFNENEVGLTGAGESAVGIPFISIDPPLHTQYRKAIMPALSPARLGDIENRIRERAKLLIEQIPFDQEVDIVQLLSAPLPLLTLAELLGVKPDVWKDLYHWTNAFVGEDDPEFRQSPEAMQQTMIEFMSFCQALFEERRANPGHDIATLLATVPIDGKAPVLRDFIGNLILTLVGGNETTRNSMSHTIVNFCKNPEQWDKIKQNPELLKTATAEMVRHASPVLHMRRTATQDTMIGEQKIAKGDKVVLWYSSANRDEDVFERPDEFDVTRKGFQHVGFGFGQHVCVGSRLAEMQLRVVFELLAERVERFELKSEPRRFRSNFLNGLKNLNVVLVAK

>CYP112A5(XOC\_0084) Xanthomonas\_oryzae\_pv.\_oryzicola\_BLS256

MSDDPLPMLPMWRVDHIEPSPAMLALRANGPIHRVRFPSGHEGWWVTGYDEAKAVLSDAAFRPAGMPPTEFTPDSVILGSPGWLVSHEGIEHARLRTIVAPAFSNRRVKLLAEQVETIAAQLFETLAAQAQPADLRRHLSFPLPAMVISALMGVPYEDHTFFAGLSDEVMTHQHESGPRRASRVAWEELRAYIRGKMRGKREEQGDDLLTDLLAAVDQGKASEEEAIGLAAGMLVAGHESTVAQIEFGLLALLRHPQQRERLVTDPSLAESAVEEILRMYPPGAGWDGIMRYPRVDVDIAGVHIPAESKVLVGLPATAFDPRHFDDPEIFDIGRDAKPHLAFSYGPHYCIGVALARLELKVVFGSIFQRFPALRLAVAPEALTLRKEIITGGFEAFPVRW

>CYP112A5(BE73\_23905)Xanthomonas\_oryzae\_pv.\_oryzicola\_CFBP7342

MSDDPLPMLPMWRVDHIEPSPAMLALRANGPIHRVRFPSGHEGWWVTGYDEAKAVLSDAAFRPAGMPPTEFTPDSVILGSPGWLVSHEGIEHARLRTIVAPAFSNRRVKLLAEQVETIAAQLFETLAAQAQPADLRRHLSFPLPAMVISALMGVPYEDHAFFAGLSDEVMTHQHESGPRRASRVAWEELRAYIRGKMRGKREEQGDDLLTDLLAAVDQGKASEEEAIGLAAGMLVAGHESTVAQIEFGLLALLRHPQQRERLVTDPSLAESTVEEILRMYPPGAGWDGIMRYPRVDVDIAGVHIPAESKVLVGLPATAFDPRHFDDPEVFDIGRDAKPHLAFSYGPHYCIGVALARLELKVVFGSIFQRFPALRLAVAPEALTLRKEIITGGFEAFPVRW

>CYP112A6(FD63\_13540)Xanthomonas\_translucens

MSQSELVALPMWRVEHIEPSPAMLMLCADGPIHRVRFPSGHEGWWVTGYDEAKAVLSDERFRPAGMPPAEFTPDSVILGSPGWLVSHEGIEHARLRTIVAPAFSNRRVKLLAQQVEAIATQLFDALEAQPQPADLRHALSFPLPAMVISALMGVPYEDHAFFAGLSDEVMTHQHESGPRNASRLAWEELRAYIRGKMREKRQAPGGNLLTDLMQAVDRGEATEEEAIGLAAGMLVAGHESTVAQIEFGLLALFRYPQQRERLVGDPSLVEKAVEEILRMYPPGAGWDGIMRYPRTDVTIAGVHIPAESKVLVGLPATAFDPRHFNDPEVFDIGRDEKPHLAFSYGPHYCIGVALARLELKVVFGSIFQRFPGLRLAVAPDELRLRKEIITGGFEEFPVRW

>CYP114A(XOC\_0082)Xanthomonas\_translucens

MAEMRVVVDQALCATTGQCALTLPAVFRQRVSDGVAEVCVAEVPPALHAAARLAASQCPVAAIRIIDADADAAGTGGGPASSQAEPSIASAPRNSGGHDGTM

>CYP114A5(FD63\_13535)Xanthomonas\_oryzae\_pv.\_oryzicola\_BLS256

MDVQNTTAVCRDAFAELASPACIRDPYPFMHWLREHDPVHRAASGIFLLSRHADIYWALKATGDAFRGPAPGELARYFPRAATSLSLNLLASTLAMKEPPTHTRLRRLVSRDFTVRQIDSLRPSIVRIVEARLDGMAPALARGETVDLHREFALALPMLVFAELFGMPQEDMSGLAAGIGTILEGLSPHASDAQLAAADATSAKVQAYFGALIERKRTESRQDIVSLLVGAHDDDADALSDAELISMLWGMLLGGFATTAATIDHAVLAMLAYPEQRHWLQGDAAAVKAFVEEVLRCEAPAMFSSIPRIAQRDIALDGGVIPKNADVRVLIAAGNRDPNAFADPDRFDPARFHHTSPGMSTEGNIMLSFGHGIHFCLGAQLARVQLAESLPRIHARFPTLVLAEEPTREPSAFLRTFRVLPVRLHSVGA

>CYP114A6(XOC\_0083) Xanthomonas\_oryzae\_pv.\_oryzicola\_CFBP7342

MAVQAAHSATCRDAFAELASPACIDDPYPFMRWLREHDPVHRAASGLFLLSRHADIYWALKATGDAFGGPAPGELARHFPRAATSLSLQLLASTLAMKEPPTHTRLRRLISRDFTMRQIEALRPSIARIVAARLDAMAPALQRGETVDLHREFALAVPMLVFAELFGVPQDDMFALATGVGTVLGGLSPHASDSQLATADTASAAVMRYFGDLIERKRAAPGQDMVSMLVGAHDDDADMLSDTELISMLWGMLLGGFATTAATFDHAVLAMLAYPEQLHWLQGDAAGVKAFVEEVLRCDAPAMFSSIPRIAQRDIELDGVVIPKDSDVRVLIAAGNRDPEAFADPDRFDPARFHGTSPGMSTDGKVMLSFGHGIHFCLGAQLARVELAESLPQIHARFPALALAAPPTREPSAYLRTFRALPVRLAVHDG

>CYP114A6(BE73\_23910)Xanthomonas\_oryzae\_pv.\_oryzicola\_BLS256

MAVQAAHSASCRDAFAELASPACIDDPYPFMRWLREHDPVHRAASGLFLLSRHADIYWALKATGDAFGGPAPGELARHFPRAATSLSLQLLASTLAMKEPPTHTRLRRLISRDFTMRQIEALRPSIARIVAARLDAMAPALQRGETVDLHREFALAVPMLVFAELFGVPQDDMFALATGVGTVLGGLSPHASDSQLATADTASAAVMRYFGDLIERKRAAPGQDMVSMLVGAHDDDADMLSDTELISMLWGMLLGGFATTAATFDHAVLAMLAYPEQLHWLQGDAAGVKAFVEEVLRCDAPAMFSSIPRIAQRDIELDGVVIPKDSDVRVLIAAGNRDPEAFADPDRFDPARFHGTSPGMSTDGKVMLSFGHGIHFCLGAQLARVELAESLPQIHARFPALALAAPPTREPSAYLRTFRALPVRLAVHDG

>CYP115A4(BE73\_23900)Xanthomonas\_oryzae\_pv.\_oryzicola\_CFBP7342

MARVALPGNVVTWAAGHHSTLGRLLADQRFNRDWRHWRALQDGEIPENHPLIGMCKLDNMVTAHGADHRRLRGLLARSFAPSRIALLAPRIERCVDALLTEMLRRGSAELMGEFAIPLPTSVIADLFGLPDDQREEIVLLTNSLANTSASEEEVRQTRQRIPEFFHRLIARKRREPGDDLASALIAGRDNGQLVSDTELIDMLFMVLSAGFVTTSGVIGNGVLALLTQPQQLHLVLSGQVPWSQAIEEILRWGSSVTNLPFRYATQGMQIAGVSLRRGDAVLMAFHAANRDEEAFGPGAAALDVTRRHNPHLSFGQGPHFCLGAALARLELRCAFPALFTRLEDLALAIAAEDVAYMPSYVIRCPQRLPITFRPSAV

>CYP115A4(XOC\_0085) Xanthomonas\_oryzae\_pv.\_oryzicola\_BLS256

MSLAILQRPGMARVALPGNVVTWAAGHHSTLGRLLADQRFNRDWRHWRALQDGEIPENHPLIGMCKLDNMVTAHGADHRRLRGLLARSFAPSRIALLAPRIERCVDALLTEMLRRGSAELMGEFAIPLPTSVIADLFGLPDDQREEIVLLTNSLANTSASEEEVRQTRQRIPEFFHRLIARKRREPGDDLASALIAGRDNGQLVSDTELIDMLFMVLSAGFVTTSGVIGNGVLALLTQPQQLHLVLSGQVPWSQAIEEILRWGSSVTNLPFRYATQGMQIAGVSLRRGDAVLMAFHAANRDEEAFGPGAAALDVTRRHNPHLSFGQGPHFCLGAALARLELRCAFPALFTRLEDLALAIAAEDVAYMPSYVIRCPQRLPITFRPSAV

>CYP115A5(FD63\_13545)Xanthomonas\_translucens

MRVEDDRGDVINISVAQSQLDNASSSIRQRNGMARVALPGNVVTWAAGRHQTLKCILADQRFSRDWRHWRALQDGEIPEDHPLIGMCRLDNMVTAHGADHQRLRGLLARSFAPSRIALLAPDIERRVDQLLAGIAARGSADLMQEFAVPLPASVIAELFGLPEENRAEIILLTNSLASTSASVAEVQQTRQRIPDFFRWLIALKRRRPGDDLASALIAARDSGELVSDTELIDMLFMVLSAGFVTTTGVIGNGVLALLTHPQQLRLVLSGQVTWAQAIEEILRWGSSVTNLPFRYATQDVEIEGCTIRRGEAILMAFHAANRDERAFGPGAEAFDVTRQPNPHLSFGQGPHFCLGAALARLELLYAFPALFARLHELALAVALEDIAYQPSYVIRCPQRLPVTFRPSIARK

>CYP116B45(FF32\_18265)Halomonas\_campaniensis

MTTPARQPDKMSEGCPFHQTAYATSHATSQATVTSPTGCPVSRDAAAFDPFGASYQLDPAEALRWSREQEPVFFSPKLGYWVVSRYEEVKAVFRDNLTFSPAIALEKLTPAPPEAVKILESYGFAMRRTMVNEDEPDHMERRRLLMDAFLPENLEKHEVWVRELARSYMDHFIDKGRADLVEEMFREIPMTVALRFLGVPSEDAKELRKFSVAHTLNTWGRPSPEQQLKIAEDVGQFWQTAQAILDRMREEPTGEGWMYDSIRMHNQHPEIVPESYLRSMMMAILVAAHETTAFATTNAFRILLSNRASWNDICENPTLIPSAIEECLRAAGSVVAWRRIATEDADVGGVTIPKGGKLLLVQASANRDSRHFENPDEFDIYRHNSAEHFTFGYGAHQCMGKNIARMEMRIILDEFVRRLPHIHLIEDQTFEYLPNTSFRGPTSLWVEWNPEQNPERHNRAVLENPTHFHIGAPIKEDIVRRVVVAEVEREAEEVVRIDLVDPYGRELPDWSPGSHIELVSGKWRRYYSLCGKRNDQHRLSIAILREPTGRGGSLYFHEMIKPGDVLHIAGPKNHFHLDETAERYTLIAGGIGITPILTMADQLKALGKPYTLHYCGAGRQTMAFLERVERDHSEALTVHASDEGCRLDISTALSNVAKGDQVYCCGPERMLEALEVLAQNWPEGILHVEHFSARSNILDPEQEHTFEVVLSDSYVTLQVGNDQTLLEALTAFGVDVPSDCCEGLCGTCEVAVVEGDIDHRDVVLSRAERAASDRMMACCSRAKGDRLVLAL

>CYP116B176(LOKO\_00991)Halomonas\_chromatireducens

MTTNSRRAGAEAGGCPIHQPGRQQDLAPNGCPISPRAAAFDPFDRPYQLDPAEALRWSREQEPVFYSPRLGYWVVSRYDDIKAIFRDNITFSPSIALEKITPASKEAQAVLERYDYGMNRTLVNEDEPAHMARRRELLEAFSPEALEAHAPMVRRLVREKLDAIVDRGRADLVDEMFWEVPLTVALHFLGVPEEDMEQLRRFSVAHTLNTWGRPSPEQQVEVAEGVGKFWQYSGEVLVKMQRQTRGKGWMYDMIEKNRQKPDVVTDNYLHSMMMAIIVAAHETTALATANAFRQLLSRPAVWDELCDNPELIPAAAEECLRHSGSVVAWRRRATREVAVGGVTIPEDGKILMVTASGNHDPSHFENPDELDIYRDNAVDHLTFGYGSHQCMGKNLGRMEMRIFLEEFTRRLPHLELEEQEFTFLPNTSFRGPEALWVRWDPAKNPERQDPAVRTAQRDFAVGAPSRQDIARTMVVAKVQAAADGVLQIALEDPRGRRVPAWSPGSHVDLIMGDYVRKYSLCGETDDPYWLQVAVLREEAGRGGSAWIHEHFEPGMTLRLRGPKNHFRLDESAQHYVLIAGGIGITPIIAMADRLRRLGKSYELHYAGRSRSSMAFIERLERDHGEALQLYPKDEGRRLDLAGLLAEPREATLLYACGPERLLTALEGGTAHWPEGSLHVEHFTAEGALLDPENEHAFEVELTDSELTVEVPPERTLLQVLRTAGIDVPSDCEEGLCGSCQVEVVEGEVDHRDKVLTAAERASQDRLMSCCSRARGRKLVLAL

>CYP117A5(FD63\_13520)Xanthomonas\_translucens

MAMLLNPLDRRPRLRHDIPVMRGAFPLVGHLPAIVCDLPNLLQRAEQTLGNHFWLDFGPAGQLMTCLDPEAFALLRHKDVSSALIEEIAPELLGGTLVAQDGAVHRQARDAIKAAFLPKGLTQAGIGELFAPVIQTRLQTWRDRGEVAILRETGDLMLKLIFSLMGIPAQDLPGWRRKYHQLLQLIVAPPVDLPGLPLRRGRAAREWIDAQLRQFIRDARAHAARNGLLNDMVNAFDHGDDALSDDVLVANIRLLLLAGHDTTASTMAWMVIELARQPALWDALVEEARRVGEVPTQPADLAQCRVAEALFRETLRVHPATTLLPRRTLQELQLGQRRVPAGTRLCIPLLYFSTSALLHEEADLFRLERWLQRTEPIRPVDMLQFGTGPHVCIGYHLVWLELVQFCIALALTMDKAGVRPRLLGDVEKGRRYYPTAHPSMGIHIGFS

>CYP117A6(BE73\_23925)Xanthomonas\_oryzae\_pv.\_oryzicola\_CFBP7342

MDVLRNPLNRRQRLRQDIPVVPGAYPLVGHLPAIVCDLPRLLQQAEHTLGRHFWLDFGPAGQFMTCVDPDAFALLRHKDVSSALIEEIAPELLGGTLVAQDGSAHRQARDAIKAAFLPKGLTRAGIGELFAPLIQARVEAWRERGDVFILRETGELMLTLIFSLMGIPAHDLPGWQRKYRQLLQLIVAPPLNLPGLPLRRGRAARDWIDAQLRQFVRDARSHAARTGLINDMVSAFDRSNDALADDVLVANIRLLLLAGHDTTASTMAWMVIELARQPMLWEALVDESQRMGAVPTQPADLAACPVAEALFRETLRMHPATTLLPRRAVQDLQLGQQRIPAGTHLCIPLLHFSSSPLLHEAPEQFRLARWLQRSEPIRPLDMLQFGTGAHVCIGYHLVWLELVQFCIALALTMHKAGLRPRVLNDVDKGRRYYPTAHPSMAVHIGFA

>CYP117A6(XOC\_0080) Xanthomonas\_oryzae\_pv.\_oryzicola\_BLS256

MDVLRNPLNRRQRLRQDIPVVPGAYPLVGHLPAIVCDLPRLLQQAEHTLGRHFWLDFGPAGQFMTCVDPDAFALLRHKDVSSALIEEIAPELLGGTLVAQDGSAHRQARDAIKAAFLPKGLTRAGIGELFAPLIQARVEAWRERGDVFILRETGELMLTLIFSLMGIPAHDLPGWQRKYRQLLQLIVAPPLNLPGLPLRRGRAARDWIDAQLRQFVRDARSHAARTGLINDMVSAFDRSNDALADDVLVANIRLLLLAGHDTTASTMAWMVIELARQPMLWEALVDESQRMGAVPTQPADLAACPVAEALFRETLRMHPATTLLPRRAVQDLQLGQQRIPAGTHLCIPLLHFSSSPLLHEAPEQFRLARWLQRSEPIRPLDMLQFGTGAHVCIGYHLVWLELVQFCIALALTMHKTGLRPRVLNDVDKGRRYYPTAHPSMAVHIGFA

>CYP133B1(XF\_0377)Xylella\_fastidiosa\_9a5c

MKLTDLSNPAFLENPYPLYETLRAQAPFVSIGPNALMTGRYSLVDSLLHNRNMGKKYMESMRVRYGDSAADMPLFQAFSRMFITINPPAHTHLRGLVMQAFTGRESESMRPLAIDTAHQLIDNFEQKPSVDLVAEFAFPFPMQIICKMMDVDIGDAVTLGIAVSKIAKVFDPSPMSADELVHASTAYEELAQYFTKLIELRRTHPGTDLISMFLRAEEDGEKLTHDEIVSNVIMLLIAGYETTSNMIGNALIALHRHPEQLALLKSDLSLMPQAVSECLRYDGSVQFTMRAAMDDIEVEGELVPRGTVVFLMLGAANRDPAQFTHPDQLDITRKQGRLQSFGAGIHHCLGYRLALIELECALTTLFERLPHLRLAHLDALNWNQRSNLRGVNTLIVDLHAKN

>CYP133B1(PD\_1688)Xylella\_fastidiosa\_Temecula1

MKLTDLSNPAFLENPYPLYETLRAQAPFVSIGPNALMTGRYSLVDSLLHNRNMGKKYIESIRLRYGDTAADMPLFQAFSRMFITINPPAHTHLRGLVMQAFTGRESESMRPLAIDTAHQLIDNFEQKPSVDLVAEFAFPFPMQIICKMMDVDIGDAVTLGMAVSKIAKVLDPSPMSADELVHASTAYEELAQYFTKLIELRRTHPGTDLISMFLRAEEDGEKLTHDEIVSNVIMLLIAGYETTSNMIGNALIALHRHPEQLALLKSDLSLMPQAVSECLRYDGSVQFTMRAAMDDIEVEGELVPRGTVVFLMLGAANRDPAQFTHPDQLDITRKQGRLQSFGAGIHHCLGYRLALIELECALTTLFERLPHLRLAHLDALNWNQRSNLRGVNTLIVDLHAKN

>CYP133B1(XfasM23\_1782)Xylella\_fastidiosa\_M23

MKLTDLSNPAFLENPYPLYETLRAQAPFVSIGPNALMTGRYSLVDSLLHNRNMGKKYIESIRLRYGDTAADMPLFQAFSRMFITINPPAHTHLRGLVMQAFTGRESESMRPLAIDTAHQLIDNFEQKPSVDLVAEFAFPFPMQIICKMMDVDIGDAVTLGMAVSKIAKVLDPSPMSADELVHASTAYEELAQYFTKLIELRRTHPGTDLISMFLRAEEDGEKLTHDEIVSNVIMLLIAGYETTSNMIGNALIALHRHPEQLALLKSDLSLMPQAVSECLRYDGSVQFTMRAAMDDIEVEGELVPRGTVVFLMLGAANRDPAQFTHPDQLDITRKQGRLQSFGAGIHHCLGYRLALIELECALTTLFERLPHLRLAHLDALNWNQRSNLRGVNTLIVDLHAKN

>CYP133B1(XFLM\_02730)Xylella\_fastidiosa\_subsp.\_fastidiosa\_GB514

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>CYP133B1(Xfasm12\_1853)Xylella\_fastidiosa\_M12

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>CYP133B1(P303\_08560) Xylella\_fastidiosa\_MUL0034

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>CYP133B2(D934\_08745)Xylella\_fastidiosa\_subsp.\_sandyi\_Ann-1

MKLADLSSPAFLENPYPLYETLRRQGPFVSIGPNALMTGRYSIVDGLLHNRNMGKSYMESIRVRYGDDALDMPLFQGFNRMFLMLNPPVHTHLRGLVMQAFTGRESESMRPLATDTAHRLIDDFEQKSSVDLVTEFSFPLPMRIICRMMDVDISDAISLSVAVSNIAKVFDPAPMSPDELVHASAAYEELAHYFTRLIELRRAQPGTDLISMLLRAEEEGQKLTHDEIVSNVILLLLSGYETASNMIGNALIALHRHPKQLARLKSDLSLMPQTVLECLRYDGSVQFTVRAAMDDVSIEGDVVPRGTIVFLMLGAANRDPAQFTDPDHLEITRKQGRLQSFGAGVHHCLGYRLALVELECALTVLLERLPHLRLANLDTLSWNQRGNLRGVNALIADLHP

>CYP133B2(XfasM23\_1797)Xylella\_fastidiosa\_M23

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>CYP133B2(XFLM\_02805)Xylella\_fastidiosa\_subsp.\_fastidiosa\_GB514

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>CYP133B2(P303\_08635)Xylella\_fastidiosa\_MUL0034

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>CYP133B3(XCAW\_0345)Xanthomonas\_citri\_subsp.\_citri\_Aw12879

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>CYP133B3(J151\_03352)Xanthomonas\_citri\_subsp.\_citri\_A306

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>CYP133B3(J159\_03327)Xanthomonas\_citri\_subsp.\_citri\_UI7

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>CYP133B3(J169\_03350)Xanthomonas\_citri\_subsp.\_citri\_NT17

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>CYP133B3(J162\_03331)Xanthomonas\_citri\_subsp.\_citri\_MN10

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>CYP133B3(J163\_03327)Xanthomonas\_citri\_subsp.\_citri\_MN11

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>CYP133B3(J164\_03327)Xanthomonas\_citri\_subsp.\_citri\_MN12

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>CYP133B3(J172\_03343)Xanthomonas\_citri\_subsp.\_citri\_mf20

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>CYP133B3(J158\_03331)Xanthomonas\_citri\_subsp.\_citri\_UI6

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>CYP133B4(XCC3047)Xanthomonas\_campestris\_pv.\_campestris\_ATCC\_33913

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>CYP133B4(XC\_1111)Xanthomonas\_campestris\_pv.\_campestris\_8004

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>CYP133B4(XCR\_3377)Xanthomonas\_campestris\_pv.\_Raphanin

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>CYP134B2(Marme\_0277)Marinomonas\_mediterranea

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>CYP136F7(S7S\_09490)Alcanivorax\_pacificus

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>CYP136F8(B5T\_02349)Alcanivorax\_dieselolei

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>CYP151A13(PCA10\_49550)Pseudomonas\_resinovorans

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>CYP151A14(PcP3B5\_54780)Pseudomonas\_citronellolis

MTTSAPTRLDDAPYLDVSDPSFSIRSQAVMDARAQSWFARTPYGIAVLRYDEVNKLLRDQRLRQGSYAWPAHNNASGSFADWWMRMLLSKEGADHSRLRRLANPAFAPKLVKQMMPDFQRLAGDLIAQFEGRGECEFVSEFAEPYATQVICLLLGLPISQWKGLADLAVEMGLALGVTFKRDEARINAATDKLFGYARQAVEALKRNGLGEDFLSSLVRANEEDKNALSDQELYDMIVLAIFGGIDTTRNQLSLAMDTFLQHPAQWELLGNDAELARAAVEEVMRVRPTVTWVTREALEDFEYQGLHIAKGTTVHLFSQAAGSDPHAFEDASFDITAKRLPHFGFGAGAHHCIGHFIARGDMTAALALLAQHLKHPAPNGEAEWLPDSGNTGATRLPIRFDAVPAK

>CYP152G2(amad1\_16670)Alteromonas\_mediterranea\_DE1

MNLILMYFKLDCYYRKLSVCEVKKRREFFYNTEYFSRTGVAPSRIKKTLFGEGGVQGLDEEEHFQRKKMFMSFLRADKIGKLSMITCDIWKSRVKDWSSKEKINLYQQSCELLTQSVCMWAGVPLKESEVSQRSEELTALFNYAGNIGPKHWKARIARKRNEAWLISIIESIREGTFRPSTNSAAYIVANHRDLDGCLLESQIAAVELNNLLRPTVAVAVYIVYCAHALHQNPLIKHRLVNGSDKDYECFVQEVRRLYPFFPFTAATVKRTFEWRGYKFPKGRRVFLDLFGTNHDARTWENPNNFDMERFRDCKVNDYVFIPQGGGDHFRNHRCPGEWVAIEQMKIATKILVSECDYTVPEQDLDLRMGNLPALPKSNFIISDVRPIDKDEDLNDHI

>CYP152G2(I636\_15975)Alteromonas\_mediterranea\_UM4b

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>CYP152G2(I635\_16630)Alteromonas\_mediterranea\_UM7

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>CYP152R2(UIB01\_16925)Pseudomonas\_stutzeri\_19SMN4

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>CYP152R3(CH92\_16810)Pseudomonas\_stutzeri\_28a24

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>CYP152W1(xcc-b100\_2293)Xanthomonas\_campestris\_pv.\_campestris\_B100

MRFTCCCVHRAQRARHHRNKSRQAMTMHASTTDHVGHAAQRLRDDAADATAETQGRIAQAPQRDVLPALLRDGYAFVSRHCDALGSDAFQARLALQQVVFARGPDALATFYHPGRFTRVGAMPPTTLRLLQGRGSVQQLDGDAHLQRKRLFLSVLTPAETSRLVACFEEEWSRQADTWARSAHIILQQEAEHVLCRAACRWAGLPLRAQQSRPLARDLGAMIDGAGAFGPRWVRGWRGRRRVERWVARAVRNVRRAGTAPEASIAATVAWHRDADGVLLSVHTAVTELINLLRPIVAVARWISFCALALHEHPPLRSRLRAGEPGLLQNTVQEVRRFYPFFPLIGGRVRMPFVWRDRHFKQGDWMMVDLYGTNHHPAVWRDPERFDPSRFEHWKGSRYDFVAQGGGSVERDHRCPGENPSIALLMSALSLLASSDYTLPPQDLRYPLNRFPTLPRSGVVLRDFIPPVSVGGVVQSA

>CYP152W1(XCR\_2273) Xanthomonas\_campestris\_pv.\_Raphanin

MHSSTTDHVGQAAQRLRDDAADATAETEGRIAQAPQSDVLPALLRDGYAFVSRHCEALGSDAFQARLALQQVVFARGPDALATFYHPGRFTRVGAMPPTTLRLLQGRGSVQQLDGDAHLQRKRLFLSVLTPAETSRLVACFEEEWSRQADTWARSAHIILQQEAEHVLCRAACRWAGLPLRAQQSRPLARDLGAMIDGAGAFGPRWVRGWRGRHRMERWVARAVRNVRRAGTAPEASIAATVAWHRDADGVLLSVHTAVTELINLLRPIVAVARWISFCALALHEHPPLRSRLRAGEPGLLQNTVQEVRRFYPFFPLIGGRVRMPFVWRDRHFKQGDWMMVDLYGTNHHPAVWRDPERFDPSRFEQWTGSRYDFVVQGGGSVERDHRCPGENPSIALLMSALSLLASSDYTLPPQDLRYPLNRFPTLPRSGVVLRDFIPPVSVGGVVQSA

>CYP152X1(UIB01\_17410)Pseudomonas\_stutzeri\_19SMN4

MPNIPRDTGLDSTWAFLRDPYRFISTRSKFHQSPVFQTRLILQKTLCLTGAEAARLICDPDRFVRQNAAPKRLQKTLFGQDGVQGLDGDAHRHRKALFMGVLTPANVQELAELSEVRWREYARTWRPGESIVLYEIAREILCRTVCDWAGAPIAERDVQQWTQDLAALYEHAGAIGLQHWQARKARRRLEQWAAELVESTRAAPPTPEQSPLERIAHYKDQHGQPLDLHTASVELLNLLRPTVAVSVFITFAALALHKHPFCLRNLQSGDERDIGCFVQEVRRFYPFFPAISARVKEDFLWEGFSFGRGTLVLLDLYGTNHDSQLWEEADRFKPERFRSNSPSPYCFIPQGPGDPHVNHRCPGEGVAVALMSVAVRFLARSLQYEVPEQDLSITWDRLPALPRSHFVMRNARITM

>CYP152Y1(Q7A\_2994) Methylophaga\_nitratireducenticrescens

MALMTKLSLDELVQITHAYWLTAINDWQLRDSPIVLKQAAAEVLTQSICQWTGVPLEPNEVKHRTQQFIHMIESASKIGFRHWQGRQARRLMERWCRKLIHQTRTKQLRVEPDKSLYKIAMHQQLDDNLLSEQVAAVELLNILRPTVAITYYIVLTALALHHYPHEAKRLDSDEARHRFVQEVRRFYPFFPATVAEVRKTFEWQGYTFPQGSRVMLDLYGTNHDERLWQNPEQFWPDRFLYNDTDKFSLIPQGGGDYWQHHRCAGEWLTLAMMELALKVLTQEMQYEVPGQNLFLPHNRMPTLPESGFIICKVAPYSVATRVESTIMGRKVHSSP

>CYP153A12(AS19\_23510)Alcanivorax\_sp.\_NBRC\_101098

MHLQIKALKNLMKVKRKTIGTSRPQVHFVETDLPDVNDVAIEDIDTSNPFLYRQSKSNSYFKRLRDEAPVHYQKDSAFGPFWSITRYEDIVFVDKNHELFSSEPQITLGEFPEGLSVEMFIAMDPPKHDVQRRAVQGVVAPKNLKEMEGLIRKRTGDVLDSLPLDTPFNWVPVVSKELTGRMLASLLDFPYDEREKLVGWSDRLSGASSATGGEFTNEDVFFDDAADMAWSFSKLWRDKEARQKAGEEPGFDLISMLQSNDDTKDLINRPLEFIGNLALLIVGGNDTTRNSMSGGVLAFNQFPEQFEKLKANPKLIPNMVSEIIRWQTPLPHMRRVATQDVELNGQTIKKGDRVLMWYASGNQDERKFENPEQFIIDRKEARNHVAFGYGVHRCMGNRLAELQLRILWEEILPRFEKLEVIGEPERVQSNFVRGYSKMVVKLTAKK

>CYP153A13a(ABO\_0201)Alcanivorax\_borkumensis

MSTSSSTSNDIQAKIINATSKVVPMHLQIKALKNLMKVKRKTIGTSRPQVHFVETDLPDVNDLAIEDIDTSNPFLYRQGKANAYFKRLRDEAPVHYQKNSAFGPFWSVTRYEDIVFVDKSHDLFSAEPQIILGDPPEGLSVEMFIAMDPPKHDVQRRAVQGVVAPKNLKEMEGLIRKRTGDVLDSLPLDTPFNWVPVVSKELTGRMLASLLDFPYDEREKLVGWSDRLSGASSATGGEFTNEDVFFDDAADMAWAFSKLWRDKEARQKAGEEPGFDLISMLQSNEDTKDLINRPLEFIGNLALLIVGGNDTTRNSMSGGVLALNQFPEQFEKLKANPKLIPNMVSEIIRWQTPLAYMRRVAKQDVELNGQTIKKGDRVLMWYASGNQDERKFENPEQFIIDRKDTRNHVSFGYGVHRCMGNRLAELQLRILWEELLPRFENIEVIGEPERVQSNFVRGYSKMMVKLTAKK

>CYP153A13a(ABO\_2288)Alcanivorax\_borkumensis

MSTSSSTSNDIQAKIINATSKVVPMHLQIKALKNLMKVKRKTIGTSRPQVHFVETDLPDVNDLAIEDIDTSNPFLYRQGKANAYFKRLRDEAPVHYQKNSAFGPFWSVTRYEDIVFVDKSHDLFSAEPQIILGDPPEGLSVEMFIAMDPPKHDVQRRAVQGVVAPKNLKEMEGLIRKRTGDVLDSLPLDTPFNWVPVVSKELTGRMLASLLDFPYDEREKLVGWSDRLSGASSATGGEFTNEDVFFDDAADMAWAFSKLWRDKEARQKAGEEPGFDLISMLQSNEDTKDLINRPLEFIGNLALLIVGGNDTTRNSMSGGVLALNQFPEQFEKLKANPKLIPNMVSEIIRWQTPLAYMRRVAKQDVELNGQTIKKGDRVLMWYASGNQDERKFENPEQFIIDRKDTRNHVSFGYGVHRCMGNRLAELQLRILWEELLPRFENIEVIGEPERVQSNFVRGYSKMMVKLTAKK

>CYP153A13a(AS19\_02080)Alcanivorax\_sp.\_NBRC\_101098

MHLQIKALKNLMKVKRKTIGTSRPQVHFVETDLPDVNDLAIEDIDTSNPFLYRQGKANAYFKRLRDEAPVHYQKNSAFGPFWSVTRYEDIVFVDKSHDLFSAEPQIILGDPPEGLSVEMFIAMDPPKHDVQRRAVQGVVAPKNLKEMEGLIRKRTGDVLDSLPLDTPFNWVPVVSKELTGRMLASLLDFPYDEREKLVGWSDRLSGASSATGGEFTNEDVFFDDAADMAWAFSKLWRDKEARQKAGEEPGFDLISMLQSNEDTKDLINRPLEFIGNLALLIVGGNDTTRNSMSGGVLALNQFPEQFEKLKANPKLIPNMVSEIIRWQTPLAYMRRVAKQDVELNGQTIKKGDRVLMWYASGNQDERKFENPEQFIIDRKDTRNHVSFGYGVHRCMGNRLAELQLRILWEELLPRFENIEVIGEPERVQSNFVRGYSKMMVKLTAKK

>CYP153A65(DABAL43B\_1552)Psychrobacter\_sp.\_DAB\_AL43B

MTKTKIVNAVKIALKTALPSSLTTAIDKIAVQAITKVSTVVPIHIQIKGAHLFQTVKKRALNQSDFPDFIEKPIPEVSTLALADIDLSNPFLFRQHRWQSYYKRLRDEDPVHYQANSPFGAFWSVMRYEDIVFVDKHYELFSSEPVILMGNQPEGLKAEMFIAMDPPKHDIQRQAVQGVVAPKNLLEMEALIRTRTQEVLDSLPIGVEFDWVETVSIELTARMLATLLDFPYEKRRKLVYWSDLAAGAPEMTGGSNNMDETFIAVADMAKQFAELWHDKAARTAAGEAKGFDLITLLQSNDDTKDLVRRPMEFIGNLILLIVGGNDTTRNSMTGGVLALHDFPKQFTKLKNNPSLIPNMVSEIIRWQTPLAYMRRIATQDVELNGKLIKKGDKVVMWYASGNRDERSIDQPNEFIIDRKNARNHLSFGFGVHRCMGNRLAEMQLRILWEELLQRFENIEVVSKPEIVQSNFIRGYSKMMVKLTAKG

>CYP153A66(MARHY2838)Marinobacter\_hydrocarbonoclasticus\_ATCC\_49840

MNIGGRMPTLSKTFDDIQSRVINATSRVVPMHRQIQGLKLLMGAKKKAFGPRRPVPEFVESAIPDVNTLALEDIDVSNPFLYRQDQWRAYFKRLRDEAPVHYQKNSPFGPFWSVTRFEDIMFVDKSHDLFSAEPQIILGDPPEGLSVEMFIAMDPPKHDVQRSSVQGVVAPKNLKEMEELIRSRTGDVLDSLPLGQPFNWVPTVSKELTGRMLATLLDFPYEERHKLVEWSDRMAGAASATGGEYADEEIMFDDAADMAWSFSRLWRDKEARRAAGEEPGFDLISLLQSNDDTKDLINRPMEFIGNLTLLIVGGNDTTRNSMSGGLVAMNEFPKELEKLKAKPELIPNMVSEIIRWQTPLAYMRRVAKQDVELGGQTIKKGDRVVMWYASGNRDERKFEDPDHFIIDRKDARNHMSFGYGVHRCMGNRLAELQLRILWEEILKRFDKIEVVGEPERVQSNFVRGYSELMVQLTPKS

>CYP153A66(Maqu\_0600)Marinobacter\_hydrocarbonoclasticus\_VT8

MPTLPRTFDDIQSRLINATSRVVPMQRQIQGLKFLMSAKRKTFGPRRPMPEFVETPIPDVNTLALEDIDVSNPFLYRQGQWRAYFKRLRDEAPVHYQKNSPFGPFWSVTRFEDILFVDKSHDLFSAEPQIILGDPPEGLSVEMFIAMDPPKHDVQRSSVQGVVAPKNLKEMEGLIRSRTGDVLDSLPTDKPFNWVPAVSKELTGRMLATLLDFPYEERHKLVEWSDRMAGAASATGGEFADENAMFDDAADMARSFSRLWRDKEARRAAGEEPGFDLISLLQSNKETKDLINRPMEFIGNLTLLIVGGNDTTRNSMSGGLVAMNEFPREFEKLKAKPELIPNMVSEIIRWQTPLAYMRRIAKQDVELGGQTIKKGDRVVMWYASGNRDERKFDNPDQFIIDRKDARNHMSFGYGVHRCMGNRLAELQLRILWEEILKRFDNIEVVEEPERVQSNFVRGYSRLMVKLTPNS

>CYP153A67(IMCC21906\_02560)Spongiibacter\_sp.\_IMCC21906

MKIVDLVAEKGAASVPMHLQIKAGHMLYKAKNKLGMYTKFPEFVEAPVPEVSTLAIDDIDVSNPFLFKQNRWESYFKRLRDECPVHYQKKSPFGPFWSITRYEDIVYVDKHHDLFSAEPFIIIGATPKELALEMFIAMDPPKHDVQRQAVQGVVAPKNLKEMEGLIRSRTQEVLDQLPLDTPFDWVEDVSIELTARMLATLLDFPYEERRKLVYWSDLAGGGAEMTGGSTNTDELFEGMRDMAKHFSQLWRVKEEKIAAGGEVGFDLIGMLQNNPDTKDLINKPMEFLGNLVLLIVGGNDTTRNSMSGGVLALNRFPDEFAKLKSDPSLIPNMVSEIIRWQTPLAYMRRIAKQDVELNGKTIKKGDKVVMWYASGNRDERAIERPDEFIVDRKGARNHLSFGFGVHRCMGNRLAELQLRILWEELLARFDKIEVVGEPEYVQSNFVKGYSKMMVKLTSK

>CYP153A68(HP15\_p187g148)Marinobacter\_adhaerens

MKLQTRAMNLSARFVPIQWQVRAAHLAQQALERVGLAPQTPKFSEHPLPDVSSLAIEDVDVSNPFLWRQGLWDAYFRRLRNEKPVHFQQNSAFGPFWSVTRFSDILFVDKRHDLFSAEPIITLGDQPAGLAIETFIAMDPPKHDRQRQAVQGVVAPKNLRELEGLIRQRTQDVLDQLPVDEPIDWVNDVSIELTARMLATLLDFPYDQRRKLVYWSDLAAASPETTGGDVGRDEFFPAVADVARSFSMLWREKEALRDSGEKPGFDVISMMVNNEDTKDLIHRPMEFLGNLALLIVGGNDTTRNSMTGGVLALHKFPKEFDKLKANPALIPNMVSEIIRWQTPLAYMRRVAKKDVELNGEKIRKGDKVVMWYASGNRDERAIDKPDQFIIDRKGARNHLSFGFGVHRCMGNRLAEMQLRILWEEVLARFDQIEVLDEPEYVQSNFVRGYTRMMVKLTKKNQE

>CYP153A69(HDN1F\_17560)Gamma\_proteobacterium\_HdN1

MSTKSSATDVIQAKMINATSRVVPMHLQIQALKMLVKAKKKIIGARRPPLNFVEASVPDVNTLALEDIDLSNPFLYRQDQWRAYFKRLRDEAPVHYQKNSLFGPFWSVTRYEDILFVDKNHELFSSEPQIVLGDPPEGLSVEMFIAMDPPNHDVQRRAVQGVVAPQNLKEMEGLIRTRAGDVLDSLPMGEAFNWVPTVSKELTGRMLATLLDFPYEERHKLVDWSDRLSGAASATGGEFTDEDGMFDDAADMAWSFSRLWRDKEARRAAGEEPGFDLISMLQSSADTKDLINRPMEFIGNLALLIVGGNDTTRNSMSGGVLALNQFPEEFAKLKANPELIPNMVSEIIRWQTPLAHMRRVATQDVEMHGNTIRKGDRVVMWYASGNRDERKFENPDQFIIDRKDARNHMSFGYGVHRCMGNRLAELQLRILWEELLKRFDDIEVVGEPVRVQSNFVRGYSELMVKLTPKQK

>CYP153A70(C427\_3047)Paraglaciecola\_psychrophila

MNSLTNTTAEPVATSSITPTPAVKFIEQPIADVSTVALEDIDVSNPFMFRQNKWQSYFKRLRDECPVHYQKNSPFGAFWSVTRFEDIMFVDKNHTLFSSEPAIVIGDRPADYMLDMFIAMDPPKHDAQRQAVQSAVAPKNLAEMEELIRERTVDVLNDLPVGESFDWVEKVSVELTTRMLATLFDFPYEKRHKLPYWSDLASGSPEMTGGLVQDDERVAGITDLMTEFSQLWHIKAAQKAAGEQGGFDLISLMQANDNTKNMVDTPLEFLGNLVLLIVGGNDTTRNSMTGGVDALNEFPQEFIKLKNDPSLIPNMVSEIIRWQTPLAHMRRIATEDVELNGKTIKKGDKVVMWYVSGNRDERVINNPDQFVIDRDKARNHLSFGFGIHRCMGNRLAEMQLRILWEEILQRFENIEVINKPKYVQSNFVKGYTELRVKLTAKV

>CYP153A71(B5T\_02075)Alcanivorax\_dieselolei

MHLQIKALKSLMKAKKKALGSTRPQVKFLERPVPDVNTLALEDIDTSNPFLYRQDQWGAYFKRLRDEAPVHFQKSSQFGPFWSVTRYEDILFVDKNHELFSSEPQIILGDPPEGLSVEMFIAMDPPKHDVQRRAVQGVVAPQNLKEMEGLIRQRAAEVLDSLPLDKAFNWVPAVSKELTGRMLATLLDFPYEQRHKLVDWSDRLSGASSATGGEFTDEDIMFDDAADMAWSFSRLWRDKEARRKAGEPPGFDLISMLQSNKDTRDLINRPMEFIGNLALLIVGGNDTTRNSMSGGVLALNQFPEEFIKLKKNPELIPNMVSEIIRWQTPLAHMRRVATQDVELRGQTIKKGDRVLMWYASGNRDERKFENPDQLIIDRKDARNHISFGYGIHRCMGNRLAELQLRILWEELLKRFDNIEVVGEPERVQSNFVRGYSKLMVKLTAKN

>CYP153A72(S7S\_11260)Alcanivorax\_pacificus

MPNKQNMTTTQTKIVNATSRIIPMHLQIRALKNVMAAKKKIFGASRPAPNFIEKPVADVTTLKLEDIDLSNPFLYRQNQWDTYAKRLRDEAPVHYQKSSYFGPFWSVMRYEDILFVDKNHQLFSSEPQIVLGDPPDGLSVEMFIAMDPPKHDIQRRAVQSVVAPKNLKEMETLIRGRTEEVLDSLPLGVPFNWVPVVSKELTGRMLATLLDFPYEERHKLVDWSDRLSGAAQATGGEFSDEGAMFDDAADMAQAFSTLWRSKEARRAAGEEPGFDLISLMQSNDDTKDLINRPMEFIGNLALLIVGGNDTTRNSMSGGVLALNQFPEEFTKLKANPDLIPNMVSEIIRWQTPLAHMRRIATQDVEVGGQTIRKGDRVIMWYASGNRDERKFENPDRLVIDRKEARNHIAFGYGIHRCMGNRLAELQLRILWEELLKRFDNIEVVGEPERVQSNFVRGYSTLMVKLTAKD

>CYP153A73(MARHY3773)Marinobacter\_hydrocarbonoclasticus\_ATCC\_49840

MPEFRETPLPPASELALEQIDVSNPFLYRQGLWESYFKRLRDECPVHYQASSPFGPFWSITRYEDILFVDKHHELFSAEPIISIGPQPEGLEIETFIAMDPPRHDVQRQAVQGVVAPKNLAQMESLIRQRTAGVLDQLPVDEPFDWVQRVSIDLTSRMLATLFDFPFDQRHKLAYWSDLATAAPETTGGQVDRDEGFRAAADMARHMSLLWREKEARKAAGKPMGFDLISLLLENEHTRDMINRPMEFIGNMVLLIVGGNDTTRNSMTGGVLALNRFPQEFDRLKQDPSLIPSMVSEIIRWQTPLAYMRRVATQDVELRGQTIRKGDKVVMWYASGNRDERAIEDPDQFRIDRKDARKHLAFGFGVHRCMGNRLAEMQLRILWEELLARFDRIEVVDEPEYVQSNFVRGYTRMNVRLGKRDAAG

>CYP153A74(PS2015\_2879)Pseudohongiella\_spirulinae

MDSATATSGSPPKTRSLVGRDPWTTPLDEIDLAHPGIWQANEFLPFLDRLRRDDPVHYCAHSAVGPYWSVMKYQDIMAVEANTAVFSSEPTIGIVDVLPEYTLPMFIAMDPPKHDEQRKTVQGVVAPANLKNLEGLIRRRVCTILDNLPLDEEFNWVDRVSRELTTQMLATLFDFPFEDRHKLTYWSDVATAIPGAGLIDSYEESLVILKECLSYFSRLWQERASKPPGNDLISMLAHGPATRNMPPMEFLGNLILLIVGGNDTTRNSISGGVLALNENPDEYQKLRDNPALIPSMVSEIVRWQTPLAYMRRTATQDSELGGKTIRKGDKVLLWYASANRDEDAIEHADRFWIDRPRVRQHLSFGTGIHRCMGNRLAEMQLRILWEEILPRFHKVEVTGEPKRIYSSFVKGYTELPVRLIK

>CYP153A75(IMCC21906\_00974)Spongiibacter\_sp.\_IMCC21906

MDSWEQRTNELMECLAYFQELYNERKKLPPKTDLISMLAHSPEMGELSGTDFIGILVLLLVGGNDTTRNSMSGSILAAHLHPQEIDKVKANRALISSMVPEIVRWQTPIAHMRRTAIEDVEFRGQLIRKGDKVAMWYLSGNRDEEVIDRPMDFIVDRPRARHHLSFGFGIHRCLGNRLAEMQLRILWEEFLNRFSGVDVVGDVKRVPSNLVHGYDELPVQLRR

>CYP159B3 (VO64\_0375)Pseudomonas\_fluorescens\_LBUM223

MPPPFRESELNTRDSAHLPPISLTIPQIRLPFAAPPPRSDNEQLRAHALAWAQRYHLIGRRGAHRLSTTPLLELGIALCGRAPTQQAQTLVCWYLWALTLDDRIDDGPWAENGALERFISAVQVVTESDGADPAGETSSFADPMLAVLVDDLWPQTQRWGGAGWRHRLVGHLIQHLRAQAALVRVRETDSALTLAEYLPLRRDSFGALFFFDLIDAAETLDPYEQQAHIEWWNTLREHAADIIAWTNDIHSLAKDVVCGERYNLVSILADTAGMDWPSALESAHQMVNSAVADFTAIAAQRVGQRACAATDPDRLRQVVRAAGDWHQSVSRYHLHAADSTPQNHRQVDLKLTPPTLKSRQFEIDPYPLYELLRTTLPIAYDEPTDVWLVSRHVDVKAALTHPEASNNNYTWQIGPLLGHTIVTMDGCEHAQHRALLSPSFRSKALAALETSIISVTTDLLARMHGRSQVDLIADFTAALPVRVMAHALGLPAETPETVERLKRWCAIGFAYMGNYRQDPALLTGGLSNRDSFYDFIQPYIDARRAEPTDDLISLLLTARIDGQPLSESFVRSYCAILMTAGSETSHGALANLIVNLLNEPGVKEAVLADPGLMDNALTETLRRNPPLQLVLREAREPLHLPSGTIPAGATLACLIGSANRDPDQFADPDTFNMSRTEQATSHFAFGAGRHFCLGSMLARMEITTSARMLLQTFPNLRWAPGFKPIERGFLNRCPEQLEVAL

>CYP159B4 (PFLUOLIPICF704805)Pseudomonas\_fluorescens\_PICF7

MALCGQAPTQQAETLVCWYLWALILDDRIDDGPWAENGVLERFVTAVQAITENDGADPLDEIGRFDDPMLGVLIDDLWPRTRNWGNERWRHRLVQNLLRHLRAQATLVNMRETGAALALSEYLPLRRDSFGALFFFDLIDAAETLDPYQHSADIEWWSRLREHAADIITWTNDIHSIAKDVVCGERFNLVSILADSAGTDWPASIKAAHQMVNAAVSAFTELAAKHTRQRPSAATDPDRLRQVARAAGDWHRSVSRYHLQANDPTGRINQQVDLNLTPPTLKSRQFEIDPYPLYERLRTTLPIVYDEPTDVWLVSRYADVKAALTHPGASSNNYSWQIGPLLGHTLVAMDGCEHAQHRALLSPSFRSKALEVLEASITSASMDLLAQMQGRHQVDLIADFTCALPVRVMARALGLPAQTTEEVEQLKKWCAIGFAYMGNYRQDPTLLTGGLSNRDRFYDFIQPHIDARRTVPTDDLISHLLAARIDGQPLPEAFVRAYCAILMTAGSETSHGALANLIVNLLDEPGVKEAVMANPDLMDNALAETLRRNPPLQLVLREARESLELPSGTIPCGATFACLIGSANRDPDHFTDPDTFNMSRPHQETNHFAFGAGRHFCLGSILARMEITIGARLLLQTFPGVRWAPGFQPAEHGFLNRCPDRLEVAL

>CYP168A1(PA2475)Pseudomonas\_aeruginosa\_PAO1

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAVAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(N297\_2545)Pseudomonas\_aeruginosa\_PAO1-VE13

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAVAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(N296\_2545)Pseudomonas\_aeruginosa\_PAO1-VE2

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAVAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(PLES\_28211)Pseudomonas\_aeruginosa\_LESB58

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(PAM18\_2564)Pseudomonas\_aeruginosa\_M18

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(M062\_12875Pseudomonas\_aeruginosa\_RP73

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(PA1R\_gp0271)Pseudomonas\_aeruginosa\_PA1R

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(T223\_14470)Pseudomonas\_aeruginosa\_LES431

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(SCV20265\_2835)Pseudomonas\_aeruginosa\_SCV20265

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(BN889\_02704)Pseudomonas\_aeruginosa\_PA38182

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(PADK2\_12870)Pseudomonas\_aeruginosa\_DK2

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEARIEVLVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALVSEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(NCGM2\_3477)Pseudomonas\_aeruginosa\_NCGM2.S1

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEACIEALVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPPGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(NCGM1900\_4055)Pseudomonas\_aeruginosa\_NCGM\_1900

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEACIEALVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPPGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(AI22\_20650)Pseudomonas\_aeruginosa\_YL84

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEACIEALVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSSPPSGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(G655\_12655)Pseudomonas\_aeruginosa\_B136-33

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRKLFAPAFGPDAVRRWEACIEALVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPPGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELAANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(U769\_12850)Pseudomonas\_aeruginosa\_MTB-1

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEACIEALVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPPGAAPSILDGAAMLEAGLGLEDLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELVANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A1(PA14\_32630)Pseudomonas\_aeruginosa\_UCBPP-PA14

MDDAFSEEGSAQPRHDAQRPALAPRSDGFDIHTYHPDFVADPYPLLRLIRSRAPVCRDQASIWWISRYADVSACLRDRRFSADPARLGAAGVRQGGASWFGHQQLQPLARFYDNFMLFNDAPRHTRLRRLFAPAFGPDAVRRWEACIEALVEELLDSLLERREPDLLRDFAEPLTIRVAAELFGFPREDTGQLLPWGRDLAAGLDLAASHGDAGQINRSAAAFSDYLQRQARGWSDGSSRPPPGAAPSILDGAAMLEAGLGLEGLVAAYAMVFMAAFETTISMVGNATLALLTHPDQLDLLRRCPELVANAVEELLRFDGAVRGGVRCTLEEVEIGGQRIPPGEKVWLSFLAANRDPEMFAAPDRLQLQRANAKQHVAFAHGPHYCLGAYLARLELQCALRGLVRRRFALASEPTDLRWRRSSVFRTLERLPIVPEGDAQKTCE

>CYP168A2(PSPA7\_2764)Pseudomonas\_aeruginosa\_PA7

MDERHTQGLAALGGDALFELPAAQRCIRLGRALAEEVARLAGRAAPVGASLEEAGLASLETLVLAGKVERRLGVRLPASAWQGHQATPERLAQRIVQNLRPEDPATAGSRLGAVALGGWRVAAPLFCLGGAGGAVGYLAALDAALAASRPLVALRSPGLEGEEPPLGSVEEQAARYIQVIKAIQPEGPYLLAGHSYGGIVAYEMAQQLGVRGEPVGALLLIDTLRVENSGDSEPPAAETLAYELGLVQRRLGGAHQSRPLTDNPQLVAVYRSNYAAMERYEPRHYPGPVTLFKAREALPAATLHPQRRTRLYFDDPTLGWGALCPALRVVELEGDHFSLVLPPRAQRLAAAIEEVLGEEATFELGVERLRAAGGLSSRRALEETPEGGLELHPYHPDFLANPYPFLHQLRARAPLYRDREGNWWLTRYADVSACLRDPRFSADPARQSGAGGPGASWFDHQRLQPLARFYDNFMLFNDAPRHTRLKRLFAPAFTPEAVRRWGARIDMLVEELLDAMLERPAPELIQDFAEPLTIRVAAELFDFPREDVGQLLAWGRDLAAGLDLAAVQGDAARINRSAAAFSDYLREQAHGWLQGTARRSSTAPILDGAAMLDAGLALDDLVAAYAMVFMASFETTISMVGNSTLALFDHPGQLERLRREPELLGNAVEELLRYDGAVRSGLRCTLEEVEIGGQRIPAGERVILYFLAANRDPAMFAAPDRLLLDRANARQHLAFAHGPHYCLGAALARLELQGALRALARRRLAPLPQAEGLSWRRSAAFRTLERLPVVAAGPQNTWE

>CYP168B1(HELO\_4099)Halomonas\_elongate

MDQHFDSVSVKGETAPESTGHATPRETPPPSRPNLREALAQEIVRLTRNNDEDISIPEEYPLNQLGLDSLAAVELTAYIERHFHVKLPLMSLFGSMTLGQLIDLIEKTRTQESAEGPLRTSLGEQSGACAVALHDWQVALPLFCIPGSMGVATYLSSLCTELAGLASTIAFQSPGIDGSESPLGSVEELARRYIAEMQTIQPEGPYRLAGHSFGGLVAHEMACQLHERGERIEALFLIDTFQVRSIGEANDATTSDLMALYELHNIIQRLSDRLDDEPIRVSELEALPPEAQRELLTRRLGTRFNSLHRVATVHHANYMAMERFQPRYYPGPATLLCARSEFPAQLVHPARSLHFCTDEPDLGWQGLCASLNVITVPGDHLTMVRPPHVQALVEAMRPAMDAQSRLSLGMDRLLPARPPRAPGRALEISRHGISFDPYHPDHVDDPYPFLSQLRDCGPVIKDTVSRWWLTRHAEVSAGLRDKRFGVDPRGLAETLPHLDASSASFPFLSALSRQQEEVPFSQHLNRFMLFLDPPQHQQLRRVFSPLFTPEAVKHWTGYIDECAAELIGNLRQDREADLIKELALPLPAAAISEILGFPREDVPEVLPWGQDMISGFDPLMSDDTAARINRSAEEFSRYIREHLETQRKVKSGPGILDPNTALDQGLSIEELVTHYALMFAVGFETTTDMIGNSALALLRHPDQLERWQAQPEISDNAVEELLRYDGPVRCSIRYALEDLDFGGRRIRRGEMVVFSFSSANRDPQAFPEPDRLDLGRDARRHVAFAHGAHYCLGAHLARIELRRVLPALIQHDFSLAPGGTQWRPSLVFRGLETLRIRNH

>CYP168C1(LG3211\_5249)Lysobacter\_gummosus

MERADPGVNIKGSVGESDIDVANGERRLGAIERRREIAEDIAGEVGRLTRAKEVALRPDTLLSDVGIDSLGSMELLGYIERKFGVAIPISTLLGSTSFDELVTKIEQLQGSAGAVDGKIHSAELLHPRAWDRKARATLLRDWRIAAPLFLIPGLNGTTYYLSSLCKALHTNRACIAFQMPGVDGLEPPLGSIEEIARRHVDEMRAIQPHGPYAIAGHSFGGVVAYEMAQMLAEQGQQVAPLMLLDSPNSESEDEALQDDEVMALFEVIGVYCRFSERPLKPIRAERLSGLPVDEQLQLLWSLLASYPTAAHVIATYRKGFVAMTRYRPRPYGGPVILFRSAEGFPAEAMHPERRVRSQFDSSTLGWGGLCADLRIVETPGDHFSMVMPPHSAELGAAMQEPLNTAADMLIDFDRLRPAAVVTKVGRALRVDGARVHFDPHHPDFREDPYPFLNQLREHTPIFQDALSQWWVTRHADVSAGLRNRLLSVDARAIDHVEGIGSESARPSALSSWFRNQDASALAQLYNKFLLFIDAPRHTVLRKVFSPSFSHESIRGLADCIDERVETLMADMRAKSQPDLMRDLALPLPVGIISLIYGVPDADSAQVTQWARDLAAGLDSGMSLQAMRKAERSAEEFTRYLHGHVQRLRKTPPHTPGGARLDVNDAIAQGITPDELVAHIAMSYLAGFETTTNSIGNGALALLRHPDQLERLRSDPGLAENASEELLRYDCPVMFVMRFALEDLEVAGQRIPRGSSITFMLASANRDPAAFHDPDRLDLARSARHHVAFSNGAHYCLGAPLARLELQRVFVALSRQRFQPVPGGLAWRDAYTFRALERFPIAWC

>CYP169A1(N297\_3803)Pseudomonas\_aeruginosa\_PAO1-VE13

MQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELAGVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(N296\_3803)Pseudomonas\_aeruginosa\_PAO1-VE2

MQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELAGVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(M801\_3668)Pseudomonas\_aeruginosa\_PAO581

MQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELAGVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(PAM18\_1267)Pseudomonas\_aeruginosa\_M18

MQQTIDCPIRRRLAHLPWANDGCAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELAGVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(M062\_19455)Pseudomonas\_aeruginosa\_RP73

MQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELARVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(SCV20265\_1331)Pseudomonas\_aeruginosa\_SCV20265

MQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELARVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(BN889\_04070)Pseudomonas\_aeruginosa\_PA38182

MTDSAAPRLHVQALSADCAEAARRWAERLGLPLAADDEAEFAVQVGEQGLQVLQLGPDSPGPVRVDFVEGASAHRRKFGGGSGQMIAKAVGVQPGIRPRVLDATAGLGRDGFVLASLGCEVTLVERQPLIAALLEDGLERARRDPDVAPIAARMRLLGGNSADLMRAWDGEAPQVIYLDPMFPHRDKSALVKKEMRLFRPLVGDDLDAPALLQAALALASHRVVVKRPRKAPIIEGPKPGYSLEGKSSRYDIYPKKALGKAECRHRREAASMQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELARVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(AI22\_26890)Pseudomonas\_aeruginosa\_YL84

MQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELARVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(PA14\_16780)Pseudomonas\_aeruginosa\_UCBPP-PA14

MQQTIDCPIRRRLAHLPWANDGRAGARHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWSERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELAGVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(PLES\_13051)Pseudomonas\_aeruginosa\_LESB58

MQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELARVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQMTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(U769\_06495)Pseudomonas\_aeruginosa\_MTB-1

MQQTIDCPIRRRLAHLPWANDGRAGARHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLAGLRAELAGVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(T223\_06425)Pseudomonas\_aeruginosa\_LES431

MQQTIDCPIRRRLAHLPWANDGRAGVRHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELARVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQMTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP169A1(M802\_3800)Pseudomonas\_aeruginosa\_c7447m

MQQTIDCPIRRRLAHLPWANDGRAGARHWLEMQRDPLAWLQKMHVAQPDLAVARMGPQRLWCLFHPQAVQELMVDRRDDLQRWQPALCMLKQWNGRSFMMREGAPAQARRKEVRPHLAPPPASEVRRLAAEWGERVEEGREYDLDLEMAAFSVTLSGHALFDVDLQPSAYRIAKAVRLLSRVALLEMSTGLPLGHWFPSKLCPRKRWALGQLREAVGEVAERSPRPLADLRDELCTLLMASHQSTGVTLTWSLLLLAQRPELLARLRAELARVNWTAIRSVADLRDCALLRAVLQECLRLYPPAYGLAPRQVTADIEVFGQRLKRGDVTMVSSWITQRDPRWFEAPLEFRPERFLEPARWPRGAYFPFGLGDRACPGTAMAMIDLAAALAYWVEHWDIMHDGDLAPRGWFSLRPQRARVRFRRRA

>CYP172B1(GU3\_14670)Oceanimonas\_sp.\_GK1

MTCPVFPKPAKSKASLWKVFFTKRHSWLDALYERSYGMKMGEYKLPGLTLYMVNQPDLVRQVMVQSMADFPKHRMLGDILEPLLGESIFTTNGEQWQKQRDMLDPAFKHARVQQVFGLMQSAANDMLERLKTHRPGQDIDPEMTFVTADIIFRTIMSTRLNEEQANRILDAFVRFQAESPKLALMKMFRLPGFLQRGGSERRRMAAAKEIRGTIEDIIRPRYQQAEAARAGCPRSKAELENQQDILSSLLLTTDASTGQPFGFDEIVDQISMLFLAGHETTASSLTWSLYLLATHPQIQEDAYQEVTQVLNGQPISVEALRKMVLVRDVFREALRLYPPVGFFARECAHATEMRNKHMKAGSTVMVSPWLIHRHKDYWHNPHQFDPYRFTAKQLKTPLSKSYLPFGAGPRVCIGAAFAQQESSLILASILQHYQLSLAEGFEPKPVGRLTIRSDNGLQLVLTPREQQP

>CYP198A1(XCC2912)Xanthomonas\_campestris\_pv.\_campestris\_ATCC\_33913

MRRPAFPASVMNSSGAVWQHKRRTLMPAFRAALVRESAMQASAATRSLLHELGDSCATQDMRTLMTGLCAQLGAGFLLGDSANAADLLRMLPMVDAISKQTRRQSLAPTWWPSSGRRRLRRLRADIDMALDRILMQSTQRPPRAASVLALLLAETARDDGDWCRDEAAAILMSALEPMSAALTWTLLLLAQHPHIAQEVAQEASALDGADVASGTSLLDRLPQSRACVKESMRLYPPAWITARIAQRDATLNGFHVPRGTQLLVSAWVVHRDGRHFPDPEIFLPARWLDDSATHSLTRYSYFPFGGGPRSCIGCMLALTQMTIVIATVLHACSLHLAPDARPSPFPALVLRPMDVRIALRPRVIRSVVPSRAHASPVRLASVTPND

>CYP198A1(XC\_1197)Xanthomonas\_campestris\_pv.\_campestris\_8004

MRRPAFPASVMNSSGAVWQHKRRTLMPAFRAALVRESAMQASAATRSLLHELGDSCATQDMRTLMTGLCAQLGAGFLLGDSANAADLLRMLPMVDAISKQTRRQSLAPTWWPSSGRRRLRRLRADIDMALDRILMQSTQRPPRAASVLALLLAETARDDGDWCRDEAAAILMSALEPMSAALTWTLLLLAQHPHIAQEVAQEASALDGADVASGTSLLDRLPQSRACVKESMRLYPPAWITARIAQRDATLNGFHVPRGTQLLVSAWVVHRDGRHFPDPEIFLPARWLDDSATHSLTRYSYFPFGGGPRSCIGCMLALTQMTIVIATVLHACSLHLAPDARPSPFPALVLRPMDVRIALRPRVIRSVVPSRAHASPVRLASVTPND

>CYP198A2(SB85\_08940)Xanthomonas\_sacchari

MTDARPRPPGPRGHWAFGNRQAFAADPLAFLQDCAREHGDVVRIAERTYLIAAPAAIASVLGDDGSLYAKSDPDPRARRAAFPASVMNSEGEAWRHKRQALQPAFRASLVRDYAGQALAATQALLQSSSDSAQAPDLRLTMTALCAQLGAGFLLGDPAHAPALLRMLPMVDAILQQTRTPSAAPAWWPSAAKRRLRAARGELDTTLTQILTSPRSNGADASVLELLRRNDPQGENDWCRDEAAAMLMSALEPMAAGLTWTLLLLAQHPSIAQAVAEEADALPGIDGASTTPCADALVERLPLTRACVKEAMRLYPPAWMTARIAQRDTTLGGFAVPRGTQLIVSQWVVQRDPRHFAAPDRFLPARWLDPAQTPARYTYFPFGGGPRSCIGSQLALVQMTLVVAGLLRERTLHLATDARPRPYPALVLRPLDVRIALRPRTTTLSRQSPATAPFPRTPETPHG

>CYP221A1(Pfl01\_2861)Pseudomonas\_fluorescens\_Pf0-1

MSDPLLKLLQKPLFDPEKRHRVSLREYMDLNIDRMRAIIGNGLMTNAMWLSQPRQSEFRLMLERAALIGAVDYSLLACIVDHFIAGDAFFAHGSQHQIAQYHQEICQLKAVYAFGCTEIASGSDVANLQTTINYDPHKHCLILNSPTPQSCKFWIGNALHAAVVVMVLGRLIVKGVDEGLHWFRVRIREQENGPLLPGVRITTCDPKGGIHANQVAGIRFCNMKLPLDALMQRYARFSAQGVFSSEIPPKERLKSAMQTFIQERLFLIAGARGAASMCVYLAYRFACHRLVKGNEGSQSLLTKALFRQRLYAEQLKVLALKLLEQAVLSRFEACWHQPARRKELHILAAVVKSVGTWLGLEVMSACRELCGSQGFHHHNRIVTLVMDHGISTTFAGDNNILCCQVARDAINRPRFANENIAQRIESLIVDQCRRAGDFSHRQAVALTYARALDLIINEGKHHPLVTSEIFEDIVHVFSPKLYEWELVASTKLEQNATEAQLILLNELLKPPSELVRAPIDKKNYVKHFTKPLYDNKPDFSNRNTIRNPYRAYTWLRKHQPVYWCEHLQAWFLTRYCDVIAAQADSRRFSSNRMQQLIDARVPENKRTHLNEFIKLASRWMYSQDGDTHKASRHLLGNAFTPRSIEALRAIIQDITDRELSRLHGQTDLKTALFDRVPALILARLYGMKDDEALRLRRWTRDIVMFLGGSQDADQGPDQALEGIKEMYACFAELIEQRRRQPGDDLVSRVLESGQNSAASLDEVLAQIVFILVAGYTTSADQMCLGLLHLLKHPQQLEALLADPTLIGSFIEEMLRFDPAGSLSHRILMEDVTIDNITMKKGNLVYLIRASANRDPEKFHAPNTFDIRRARNEHLTFGKGEHFCMGTSLFRLEAEIVFTSLLKRFPDLQLIARRPAKWRNSNLQFRGLKTLPVDLGTGV

>CYP221A4(AA957\_29280)Pseudomonas\_trivialis

MALLSAPDFSDPKTIINPYPAFARLREHHPVYWSEHHKAWLLTRYGDVSSAQADARRYSSNRMRQLVDAQLSPEKRAALEPFVEKASRWMYSQDGKEHEAGRKVLGKTFSPGSIEALGEAIQTIIDDQLKQLSPRPEMMDELFNKIPALILAYLFDIPANDALKIRGWTDAIIVCMVGSTDPAYGPKEALQAMEEMYAYFSRLIGRRRLAPGNDLVSQVIAAGDKASMSEEDFLAQLAFILVAATTTSADQLGIILFYLLEKPKRWAAVRDDPDKVDAAIEEALRICPAGQLSHRVLTEDVVLHGKTMRKGELVFLIRAAANRDPAHFAHPDRFDLYRQKQDHLAFGRGPHYCMGRLLFKLEAKILFTTLLRRFPHMHLIKGRPPRWRDNSLQFRGLGRIEVELAPVTDVITRCFSAAPWEKKGGYCRALRVGNLIMTSGTVSFDAQGKPFAEHDAYLQTQRCLEIIETALKQLGTDRTRVIATRMYTTDMELWQKILKAHKAFFDGCEPTTMLLSVKALIAPEFLIEIEAQAMVAQS

>CYP226A10(RK21\_01256)Pseudomonas\_plecoglossicida

MTIKPEKIMSTSEHNELTKAFNDVASNYRGTSDIDLHATYREMRANSPVLRDNFMARLGVPSIAGLDATRPTFTLFKYDDVMAVMRDAGNFTSGFIAEGLGAFFDGLILTAMDGEAHKSIRSLLQPVFMPDTVNRWKETRIDRVIRDEYLKPMVPARSADLMDFALYFPIRVIYSLIGFPEDRPEQIEQYAAWALAILAGPQVDPEKAAAARGAAMEAAQALYDVVKEVVAERRAQGGTGDDLISRLIQAEYQGRSLDDHEIATFVRSLLPAASETTTRTFGTLMSLLLQHPGVLERVRNDRSLVNKAIDEAVRFEPVATFKVRQAAKDLQIRDVPIPQGAMVQCIVTSANRDEDAFENPDVFDIDRKPKPSFGFGFGPHMCIGQFVAKTEINCALNAILDLMPNIRLDPNKPAPEIVGAQLRGPHYLHVLWD

>CYP226A13(Glaag\_0363)Glaciecola\_sp.\_4H-3-7+YE-5

MSKQQNENLEKAFAGVADNYRGQDVDLNAIYREMRKNSPIIAEDFMSQQGVPNIAGLDANRLTFTLFKHKDVMTVLRDAKNFTSGFIAEGLGAFFDGLILTGMDGEEHKKARALLQPVFMPDVVNTWRDTKMDPIVRNEFLIPLQKEGKADLMDFALYFPIRLIYSLIGFPEDDHDKVKQVAAWSLAILAGPQVTPEKAAEARKAAMEAAKCLYDAVKEAVVEVRKNGAQGGDLISRLIRAEYEGRQLDDHEITTFVRSLLPAAGETTTRTFGSLMTLLLERPALLERVRADRSLVGKAIDEAVRLEPVATFKVRQAAEDLEIRGMQIPKGAMVQCIVASANRDEEVFEDSEKYIIERKVKPSFGFGFGPHMCIGQFIAKTEMVVALNAILDLFPNIRLDPDMPKPKIEGAQLRGPHEVHVVWD

>CYP226A14(HP15\_18)Marinobacter\_adhaerens

MTLTANNLDIEAAYHAVSDTYLGSEVDIHELCREKRHNEPVMEGDFVDTYLKVPTNAGAKGGKCAVTLFKYKDILSVLRDGETFTNGFIAEGLGAFFDGLIVLAMDGEQHRRTRALLQPIFMPQTVNTWKPEIERVIRDEFLTPLVATKGTNLMDFGLYFPIRVMYALMGFPTDDTEKFKKYASWALALVAANQIDPEKAKIFGPIAGQAVKSLYDSINEVVVKTRAEGAEGNGLISRLINAEYEGRALDDHEVTTFVRSLLPAAGETTTRTFSSIMTLLLERPDLLERVKNDRSLISKLIDESVRFEPVSTFKVRQASKDVEIGGVKVPKGALVQCMVISANRDEDIFPEPDTFDIDRQARPSLGFGFGPHMCIGQFVAKVELNSAINAILDLFPGIRLDPSKPAPKIAGAQLRGAKAIHVIWD

>CYP226A15(HP15\_51)Marinobacter\_adhaerens

MSELSKNELENVFEDVASNYRGADIDLHAAYAQMRKESPVLPENFMEKLGVPSIAGVDPDRPCYTLFKYDDVMRVMRDSTLFTSGFIAEGLGAFFDGLILTAMDGEEHKKMRNLLQPVFMPDTVNRWKADRIDRVIREEFLEPMVADKQADLMDFALYFPIRVIYSLIGFPEDRPEEIKQYAAWALAILKGPQVDPAKAEAAKKEAMEAVQALYGAIREVVEQRRAEGGEGDDLISRLIVAEYEGESLDDHQITTFVRSLLPAAGETTTRTFGTLMTLLLERPELLARIREDRSLVNKAIDEAVRFEPVATFKVRQAAQDTEIRGVQVPKGAMVSCIVSSANRDEDAFEDADTFNIDRRQKPSFGFGFGPHMCIGQFVAKTEINCAVNAILDLMPNIRLDPSKPAPEITGAQLRGPHSLPVVWD

>CYP226A16(Glaag\_0358)Glaciecola\_sp.\_4H-3-7+YE-5

MKTESIEDLQLETAYKAVSDTYRGTGIDIQKACKKQREEGGPVYKGDFVAQFGVPTNAGLQQGTRPTFTIFDYKDVMAVMRDSKTYTSGFIAEGLGAFFDGLIILAMDGDQHRQVRSLLQPAFMPEAVNKWRPEIEAVMRRDFLEPLAPKKKADIMEFGLFFPIRVMYALMGFPTDDPEKYKKYAAWALAMVGGNQIDPTKIEEARRQAGIAVKSLYDSILEVVQERRASNEYKDDLIGRLIVAEFEGRTLDDHEIVTFVRSLLPAAGETTTRTLSCVLTMLFNTPGLLDRVRDDRTLIPKLIDETVRYEPMGTFRTREAASDTEIQGVKIPKGSFVQSMIVSANRDDTVFENGHEFDIDRKMKPSFGFGFGPHMCIGQFVAKLEMNCALNAMFDLLPNLRLDPDYPAPAIEGAQLRGCSSIHLMWD

>CYP229A1(Pfl01\_3472)Pseudomonas\_fluorescens\_Pf0-1

MDPIIAATHADPYPYYAELRAAGGLTFHHGLKLWVASSARAVCAVLAHPDCRVRPVQEPVPKAIVDGMAGKVFGLLMRMNDGEAQRCPRSAIEPPLGLIDREEVGALVSARLITNDSDGLYKAMFRGPVCVVASLLGFTPAQARVISELTADFAACLSPLSNDLQLAAAHRAAEQLRGYFIEMLADPNPFLADIRQRFVGNEEVLLANLIGLCSQTFEATAGLIGNALVALHRQPELRNASVDSLLAEVQRFDPSVQNTRRFMANSCEIDGVRLEAGDVILVLLASANRDPALNENPDRFRVDRPNRRSFTFGSGRHQCPGQTLAMTIASATLTEILARNIDPGRFTWHYRPSLNGRVPMFSEVQP

>CYP229A3(PputUW4\_02968)Pseudomonas\_sp.\_UW4

MDPIIAATHADPYPYYAQLRAEGGLAFHPGLNMWVASSARVVAAVLAHADCQVRPALEPVPRAIADGMAGQVFGQLMRMNEGERQHCPRSAIAPGLDLIDTREVESLVSARLISADAVGLHNAMFRGPVCVVAALLGFTPAQGRIISELTADFVACLSPLSTSAQLAAAHAAAEQLSGYCAELLADPDNHSRLLAGIRQRFTGGAPQTLIANLIGLFSQTFEATAGLIGNAVLALIQHPSLHSESTSIEDLLAEVQRFDPPVQNTRRFVAAPCEIDGTRLNAGDVILVLLASANRDPQLNDNPDTFLLDRPNRRSFTFGAGRHQCPGQSLALSIAGATVRQILAMKPELDRLTWHYRPSANGRIALFKDWPVA

>CYP229A4(PSEBR\_a3386)Pseudomonas\_brassicacearum\_subsp.\_brassicacearum\_NFM421

MDPITAATHSDPYPFYAALRAAGGLAFDPGLNLWIASSAEAVCAVLHHPDCHVRPAHEPVPKAIAEGPTGRVFGHLMRMNEGERQHCPRAAIAPRLQDINPRQVEALVRARFLREGAEGLHQAQFIGPASVVAALLGFSPTDCQRVSELTGDFVAGLSPLSQAPHLDAAHQASEQLTGLFQARIEAQDNPLLLGIGQGFEGADPNSKIANLIGLLSQTYEATAGLIGNALLALIGDPALRRTLREAPTQIGSLLAEIQRFDPPVQNTRRFIAAPCKILGTALNPGEVVLVLLASANRDPQLNPRPDTLLLDRPNRRSFSFGSGRHECPGQTLAMDIACATLAAILEREPPLDQLTWCYRPSVNGRIPLFCERSRTDRP

>CYP229A5(PCL1606\_36860)Pseudomonas\_chlororaphis\_PCL1606

MDPITAVTHADPYPYYASLRARGGLAFDPGLGLWLASSAEAVAAVLAHPQCHVRPVHEPVPRAIADGAAGRVFARLMRMNEGERQRCPRAAVEPGLQQVHAEEIGQRVCALLPGLPSDIGARLHDCQFHLPVAVVAALLGFAAHQLPEIAELTRDFVACLSPASHLAQRDAAHRAAEHLTGHFAVLLDRAPISPLLQRIVDGFGAQGRDSLIANLIGLLSQTLEASAGLIGNSLCALLNDRQLLAELRAAPARIGDLLAEVQRHDPSVQNTWRFVAAPCSIAGVTLEPGAVVLVLLASANRDPQLNPHPDRLLLEREARRSFSFGNGRHQCPGQALALSIASAVIGALVRDPTLEQPIGWSYKSSLNGRIPLFTTLPESH

>CYP229A5(TO66\_12285)Pseudomonas\_sp.\_MRSN12121

MDPITAVTHADPYPYYASLRARGGLAFDPGLGLWLASSAEAVAAVLAHPQCHVRPVHEPVPRAIADGAAGRVFARLMRMNEGERQRCPRAAVEPGLQQVHAEEIGQRVCALLPGLPSDIGARLHDCQFHLPVAVVAGLLGFAAHQLPEMAELTRDFVACLSPASHLAQRDAAHRAAEHLIGHFAVLLDRAPISPLLQRIVDGFGAQGRDSLIANLIGLLSQTLEASAGLIGNSLCALLNDRQLLAELRAAPARIGDLLAEVQRHDPSVQNTRRFVAAPCSIAGVTLEPGAVVLVLLASANRDPQLNPHPDRLLLEREARRSFSFGNGRHQCPGQALALSIASAVIGALVRDPTLEQPIGWSYKSSLNGRIPLFTTLPESH

>CYP229A6(JM49\_18480)Pseudomonas\_chlororaphis\_subsp.\_Aurantiaca

MDPITAVTHADPYPYYTSLRARSGLAFDPKLGMWLASSAAAVAAVLAHPECRVRPAHEPVPRAIADGAAGTVFGQLMRMNDGERQRCPRAAVEPGLQLVPAEEIQQRVAALLLGLPRDTAARLHDCQFRLPVAVVAGLLGFAAHQLPEIAGLTRDFVACLSPASNQAQREAAHRAAEALSRHFEVLLDQAPVSPLLQRIVNGFGRQEHDNLIANLIGLLSQTFEASAGLIGNSLCALLNDRQLLADLRATPNRIADLLAEVQRHDPPVQNTRRFVAAPCRIAGMTLEPGAVVLVLLASANRDPQLNPEPDRLLLEREDRRSFSFGSGRHQCPGQPLALSIASAVVGALLPQSTLDQPIAWTYKPSLNGRIPLFTLLPESH

>CYP229A6(EY04\_11415)Pseudomonas\_chlororaphis\_PA23

MDPITAVTHADPYPYYASLRVRDGLAFDPRLGMWLASSAAAVAAVLAHPECRVRPAHEPVPRAIADGAAGTVFGQLMRMNDGERQRCPRAAVEPGLQQVYAEEIQQRVAALLLGLPRDTTARLHDCQFRLPVAVVAGLLGFAAHQLPEIAGLTRDFVACLSPASNQAQREAAHRAAEALSRHFEALLDQAPVSPLLQRIVNGFGRQGHDSLIGNLIGLLSQTFEASAGLIGNSLCALLNDRQLLADLRTTPNRIADLLAEVQRHDPPVQNTRRFVAAPCRIAGVTLEPGAVVLVLLASANRDPQLNPEPDRLLLEREDRRSFSFGSGRHQCPGQALALSIASAVVGALLPQSTLDQPIAWTYKPSLNGRIPLFTLLPESH

>CYP229D1(A7J50\_1920)Pseudomonas\_Antarctica

MTPLQAATHVDPYPYYAGLRRNPELMFDADLGLWIASRASTVEAVLAHPDCRVRPLNEPVPKSLAQGAAGQVFARLMRMNEGQAHRCPRAAVEPALAGVGAQPIADVVGQLIDSMGNLDTLMFSLPVSVVAALLGFQAQQLASVAGLTRDFVACLSPLSSEPQLLKADAGASRLRQMFSDLLEETALLAHLRSGDWQDADVLTANLIGLLSQTCEATAGLIGNSLVMLARRPDLVDRILHTPALALSLVEEVARYDSPVQNTRRFVAEDCTIGNRVLAAGDSILVLLACANRDVEANPNPDSFELERAHRRLFSFGSGRHQCPGQRLALSIASQAVSALLHRQPGLLAGAGRFSYWPSLNGRIPRFHAAALSQ

>CYP229D2(PflA506\_2140)Pseudomonas\_fluorescens\_A506

MTPFEAATHADPYDYYARLRRQSELVFDADLGLWIASGASVVEAILEHPDCLVRPPHEPIPAAIAQGAAGDIFGRLMRMNEGVQHRCPRRVIEPALGSLGTENIAGIVARVVETLDDPVGNPNEWMFRLPVSVIATLIGFAPSQCQEVAQLTQDFVACLSPLSDEAQLSEAHCGAARLRQMFQALLNNDDKRSGLLDRLYGEYQASAWKDDDALIANLIGLLSQTCEATAGLIGNALIALQRNPDLFEGMHATPMCVAEWVAEVARHDSPVQNTRRFVAQRCTIGGSVLEAGDTVLLLLAAANRDPCANPDPDSFLINRTQRRTFSFGAGRHQCPGQPLALAIASEVISAFLHRRPDLFARAYRWDYLPSLNGRIPRFYRDEETQQ

>CYP229D3(AA957\_05280)Pseudomonas\_trivialis

MTPLEAATHADPYAYYARLRRNEELLFDAELGLWVASRAETVGAVLAHPDCRVRPPHEPVPPAIAQRAAGQVFARLMRMNEGAAHRCPRAIIEPALAALDTQQMAVVVKQLSSRMNTPDEWMFTLPVSVVAQLLGVPSEQLKTVADSTRDFVACLSPLSSAAQLQNADAGVSQLRQVFSGVLAETGLLALIRRGDWQDAEVLNANLIGLLSQTCEATAGLIGNTLVLLSRRPDLVEQIQRAPTLVTALVEEVARYDSPVQNTRRFVAGRCTIGRRVVEVGDTILVLLAAANRDPDANPDPDTFQLERAQRRVFSFGSGRHHCPGQTLALTIASHAILAVLQRQPSLFASAIAFSYWPSLNGRIPRFDSTVLQR

>CYP229D4(HZ99\_01685)Pseudomonas\_fluorescens\_UK4

MTPFEAATHADPYVYYSGLRRQNGLLFDADLRLWIASSAKAVEVILGHPDCRVRPLNEPIPPAIAQGVAGMIFGRLMRMNEGPQHLCPRMAIEPALASVGTESIADIVSRVVETLDNPVENLDELMFTLPVSVIAALIGLPSSRLQEVARLTRDFVACLSPLSDEIQLGEANSSATRLSQLFSALLSNDDDRSRFLSHIRSGCEATAWRDHDALIANLIGLLSQTCEATAGLIGNTLVALHRNPDLIKDMQPTPMLVADLVEEVARYDSPVQNTRRFVAKRCTIGGSVLEAGDTVLVLLASANRDSYANPDPDSLLVKRTQRRTFSFGSGRHECPGQQLALTIASEAILAWLHRQPASSARLYRWIYLPSLNGRIPQFYRDRETQQ

>CYP229D5(PFLU\_3256)Pseudomonas\_fluorescens\_SBW25

MTPFEAATHADPYGYYSNLRRKNGLLFDAELGLWIASSANAVEAILGHPDCRVRPLSEPIPPAIARGAAGVIFGRLMRMNEGPQHLCPRMAIEPALASVGKESLSEIVSRVVETLDDPVEDLDELMFTLPVSVIAALIGLPSGRLHEVAKLTRDFVACLSPLSDEIQLGEAHFGATRLNQLFSALLSDQEDSSRFMSHIRSACAANAWSEHDALIANLIGLLSQTCEATAGLIGNTLVALHRYPDLTEGMQPEPMLVADLVAEVARYDSPVQNTRRFVAKRCIIGDSVLEAGDTVLVLLASANRDPYANPHPDSLLLKRTQRRTFSFGSGRHECPGQQLALTIAAEAILAWLHRQPTSSVRPCQWGYLRSLNGRIPQFNRDRDIHRYL

>CYP229D6(H045\_00255)Pseudomonas\_poae

MIFGRLMRMNEGPQHLCPRMAIEPALASVETDSIADIVSRVVETLDNLVENLDELMFTLPVSVIAALIGLPSSRLQEVARLTRNFVACLSPLSDETQLDQANSGATRLSQLFSALLSNDDESSRFLSHIWSGCEATGWTDHDALIANLIGLLSQTCEATAGLIGNTLVALHRNPDLIKDMQPTPMLVADLVEEVARYDSPVQNTRRFVAKRCTIGSSVLEAGDTVLVLLASANRDPYANPDPDSLLVKRTQRRIFSFGSGRHECPGQRLALTIASEAILAWLQRQPASSAHPYRWSYLPSLNGRIPQFYRDQETQQ

>CYP229D6(VO64\_5352) Pseudomonas\_fluorescens\_LBUM223

MTPFEAATHVDPYVYYSRLRQQRELLFDADLGVWIASGAGVVEAILEHPDCLVRPLHEPIPAALAQGAAGHIFGRLMRMNEGAQHQCPRRVIEPILASMGTQNIAGLVAQVVETFEISGDNPNEWMFTLPVSVIATLIGFTSNHLQEVAQMTRDFVACLSPLSDEAQLSKAHCGAARLSQMLQALLSNDDKGNCVLGRLYSDYDTSAWEDDDALIANLIGLLSQTCEATAGLIGNTLIALQRNPELFEGMQATPTLAAEWVAEVARHDSPVQNTRRFVAKRCAIGDSVLEAGDTILLLLAAANRDPCANPEPDSFLLKRAQRRTFSFGSGRHKCPGQPLALAIASEVVFAFLHRQPTSPAPAYRWRYLPSLDGRIPQFCRDGEIQQ

>CYP229E1(POS17\_2517)Pseudomonas\_sp.\_Os17

MDPISAATHFDPYDFYYARLRARGGLTYDSALGLWVASSAAAVAAVLNHPACRVRPLQEPVPRAIAGRPAGQVFARLMRMNDGPRHGCPRQAMAPGLQALGGIDLMPWLARWRPALRAPQCAADLQRWQWCLPVALLAALLGVPAAQCEELARRTGEFVACFSPLSTEPQLQAADSAAQALLRQMQAVLDNPQPGPLLRTILERSNGLAPEDLQANLVGLLAQTHDACAGLLGNSLLALLADPALARRLQHDPRQLQDWLLQLQRLDPPVQNTRRFVAEPCTLHGVDLQAGDSVLVLLAAANHDPALCAITGSDPARQGFSFGAGAHRCPGRDLALNIVHSLLRTLLQPPGLDALALQWQYRASVNGRLPQFSDAPGSRPMDWQPADA

>CYP229E2(PFL\_2514)Pseudomonas\_protegens\_Pf-5

MDAISAATHSDPYFYYTRLRARGGLTYDCALRLWVASSAAAVAAVLDHPACQVRPSTEPVPQAIAGRPAGQLFGRLMRMNDGPRQRCPRAAIEPALQGLCTAGLETHLARWQPALAGPACAADLQRWQFVLPVALLASLLGVPAEQCETLARRTGEFVACFSPLSDQPRLQAADRAALELDAQMQALVQAPQHSPLLRQILDRSGELAPADLRANLAGLLAQTHDACAGLVGNSLVALLAAPAMQQRLRQEPGLLGDWLLERQRLDPPVQNTRRFVTAPCTVHGVELQAGETILVLLAAANQDPALAAITGSNPAHQGFSFGAGAHRCPGRELALGIVRCLLHALLQGPGLDALALDWQYQASVNGRIPLFSDRGEAEQ

>CYP229E2(PFLCHA0\_c25790)Pseudomonas\_protegens\_CHA0

MDAISAATHSDPYFYYTRLRARGGLTYDCALRLWVASSAAAVAAVLDHPACQVRPSTEPIPQAIAGRPAGQLFGRLMRMNDGPRQRCPRAAIEPALQGLCTAGLETHLARWQPALVAPACAGDLQRWQFVLPVALLASLLGVPAGQCETLARRTGEFVACFSPLSDQPRLQAADRAALELDAQMQALVQAPQHSPLLRQILDRSGELAPADLRANLAGLLAQTHDACAGLVGNSLVALLAAPAMQQRLRQEPGLLGDWLLERQRLDPPVQNTRRFVTAPCTVHGVELQAGETILVLLAAANQDPALAAITGSNPAHQGFSFGAGTHRCPGRELALGIVQCLLHALLQGPGLDALALDWQYQASVNGRIPLFSDRGEAEQ

>CYP229E3(PPC\_2556) Pseudomonas\_protegens\_Cab57

MDAISAATHSDPYFYYTRLRARGGLTYDCALRLWVASSAAAVAAVLDHPACQVRPSTEPIPQAIAGRPAGQLFGRLMRMNDGPRQRCPRAAIEPALQGLCTAGLETHLARWQPALVAPACAGDLQRWQFVLPVALLASLLGVPAGQCETLARRTGEFVACFSPLSDQPRLQAADRAALELDAQMQALVQAPQHSPLLRQILDRSGELAPADLRANLAGLLAQTHDACAGLVGNSLVALLAAPAMRQRLRQEPGLLGDWLLERQRLDPPVQNTRRFVTAPCTVHGVELQAGETILVLLAAANQDPALAAITGSNPAHQGFSFGAGTHRCPGRELALGIVQCLLHALLQGPGLDALALDWQYQASVNGRIPLFSDRGEAEQ

>CYP236A17(Patl\_2305)Pseudoalteromonas\_atlantica

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>CYP236A18(Glaag\_2453)Glaciecola\_sp.\_4H-3-7+YE-5

MKKYQSPDPFTGAREVSGCAHMNDQDDPVTMILRLKDVRKTAHNWKTFQSGAAPGRIVIPSEVNIRDTRQIPFEVDPPMHGSFRALLDPWFKRPLGDEYRAQLGQQVNALVDEVLTKGVIDAVEAFSLCLQSRALTLLLNTDASEADTWIGWGTHVFRSEDDPLDKDKAGLLYDYIDEKINAASADPEGDLYSVLLAAEVEGKKLTHEEIKGIMILTFAGGRDTVINAVTNTISYFAEHPESLTRLRNEPDIIGRAIEELIRYFAPLTQMGRVATQDSTVCEHAIKADSRVSLCWASANRDASVFESPEEVILDRKLNPHVSFGFSHHNCLGATHARQIMRVLIETLIEKVGSIDIVDFEENIEQLGEFERKVGFHRLNVHFHPR

>CYP236A19(AOR13\_2915)Alteromonas\_stellipolaris\_LMG\_21856

MQTKNSDGGCGTPSHQQFEGEKSKCPMSEHVMGNVSQLDDPFTALRQGDGVLDIDDQGDPVKMVLGLKDVRKAAHSWQLFQSGAIPGRIVVPSEVAIRDVRQLPFELDPPAHKGFRGLLEPWFKRPAGKAYQDKLTDIVSIMFDSILDNHTAINKRSSPEMVTHDAVKDIALVLQSRALTVLINVPMTEAQTWINWGTHVFRSDDNPLDASKANVLYDYLDEQIAHAKKAPGEDIYTELLHAEVEGKALTEEEIKGIMILTFAGGRDTVINALTNSLAYFSENPDALNFINEHPENLNSAIEELLRYFSPLTHMGRVATKDTQVAGHDVAYDSRISLCWASANRDESVFESPNEVNLTRKANPHVAFGFGIHNCLGATHARALLRIWVGQLAERVARVEVVEADENTEQWGEVARKVGFHKLLVRLHKRA

>CYP238A1(PP\_1955)Pseudomonas\_putida\_KT2440

MEILDRPQAPSDFNPMSEQSFRDPASICQRAREETPVFFYAPLGVWMVTRREDAERVLSEWETFSSLANSPNVPEEFRSRFAPSVMADSIVAIDPPRHTQARNVIQRGFMKPKIDPLEPIIEQRAHEIIDRFAGESGTEIMNNYCLELTTRTLMALYDLPLEDRPMFERIRDVSIKVLASVYEPMQEPEKSRVWNEYVSGYEYFYQLVEQRRNSDARDIISTMASQKDNQGNPALSTERIALHLVEIAFAGTDTTAQMMANAILFLDSHPEALAAAKADKTLWSRVFEETVRRRPSAPFAGRITTTEVEIQGVKIPAGSPVWVSLAAANTDPRHVGCPMNFDINREAPQDHLAFTKGRHTCPGAPLARLQGATGLRVLFERLPELKVVPDQPLNFAPMALLPVRLSLQVIW

>CYP261D1(MVIS\_3494)Moritella\_viscosa

MNANMVKDMNASTISLDELPGPKQTPVLGNFTQISSESFHTNLESWAREYGSAYQIKLLNKQFLVISDPKIGLEIIKQRPKLFNRTERLEWLFEDLGFHGVFSSNGDKWKRQRRLIMPAFSYKTLANFVPHLKSLSINLQTTIDQKIATGAAFNVHKLLQYFTIDITTSLVFGYQTNMLSGSTDTHLRDNIDRLFHALNKRSKYPFPWWHYIRTPETRRIDKAREEVYQLAVTMITKAKADLAGNSELSEEPDTILQAMIVASDSEDNKLTDDELVANILTLLLAGEDTTSNMLAWTLYYLAKNPHLQQQVIDEVSQVCNGDIETLDLVALEQFEFIEAILREGLRLKGTAPLISAEPTEDTVLSNGIQLPKGTAIFILTRPGGLDESVVKCPEQFNPERWLATPEKPVCPHLQSSHIPFGAGARHCPGERLAIMEGKAVIARLCWYYAINQPEQAAEVGEEFAFTMRPTNLHLTLTPR

>CYP289A10(GU3\_03105)Oceanimonas\_sp.\_GK1

MSSKLHQWDPAGEQDLIEACDRLRPRCPLAHHDALHWSVLRQQEARQVLSDHATFSNAVSRHLSVPNGMDPPEHGPYRRLIAPYFSPERMAEFEPRCRAIIEALATGLRGELELVQAFAEPLSLQLQCAFMGWPETLHGPLRDWTRQQHQATRSGDHAALQALANTFDGYIREQLEGRRCAQAPDDITTRLLAERVNDRPLTDEELISLIRNWTVGELGTITACVAILAHYLAAHQEVQELLRQTPEVRGAAIDEILRIHPPLLSNRRITTQDVTLGGQSLPAGSRLSILWASVNRDEGVFGDPDEFRLDRNPEHNLLYGAGIHRCPGAPLARMELELALDAMLSAGRLTLVPGKPPVKARYPTGGFSELWLRLE

>CYP289A11(ACG33\_09565)Steroidobacter\_denitrificans

METDWDPRSAEVLRDQRAAYDSMRERCPVAFSEFMHWSLFRHEDIERALLDHETFSNAVSQHLTVPNGMDPPEHTAYRAIIDRCFTPERVDAFAPVCRGIAADLVRNMLGRDEVELIADLALPFSVYVQCAHLNWPTTLHEPLIRWTRRNYEANLKRDRHITSEIAREFEALIDDMIEARSQGQSKPEDDLTAVLLNERVWGRPLSNEEIASILRNWTVGEIGSISAAVGIVAYYLAQHVDLQQQLRTQPSLLDAAIDEILRMFGPLVANRRITTRPVEIGGRKIGAGERISLMWIAGNRDGRVFDDPDSFRLDRDPAKNLLYGAGVHVCPGAPLARLELRMITEELLRQTTAIEPVPGKTPVNAIFPSSGYATLPLCIKR

>CYP289A12(Q7A\_103)Methylophaga\_nitratireducenticrescens

MANNSRKADWNPRSEEALKDQISTYDTMRTQCPVAWSDYQHWTLFRHGDVMRVLEDHHSFSNAASSHLSVPNGMDPPEHALYRQVIEPYFSTQAMSEFEPTCRNIARQLVDTLPSGQPFDVVDLFSRAFALQIQCAFMGWPDSLRAPLREWVLKNHHATLSGDRQAMADVAHEFDGYIHDLLETRRQAGANAPKDVTTSLMKETVNGQTMTDEALTSLLRNWTVGELATISASVSILLNYLSEHPDLMHSLSIDTNALSDAIDEILRMDAPLMSNRRVTTRDVEMGGKSIPAGEKITILWASANRDEEVFGDPDAFSPQQNREQNLLYGAGIHVCPGAPLARMELRVLMEEFLAAVDTLKHAPNEQAERAVFPTGGFSYLPMIIEKN

>CYP289A6(PSF113\_3435)Pseudomonas\_fluorescens\_F113

MDEKSLPDWDPRSEAVLKDQTTAYDDMRRRCPVAYSQYGYTSLFRHEDVLRVLKDHESFSNAVSRFPSVPNGMDPPEHTVYRNLIEPYFSPEHMDAFAPVCRDIAVRLVRALPDEGPSELIGEFAQIFALRIQCAWLGWPADLHEPLRLWTLKNHAATLARDDADLAAVALEFDGYIKDLLEVRRTAGAAAPNDITTILLRDQSLGRTLTDDEIVSILRNWTVGELGTISASVGILAHYLAINSEWQQQLREQPALLPAAIDEILRIHAPLIMNRRVTTKQVMLGGRTQAKGARIALNWASANRDEAVFGDPDEMRLDRDPELNLLYGAGIHVCPGAPLARLELRIVMEELLGRTSRIALAMDKEPVNAFFPASGFSSLPLRIQKPSSQALGACLPPEIP

>CYP289A8(PSJM300\_12960)Pseudomonas\_stutzeri\_DSM\_10701

MSEEPKSDWDPRSADALADQIAAYDALRARCPVAYSDYLQWSLLRHADVMQVLLDHETFSSAVSSYPSVPNGMDPPEHGLFRRLIEPYFAPPRMQAFEPLCRAIASELAAALPKAGDVELIDGFAQDFALRIQCAFMGWPGDLHEPLRQWTRKNHRATLAGAHAAKAEVALEFDGYIRGILEARRAEDHLAGDDPTDRLLAERIEGRPLSDEEIVSILRNWTVGELGTIAASVGIVTHYLAARPELQRQLRQDLSLLPAAIDEILRIDAPLIANRRITTRAVELGGRRIEAGERLTLLWASANRDEDVFDDPDAFRLDRDPSLNLLYGAGIHVCPGAPLARLELRVVMEELLRQTLHIALVPDQPPVRACYPAGGFSELPLRIG

>CYP289A9(Maqu\_1895)Marinobacter\_hydrocarbonoclasticus\_VT8

MAEQHHEDWDPRSAEVQKDQIRAYDAMRKECPVAWSDYQQWTLFRHADVMRALEDHHTFSNAVSAHLSVPNGMDPPEHTPYRKAIEPYFAPEPMARFEPVCRDVARALVQTLDKNKPLDVVNALSRPFALQIQCAFMGWPDSLHQPLAEWVMKNHRATLARDHAAMADVAEEFDGYIRDLLDSRRQPNKPAPDDVTTRLMREQINGQPMTDAELVSLLRNWTVGELATISASISILTNYLAHHHELLNNLKAAPEQLPEAIDEILRMDAPLISNRRVTTREVEIGGRTIPASEKITLLWASANRDEVVFGNPDQFCPRQNAARNLLYGAGIHVCPGAPLARMELRIFMEELLKQIEAIEQADGEQPERAMFPTGGFNYLPLVFR

>CYP289D1(HDN1F\_30550)Gamma\_proteobacterium\_HdN1

MSNSSNQDWAPQSDSVQGDQRAAYDQMREDCPVAYSEYAHWSVFRHKDVLRVLLDHETFSSHVSRFASVPNGMDPPQHTRYRELINPYFSAEKVAEFEPLCEKIADSLAQSVLCGEQVELMEAFAQPFALQVQCAFMGWPLSMQGTLLSWVQRNNQAIFKQDRALLAELAAEFEAIIAGLIAERRQAKVGPDCDVTGALMHEEIDGRLLNNAEIASILRNWTVGEVGTIAASVGIIAHFFATNPEWQARLRESPDLLWKANDEILRIHGPLVGNRRRNTCPVEIGGRQIPAGERISVNWIAANRDPQVFPQPDQFSLERNPADNLLYGAGVHVCPGAPLSRMELVVVARALLRSTDAIRLLEGQPPVLAGFPASGYARLPLALG

>CYP1043C1(YC6258\_04794)Gynuella\_sunshinyii

MNIFLLTVTVAFVLSLPYWLPPLIIRLRMNVFTRINGEEALHLPSDSFNAEDFKTLYGNPALSGRSKGAELSDLFWYWLAPGPEVHPEHLELSDRYRNLSRFTRQLMARSRTELESMIDQYQQDPLRLSLHHKKNWTSIRLRDAFMPLWADFFYRLLFNEPCNEKTRNLIVNHASDVVNALKCCKLRNMSKRHQLTEFLVNKLESNEFPHPFPPGLTTLEQAHYLQGAFFNTAIVQMSEAMSHLIMVIAQHPHCQERLRSGDHDHYLDDVINESLRLNPLFGIAHRIVTDTVNFKGSTIKKGTVVCFNYPEFHKQGYENPDQFNPDRWQQCPAKDSNFMPFGITSNRSCPAQGLATVTMRRLAFHVINSYWFTSPVPHTRSLPNRGPCLVMLSQSVSGHRFIRHIILPLMLLRDHWEDLYRSLTQLVFGTIMILHAKKLKLCKKYFQQLESL

>CYP1097B1(OLEAN\_C17420)Oleispira\_Antarctica

MTIKSATSSSATPPLRQFKDLPGPRPWPLVGNALQIKLSRMHQDIEDWAQQYGPIFKMHLGPTKVLVIADHQIETALLKDRPDSFRRPKQLVDTLEEMGLQSGLLTAEGQTWKDQRRMVMASLSANNVRSYFPSLLKVTKRLQGRWLNAVDTDTTIDLQADFMRFTVDAIAGLSFGSDINTLETDDDEIQRHLDKILPTLFKRVNALVPYWRIIKSPADRQLDRSVALVNESINGFIEKARARLDSDSARREQPQNLLESMLVAADKSDSGVNNNDVAGNVITMLLAGEETTATTLSWLIYLLKRNPEALKCAQQEVQSILAELDDDLDSLTPEKLNELKFIEACTLETLRLKPTGPFDVLVALEDTEVAGIAVPKGMWIWVVCRHDTLAEHYFPDPKAFKPQRWLKTEDNDLAQSRRVSMPFGSGPRICPGRYLAMLEIKLAMVMLLKNFDIESVDTPDGGEAKEIMSITMNPVGLTMKLQKRL

>CYP1104B1(FF32\_08560)Halomonas\_campaniensis

MHQDSVLCKAVTTKSANDHQGLSAALNRAKGLEPPVKVTPVSASKGIVHRLRLAQHNLLSVWREEDYSIRTSRMALMKQDYVLCNSPDTVRRVFLEQHDNYDRKSPQMRRALEPLLDDGLFVSDGDLWRQRRRQCAPSLTNALLPGFCTTMTASAEETAKRWAQHPSDTPIDMLTEMAHLTARIIGRTIFGDDTTDEEAEQVVAGFTEYQRHSEHLDMANMLGLPFLSLLGNPLRRARTRYSAKQVHEIIDRIIDRHTHRSGQGQHSLIESFMTSMKDGGDNSCPMGRKAVRNEAIVMFMAGHETTANALAWCWYLLDYDPQAMARLQHELDDVLGGRTPCYEDVAKLPYTMAVFEEAMRLYPPVPMLSRQARGGDKVRNRDVREGTVLLVSPWLLHRHRKLWEAPDHFVPERFLPDAPRPDKFAYLPFSVGPRVCLGKRFGLYEGVLCLATLAQHFTPKLVKGHQVSIECRLTLRPQGGLPMMLQPR

>CYP1104B2(A9404\_09670)Halothiobacillus\_sp.\_LS2

MTEFARLTLPEGCRDLAEPDPVKVIPPTAWLDSTRTLSELKTNLLSIWPERAYRGLTFAFQLLNQHYLVCNSPDTVKRVFLEEHDNYDRKSPQMRHALEPLLGDGLFVSDGALWKERRDYCAPAFEAERLPDFAGVMVESAQEMADRWARLPHDQPVDMLNEMARLTSLIIGRTIFGDDTSDAEAAQVVDGFSTYQKAIEQMNWADTFGLPYLRWLSNPLSRFRAQRSAARIHEVIDRIIERHKARKDSDRVTLLSMLLEGHPGSRGQKRCPLHALGARNEAIVMFMAGHETTANSLAWAWYLLDHSPRAADRLHEELDRVLGGRAPTLADVPKLPYTRAVFEETMRLYPPVPVLSRQARAGDEIRGKALRKNSIILVIPWLLHRHELFWEKPNQFIPERFLPGQPRPDKFVYLPFSVGHRVCLGMRFGLTEGILCLATLAQRFRARMAPEHSVDIECRLTLRPRGGLPMYLEPRSS

>CYP1104B3(Hneap\_1482)Halothiobacillus\_neapolitanus

MPESTFERLPEAYRDLNEPPPVAVAPPDTWLKDWSAILKLRKNLLVLWPKRAYEGKTFTAQLFKQHYFICNSPDSVRRVFLDEHDNYDQKSPQMRHSLEPLLGDGLFVSDGAVWKERRAYCAPAFESELLPDFAAIMVDSARELADHWESLPAGSSIDMLNEMARLTSRIIGRTIFGDDTSEAEAATVVDNFSQYQKAIEQLNFSDSFGLPHLKWLGNPMAKWQSLRAAQKIHTVIDQIIERHPQRAKPESPTLLSYLLGEHTSKKTSGKRCPLSSVDARNEAIVMFMAGHETTANSLAWVWYLLDRYPRVAEKLQEELTQMLGDRSPRFEDVPQLPYTRAIFEETLRLYPPVPVLSRQARASDEIRGKAVPPNSIILVIPWLLHRHNLYWEKPNHFIPERFMPGQPRPDKFVYIPFSVGPRVCLGLRFGLTEGILCLATLAQRFRAKLKVGHEVEIECRLTLRPQDGLPMQLEPTASSVTPPQ

>CYP1138A3(R615\_00540)Thalassolituus\_oleivorans\_R6-15

MDFLAEYDAAPDVEKYPLVRKWIKTNPLPFFKQLRAERPILVTPECTLLARSSDVRDCLQMPTIFSVDLYKSKMGVTDDNPGYLMAHDDDALHYREKSIMQSMLNRDDIPRIKKLISDTSKKILDDADGQIEIVNNYCRMVPVILVQKYFGFDGIEPEALFKWSYWNQYNTFYNQPFDLNPKDKHDHIVQCHEECTAELTEYLKAMILRKLFAVNVKDRVLKPALKIKNAVRGLIGKEPDVHEDDIVTRMLRSSFPDEVDFPLIRLGRNVGGLLIGTVETTSKAAAQVIHFFLERPELLAQAKAASLLEDTDEIESLVWEALRFVPIGAYMFRQVAQDYIIAEGTEHETSLKKGTTVLALTQSAMFDECAYKNADEFNKDRNWYNNFTYGFGAHDCLGKYIGMAMLPEMVRQVLALDGVHAVSAMDFKDGPFPEHYELVWNK

>CYP1142A1(VIBNI\_A1030)Vibrio\_nigripulchritudo

MGCLKTSVNRMKRRLSPFTRQLRLLAEIMSITTRLKEWASNNVPLVFSILRFIQPNVIYKNNAVITRFKDVQEALSRPNELGVTYAEKMRIITDGKNFFLGMDDIPDYTRDVSNMRLVARRDDLEKIVNPMTEKMARVIMEKSSGRIELVSELTSVVPSQFTAEYLGVSGLEPKTLFDWTCNLFQYLFYPDCPKEVEDAAIRDAAGLRAHIDELIKQRKQQPEKDDVLGRCLKLQESGTPGMTDIDIRNNLIGIIIGLVPTTSKCVIQVLDYLLDRPELYKQAQRAAHLDDMHTLQQFVLETLRFTPFGAGLLRTANCDYTIAKGTWRAKKIKKGSQVFVATQSAMMDGRDVSSPKSFKLDRPRHIYMHFGYGMHTCFGQYINLIQIPNILKAILKCEHVQRAAGKEGQVTYRQPYPISLTVTHEVMTRPAVKTKQESKEAEPSKVA

>CYP1157C1(PsycPRwf\_1012)Psychrobacter\_sp.\_PRwf-1

MFGNSKIKALYSEDDQRSLTDKRRQQQDIIKNEAGEWVLLRHADVKAAALDDATFSSHVSRFLQIPNGLDGAEHDQYRALINRYLSQDAITPYVPLFQHVATELVSGLPKGEVINAVTDIGTVFAVRAQCQWLGWPAEVEPILVQWVNDNHQASRLKDHTKLATVAQDFNEIIRSVIAPFRDTDSAAASHNKANQDSITAQLCREQIKGRPLSEAEIVSILRNWTGGDLGSMALCVGVVVAYLAHHPKQLQHCANASDAELEAIIDEILRLDNPFPSNRRITKCPVTLGEHQLPEGAKVHLDWISANRDEAVFGKDTFDPVRHAADNLVYGIGRHVCPGRLLATWQLRILIRALLAHVEAITPAPNESFERQLPPLGGYSRVPVVLS

>CYP1164A1(HDN1F\_07780)Gamma\_proteobacterium\_HdN1

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>CYP1165A1(HDN1F\_19730)Gamma\_proteobacterium\_HdN1

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>CYP1165B1(HDN1F\_04700)Gamma\_proteobacterium\_HdN1

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>CYP1172A1(LHA\_1423)Legionella\_hackeliae

MSNGNKANPVTITVNRRGFFGNLVETIKQPVIKIVDYAKGTGNLYRLLVNYGAAKDPNAFHKMLDNDYSQIPPTQSKVVIEPILSPSSSQIYDRVVGIANPVILQELRKIPRVETTRPSYYEEHPDVPRISGGRAFSSVLDAIGMGILSAESDVHKLFLQEMTAALTIRLNNKSDSLYAGNDYKTRFINVIREETQELISTIRAAAESKQKEPCHLDFRFYALKIFLRGFYPEATWENDWINKLSQEIEIVSDMAFKGMVNPYTDIEALRKEANKRMDPFIERIMKEKQGYLRANYVNEATPEILRQIIVSLLFAGGDNIKKYLDHIFVEFGNDKIREKYLQKKLAGEELKTYITEIGRLYTTIYAQPGDALDDFVIEYKGEKIYIKAGDKLHYTTWRANRDEQEWGPFANEFNPEENKKYYDQLNPLATFGSGARACFGKTITMSIIEYLMNEVLTICRWKTFVNGQENSHPTEFNFNNGVQGTIGLIFTLFQEPVLRSTENQCDSNVLDQVPNWRTTAANTDGVPSKCGSFKQPVKRCDNPVEEPATKLEL

>CYP1199A3(SB85\_18120)Xanthomonas\_sacchari

MSATMVDRDARATVFAPRLQALLRAHVGQDAFRLDAETVGVAGAALSDRLLAARPATEHERPTFKPLHGRSIARSEAAKLMQAIGRDVREALKRPPPPTLDLSGPWPHIGHVYLRDLLLGGDPWRLRLLMDRTLELTPRLTWAVIAAGALAPLAPGAEASALATLLSAADGYRARRDAMGLYRRTAAPVCFTISTLVANALWLGSPFDARVCNRNILYETLRLLPPSWNILRNASPEYGALDPRIGAADDVLVLPLLSHRDPALWEEPEAFRPERWDGVDPDALPGYLPFGHASERCWGRHMVMPLAERLLDLLRGQDLVADPQQRRATVPLTGLLGVAQVDVIRHTRARGVACRTR

>CYP1199A5(FD63\_14695)Xanthomonas\_translucens

MSAIVRDRQARATVLAPRLQALLHDHLGQDAFRLDADTIGVAGPALTHRLLDARPATEWERPTFKPLHGRSIARADASKLMQAIGRDVREALKQPAPPNADLSGPWPHVGHVYLRDLLLGDDPLRLRLLMDRVLELTPKLTWAVIAAGAVAPLAPQAGASALATLSAAAGGYHERRYAMGLYRRTAAPVCFTISTLVANALWLGSPFEACTSNRNILYESMRLLPPSWNILRNASPEYMALDARIGAADDVLVLPLLSHRDPALWDEPQAFRPERWDGLDPDVQPGYLPFGHASERCWGRHMVMPLAERLLDLLRGQGLAASPRQTRAEVPLAGLLGVAQVDVVRH

>CYP1201A1(LMI\_0196) Tatlockia\_micdadei

MIILLLILGALVVIRVYQQSQRALSLETTSPATTDYLKLVKDVVSLRQSQSEENKMQLQTRFMSFVADLGARSLQEGGSGVGYFRLPNLTPVYVLSNRAVIKKFYEGNAYLDNEQKKQIRFGQKKFFTRLAIILGQDNLMSADLGSATHSEVRAAILSRNEMFRPKIADLVLRYFKEYEKSEQGRPLSDVMDALSRQVLIATYFDPLVINQFETLYKPELTKELISFLFSLDPISTNEQQSLVKLREKIFELGCNLIFSTSEIKQQLLEEKSWLNYLLKIRVLGNEALQDELARLDIFVSPKRELSSSQCERLVRYAISNNDRTPLAAAVKDAVNESLFIPLLGFDATATALITSLRIIIQDRRIYTLVMKEIREKLANQEDFVLHSPWDLGKEGALSYMEAVILEALRLSPPAPMIPETINETLSLGIDGKTLVLPKGALVFIPLESLHVHPSYFPDIPLSPRGQEILGKQSMSASDIFPERWLPKHKDEIYNADFFQEGYLNETDSSVNPRQLEKEGGLLTFKTGPRRCPGLRIALAEILALFKMLSVFKFELDNEENLALGFHYATPLQRNGGKGTITITPLEETKQTATVRNSAAQESSFSASGNSPFFKSSPESRRSRLDAICLSSEKTAMTGRI

>CYP1201B1(LLO\_3439) Legionella\_longbeachae

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>CYP1202A1(THII\_0230)Thioploca\_ingrica

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>CYP1225A9(AYM39\_01420)Methylomonas\_sp.\_DH-1

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>CYP1229A1(XCV2150)Xanthomonas\_campestris\_pv.\_Vesicatoria

MRVRCNAAAIGKKGARAARLVAQPYRLSQCSRRSQVDTRSPLVSLWLLPTVHAALSNRSGFPRSPPHEMIMQQPLKCTSAELQANPQIVFARLRPLTPVLQRDDGLYVAIRAQDVQQLLVDPRTRQMETEIATARGVTDGPLLEFLKHTMVLSNGTAHRNRRLPLVQAFASRFVQDVRPYARRVAEQLIDARYDAGAMDVIGDFASWLPARVICHILGLPETDIPAFTRCVYSVSRAFNSTFTPDEVPELQQASGELDAYVRGLIAHRRRHPREDFITSYIAASDASGQLSQTEVVAQLMSILLAGSDTTRSALAIQTSLLLQHPEQWQAVCRDSALIPAAVRECLRYQPAVASVPRITLEDIVLDDTLVPAGKILSLSTLSALRDPALYAEPERFDIHRTDAPKRQLVFGGGVHRCLGEALAMIELEEGLAAMAQRLPDMRFDGNPVVVQGGFGIRTAQDFRVSWGSARTG

>CYP1234A1(ABO\_2384)Alcanivorax\_borkumensis

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>CYP1234A1(AS19\_24460)Alcanivorax\_sp.\_NBRC\_101098

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>CYP1234A3(S7S\_16860)Alcanivorax\_pacificus

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>CYP1234A4(AZF00\_06235)Zhongshania\_aliphaticivorans

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>CYP1234A5(AZF00\_12795)Zhongshania\_aliphaticivorans

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>CYP1234B1(IMCC21906\_00747)Spongiibacter\_sp.\_IMCC21906

MAEAETEHYTLAKDNTDLAHIPGSFGPPIIGHTIALVRDLHGTISKQQQQYGAVSRFGLAGFKGVLLLGPDLSQEVLRDPQRNFSAEMGYRRSLGRYYLGSLLLRDGEEHRFQRRMMQTAFKAEAMRGYAERMGAMMASAIDSWRYTPEMKGFPAIKDILLDSAAQIFVGVDPGEAAAKNMNRAFTDVANGMLGIILKELPGTRHAKAKKQERFLQSFFNHLIDERRQGSASDVFSYLCRERTEDGAFFAKADISVQMSFLLFAAHDTTTSALSHLLYYLGQDMETQQRLRDEVMALDKSLLEYSDLEKMPLAEVALKEALRLHPSVMMMQRRSIKACELGGYHIPENTLIFLAPQHTHRMADYWDAPDKFDLDRWLAPREEHKRHSFSFVGFGGGVHKCIGMHFALMQSKIFLHQFLRRYRFKLADNFSSKMQTVPLPKPVDNLPVVLVPIKAV

>CYP1247A3(VS\_1891)Vibrio\_tasmaniensis

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>CYP1261B1(BST95\_01770)Halioglobus\_japonicas

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>CYP1311A2(IMCC21906\_02744)Spongiibacter\_sp.\_IMCC21906

MQFDPMSPDFQQNPYPFYDELREKAPVIWSESMQGFCVAGYDEIMTVLTDSDQYSSSKFWPILLGEYDPAPEVQPMISLDPPDHLRTRTLAQKAFLPRELKKLEEKIIQISDELVEHAISVSDDNTFDMAWDFAALFPVSVIAEMLGIDKSMRLDFKHWVDNLLAASNRAVYDEARLKEIKHASDSLRAYFSKIIDERTENPGDDMISAFIKAEVNGEKLSKIEVLNLSILLLIGGTETTTNLIGGLFAGVNEYPEAFAAARADRSLVPQLLEEQLRYRPPVQSLFRHTTREVVLGGVTIPENTMVMPLLGSANRDPEKFPNPGKFDLNRDVRGYCTFGQGPHFCMGSFLSKFEAAIAVNRLFDRFKVLEPLQKTAEIRWIDSYFAHGPATLPVRYELA

>CYP1415A2(CD58\_14745)Pseudomonas\_brassicacearum\_DF41

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>CYP1464A1(PFL\_2992)Pseudomonas\_protegens\_Pf-5

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>CYP1464A1 (POS17\_2973)Pseudomonas\_sp.\_Os17

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>CYP1465A1(BZ13\_874) Francisella\_philomiragia\_subsp.\_philomiragia\_ATCC\_25015\_O#319L

MNKIKEKNYNIYAPFPPYYTDEKVPLRKLLKAKSFIEFYKERHYKMKMGYPKKKVGKKEISLCVNEYVLDVLSDYERYPKSKNLHKLLSPLLGNSIFTTNGDIWRFQRNIMNKSFAALQPKKTFSLMAEATLALIELIDNKSKDSNIIAIDSMMTYVTANIIFRTIFSIDYSYDNAIKLFNDFNLYQETSYLLNSPYKYILYPYLKYKQREYVRKIHNQFYPEIAKRYHTDDCSQYNDILGNLILKTDEKTGKKFSQKDLNEQICMLFLAGHETSATALTWALYLISQSEELQEDLYQEVQDSLENGEIAYSSLKSMPLMTAVFEETLRLYPPVVGLLRQSSENVVMYNKNLVKPRDEIIIPLWIQHRHTDKWYNPMEFNPYRFYNKKASNVCPVYMPFGKGDRVCIGSAFALQESLLILSTIINKYRLENLTKDVMPIGRVTLKPSEPINVRFTNR

>CYP1465A1(Fphi\_1150Francisella\_philomiragia\_subsp.\_philomiragia\_ATCC\_25017|

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>CYP1465A1(BF30\_1394)Francisella\_philomiragia\_O#319-029

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>CYP1465A1(KU46\_163)Francisella\_philomiragia\_O#319-067

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>CYP1466A1(YC6258\_04201)Gynuella\_sunshinyii

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>CYP1467A1(UMN179\_00602)Gallibacterium\_anatis

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>CYP1468A1(Marme\_4095)Marinomonas\_mediterranea

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>CYP1469A1(LA76x\_0658)Lysobacter\_antibioticus

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>CYP1469A1(GLA29479\_2851)Lysobacter\_antibioticus\_ATCC\_29479

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>CYP1470A1(Fphi\_0249)Francisella\_philomiragia\_subsp.\_philomiragia\_ATCC\_25017

MKFIPPYPKPISSSKKLYKKGLLNTLRTIFYLNKSGVHATCESNFQEDVIFDLSPPLFKIIGLKESANLILNNKEVSAKKSVLINNMLRPLLRDSIFNTNDDVWQKYRTIMSRGLNTLHTRKTFFTMLDVVKKNISKFETGKEIDIEEKMTNITADIIFNTILSSQLSSRELSEFITDFTNFQKTFIKSYKFKILGIDFLEKKLNKLGQNIRNVIDMRVSSRYESFAKDDCDDTLTQFIKASLDSESLNISKDEMVDQICMLFLAGHETSAAALSWSFYLLSQDQKIQIEVYNEIKSIIGNRDVEFEDLNKLSLTSGVFYEAMRLYPPVYILPREKSTRCPISNKTIKKEHYLINNWIIHRNSNYWENPNSFCPDRFVNKKYSEYTKEGSYLPFAKGARACIGKAFAIQEGLITLAEIIKKYKILPSDTPPKPYGSLTLRAKKGIKVTLEERNDN

>CYP1470A1\_ortholog(BF30\_424)Francisella\_philomiragia\_O#319-029

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>CYP1470A1(KU46\_1128)Francisella\_philomiragia\_O#319-067

MKFIPPYPKPISSSKKLYKKGLLNTLRTIFYLNKSGVHATCESNFQEDVIFDLSPPLFKIIGLKESANLILNNKEVSAKKSVLINNMLRPLLRDSIFNTNDDVWQKYRTIMSRGLNTLHTRKTFFTMLDVVKKNISKFETGKEIDIEEKMTNITADIIFNTILSSQLSSRELSEFITDFTNFQKTFIKSYKFKILGIDFLEKKLNKLGQNIRNVIDMRVSSRYESFAKDDCDDTLTQFIKASLDSESLNISKDEMVDQICMLFLAGHETSAAALSWSFYLLSQDQKIQIEVYNEIKSIIGNRDVEFEDLNKLSLTSGVFYEAMRLYPPVYILPREKSTRCPISNKTIKKEHYLINNWIIHRNSNYWENPNSFCPDRFVNKKYSEYTKEGSYLPFAKGARACIGKAFAIQEGLITLAEIIKKYKILPSDTPPKPYGSLTLRAKKGIKVTLEERNDN

>CYP1471A1(YC6258\_00787)Gynuella\_sunshinyii

MSHHYSSHNTLQNAEYTDVDLHSTEFISNPFPAYQALLQQGSIYQSPSATEYYVVRPSQVERILKDNKTFLSDRTGSFAAKLSEGQHDQVQPLLNSLAKWLLFQDPPKHMPLRKIVNASLSHKLVSSLEPDIRAITRQLVTTMVTEQHNDLVNNLSYPLPALVIARLLGVPAEDILLVKKWSDDIASFTGAQSGIDIAERARASVVEMSDYLQQLLHSTELIENTTVLGNLTQFRQQNDEFTEEDLIANCIMLLFAGHETTTCLINNLWIQLQQHDSQRLDLIRHPELISSAVEEGLRYDGAVHRLGRFIKSDTEIDGIQLQQNRMIYVLLGAANRSPELCERPDKFDIRRKPVRNFGFGFGPHLCSGAALARLEAEIATEELLKLIPEGHVMETPEYHRNLALRSVKSLKIKI

>CYP1472A1 (PSEEN5529)Pseudomonas\_entomophila

MSINTAPDVEMDVLLEPVEQGAGGNRKIDGPSSILGTVRKLRKDALAALVEFNTTYGDLCRIKFGLKEQALIISHPEDIREVLSDRRGHYQKGGNRNFKEIDRFFTNSLFTSDGDFNKRQRKLLKPTFNPMLTDSFAVPMVNAAKEMMDAWEQQGLQQIDLKQAILQLTRRNICENVLGVEETFEDAARTIRECFEVANIVTMERARQIAPAPLWVPTPSNRRFLEAKERMLHLIERVIERHRVEQAPVRSMVQMFMAARYADNGEPMAHEQLLTECMTLCFGAYETSANTFTYAFHFLSKYPQVRARVIAEVDEVTQGRLPTIADVAKLGYTRKVLNETMRHYTPGSMLIRCAKQDTELAGNPVPAGTMIVLNIYFMHRHPDYWENPLAFDPDRFDAPVANPGVKQAFIPFGGGGRSCIGMGMAMMDGLLLLATVSQRYLLDNRLDAAEGAAPSLRRIVMGPESGVQVMLRKRGHH

>CYP1473A1(JT25\_015675)Methylomonas\_denitrificans

MANSTLQIHPEKPSLPEHSVIMPMAQLIWRPLATLARIHSKYGELVLGRLFGRKILFVSTPEHIEQIFNLEGKGLLSRDFLYDAKKVLFGDGLVNSGSEVWSRQRRLMQPLFTKEAVKNYELIMIEEAAAVANQLKKAADSPINLTTELKNLIQRIFIRILLGKSVDSLSNSAELIKVIEIIRQELPVQLGSEIIFGSRLKRFIPLKSRRYHAAVDYLKAFIRQEIAEKQENPGQDLISQLIQSGDRATGYTMPAELLQDEAVNLFFAGQETTINTLLWFFYLTGKHAEVRNKIAAEIRQLPDGPLNAAHLSQLSYTKAALNETLRLYPPTSALSTQTVQDIELGSYNIPKGTTVLLSMHTTHHNPRLWDKPEEFNPNRFLETATPERHKYAFFPFGGGVHNCIGKHFAELEMLLVIASFIREFTFETDITVKEAFSITLKPDRPIVGRVEPIS

>CYP1474A1(Smal\_1573)Stenotrophomonas\_maltophilia\_R551-3

MDERAADAEVVSINDLLERVRREGPVLRFQNDVVGIFDPALAVKIDKANTDQHTVPDSLIDFLGLRGSKDPVAWREVRALLSEQAGRLASPAHMRSLYARMQGFLTERAGRPHDLSALSWWTISQSLLPLLIDGLSRSDVDALIGEQKTRYNAIVLQNFSFWRRVIDFHLSRRAARTVSRHIRRRSRETQPREDFLQSLLPLVQRVGVDRVAYLVSMVLAGMSGLPGITAASLLYAMHRFPQWHARIREETSALSLDELYALPIKSLPCTSRFVKETLRLWPGLFALHRPASHDIDIDGVCIRKGGAYELSSYFQHHSPDYWQSPDSFDPDRWLPERRQPNKGAYVPFGFSSRACIGSAVGHAQLLLFCALVTRDFELQVQDQPAPWMQLEGFAIPVDFIGTLTPRRA

>CYP1474A1(BurJV3\_1622)Stenotrophomonas\_maltophilia\_JV3

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>CYP1474A1(SMD\_1771)Stenotrophomonas\_maltophilia\_D457

MDERAADAEVVSIDDLLERVRREGPVLRFNNDVVGIFDPALAVRIDKANTDQHTVPDSLIDFLGLRSGRDPVAWREVRALLSEQAGRLASPGHMRDLYTRMHGFLAQRADRPHDLSELSWWTISQSLLPMLIDGLSRSDVDALIGEQKTRYNAIVLQNFSFWRRIIDFHLSRRAARTVSRHIRRRARQTVPREDFLQSLLPLVQRVGVDRVAYLVSMVLAGMSGLPGITAASLLYAMYRFPHWQARIREETSALSLEQLYALPIKSLPCTSRFVKETLRLWPGLFALHRPASHDIDIEGVCIRKGGAYELSSYFQHHSPEYWQNPDSFDPDRWLPERRQANKGAYVPFGFSSRACIGSAVGHAQLLLFCALVTRDFELTVQDEPTPWMQLEGFAIPVDFIGTLTPRHA

>CYP1474B1(LC55x\_3050)Lysobacter\_capsici

MTTQPDPADDPAARLLERVRREGPVLPLPGGVVGIFSPALANKVDKINSDDLKVIDSLADVLGMRKSEPVTWREVRALLTERSGALVTPGQMRALHQRMQAYLGEHTGSEQDLTKLMWRTVSRALIPLAIDGIDGRDLRTLIAEQELRFRIQLEQHVPLWRRIPDFLLHRAATRAITRQIKQRVARGESRDDFTQPLLGLVDRIGVDRVTYLVTVQMIAISGVPGMMAACLVYAMSQYPQWREHLQEEMDALEWEELYTLPIRKLPRTMRFIKEAMRLWTTPFVTRRVAQRDIELDGVSVRKDQIYELSSYILHHSEEYWDEPETFDPDRWLSSRRQEAKGAYVPFGFGPRSCVGASVGHAQLVLFCAMMVRDFRCDLSPVHAPWMRKEGFAVPTDFVGVVSPRPR

>CYP1474B2(GLE\_2797) Lysobacter\_enzymogenes\_C3

MISIDHLLERVRQEGPVLDFQGDVVGIFDPVLAVKVDKANTDRLTVPDSLIDFLGLRKSRDPLAWSVVRTVLIEQSGRLSQPEHLRGLYSRMQAFLAQRAGSVRNLSELSWWTISQSLLPMLIDGLDEADTDALIGEQKARYNGIVLQNFSPWQRIVDFGRSRRAARAVSRQIRQRLRDGDRREDFLQSLLPLAERIGTDRVAYLVSVVLAGMSGLPGITAASLAYAMYRFPEWRERIRAETAALSLDALCALPMRELPCTARFIKETIRVWPGLFALRRPAFHDIEVDGIRVKKDGAYEISSYYQHHCPHYWDAPDVFDPDRWLASRRQSNKGAFVPFGFSSRACIGSSVGHAQLVLFCALLTRDFDIQVQEQPKPWMQLEGFAIPVDFTGIVTPRGAAAA

>CYP1474C1(SMD\_1774)Stenotrophomonas\_maltophilia\_D457

MSNEGSAIAAERLAARVEREGPVLKLETGGIGVFCPELAGKVDKENSEHLFVVESLADLFRRHERVRWTEVRSLIATRSAELTGAQTLEALQSRMRQALDALCGRELDATPAVWKVMAHPLVPLVIDGLDARGTEAIERALHLRYTTQVEQVIHRRHLLRNFLIGRGESRAIAAELRRRVRSGRSPLDYAQSLLTLRERIGLDKVTYLVTVQLIAISGVPGMMAACLLLAMQMHPHWRQRIEEEFAPLSDAEIHALPMARIPCTMRFLKEVMRLYSTPFNNRRVAACDLQVEGQAIAEGTVFELSSFIQHRSAKYWDDPLQFDPDRWLPERRKRTAGIYVPYGFPTRSCVGSAVGNAQLVLLCALLAREFRFTPSADYRPEVRMEGFAIPAALHGTFSRHKAGA

>CYP1474C1(BurJV3\_1626)Stenotrophomonas\_maltophilia\_JV3

MQGMSNEGSAIAAERLAARVEREGPVLKLETGGIGVFCPELAGKVDKENSEHLFVVESLADLFRRHERVRWTEVRSLIATRSAELTGAQTLEALQSRMRQALDALCGRELDATPAVWKVMAHPLVPLVIDGLDARGTAAIERALHLRYTTQVEQVIHRRHLLRNFLIGRGESRAIATELKRRVRDGRVPLDYAQSLLSLRERIGLDKVTYLVTVQLIAISGVPGMMAACLLLAMQMHPHWRQRIEEEFAPLSDAEIHALPMARIPCTMRFLKEVMRLYSTPFNNRRVAACDLQVEGQAIAEGTVFELSSFIQHRSAKYWDDPLQFDPDRWLPERRKRTAGIYVPYGFPTRSCVGSAVGNAQLVLLCALLAREFRFTPSAGYRSEVRMEGFAIPAALHGTFSRRTAGA

>CYP1475A1(LOKO\_03351)Halomonas\_chromatireducens

MTDSKPTESTPPPSLPGLPLLGNTIELLTKDANRFFSEAYEKLGPVFQVNYLFRNYTIMAGPESLNHLLEFREQGMSREAFFGPVDKQIGGVVLLTQPVGAYQNLRNQARLAFSRQLAAEFIPDLVGCVDEGLDRHPPGSTVSVMDLCTRVSFDQYSRLLCGESLDAYFDTANRYAVWVMNIGVKKVPEFSVHLPAYKKLRRDVMKMADEVLTRYENRPADHGMPYTILDALVSATDDDGNPLPRKDLVATLQYGIIGTVVYMNRTVAFLLHDLLSNPEHYERVREEVDGAYANGLPDSLDLRGMSTLNAALKESMRLHPVSLGMPFMVDEPFEFNGHTVPKGQFCVYSGVPNHFSADFYPEPHRFDPDRCRAPRNEHKQRRAYAPYGYGKRVCPAGGLVETCTLVSISRIIHRRTFERVPANDPLRTVLAPLPAPDRKFRIRFNEERSKHAAGKTDHTQLAVNALDELFESGRLAKPAMRERLDHVTARRHEPGDYILRKGERAETFHVLIEGTVEVTSGSDEHLATLEPGSYFGEIGLLGEGRRTANCLSTTRTLVLEMTREDFLAIVLKDDLVPGEIAAALRQRYLTTRMHKALPALTSEQLRTLAGTGSLKRFEADDTIIRQGDEADWFYILLTGKVAVLIEDANGTQQVATLEAGDHFGEIGIIESRARTATVQVTPDGPVETLAIQRDALLELVEHDPQARKDIASVIMDRIRTGAP

>CYP1476A1(BST95\_07125)Halioglobus\_japonicas

MSEAATALPPVAEIFNPHSSEYMNDPVSQCLALAERGPIVWYEPWQAWIVTRMEDIMACWKTEPLSSDFYDWEFAPERPSEDKWSNFERAMIGHSLLADHGHHRLVRKVVSPAFSRNVVDKIQEKIKPDVEKLFDELGSPETFDYIEDIAQHIPFISITRMVGIPEKYWPEIRKVILTFTETWNPTISDEQREAARQDCNKAIDIILKVIAERRAQPEQDDFLSTLLKIEEENENFKEWDIVTLVLALIGAGADTTLVAQQWSVYSLLKHKDQVAAALESPDAFSNAFSEINRWGVASKMGFARYAPNDMEFMGEQLRKGVMVLMMPHLKDYNPAYYDSPETFDVKREFNPDAMFGYGPRFCIGAALAKRQLYLTMCELFTRFPDVELAEEPERDADDHNAIVFKRLMLRTNA

>CYP1477A1(Fraau\_1243)Frateuria\_aurantia

MSPIQRECPCSARTDITISPHPHSVPPAKGKPAFALWLLYLAIIITLIGAWLLHPVLGIALAAGLAIAAAAWTSWHNQRQARRFRRVTGIDNTGPERLPVLGALRTFCDIALRRQTQLRDIDLQRMRRYGDIYLMFLGTMPIVVVTCSRLAGRISTALDVFAKSDPRDLNMPFYYQWVGNNNVVLANGEAWRRIRRITHPPLNRVHLFSPIFRRKALLLCESIASQLPATGTADIKLQRWLKAVSLDSAGEALFGYDFNHLKQQRNPGVDALDYILAQVFNPLRRMLPIINQLPLPSNRRLQRSMTLLDQLVLNLVRSTRNRQSETPRNHVLELLLREHAEEHLSDEELRNNIIAMVLASHETTQVALGGVLYHLARYPQWQQQIRQEATELFPDLDAAFAQPGHHEDGRHSLAFRSLQSFHTLSRFILESMRIYSPLAHQNPRTTTRATELAGYQIPIGTLVSINIHAIHMNPREWTQPERFDPERFTGESSQFSHAYLPFGTGPRICAGRLFSLMEQKIVICHLLRRFDIELPSPDYILPLERGSFTGMHDASFRLRFRQRTSPAD

>CYP1478A1(YC6258\_03069)Gynuella\_sunshinyii

MTKKTSNSDITYNGKPLQGLALSSEDEVFRENTDEVLDYIRKTVPVLEDGEFKRWFISDHAVADGVLKDRENFRRDWEENAAEGTWGKDVAPMIGKWGMFDIDGPEHKRVRAPVSRMFTPGKLKLLIPKIEEAIDREIEHIRNKEEFDFISEFAVPMSTNFMAALLGIEARDLVEFKQYAEDLTQVFIERESENVIEKAGAAKEGLEAFFHKVVAEKRENPKEDLISLLTEEEKNPITDKDIVDNCVLMVIAGKVTTTDLLGNGLVAFLQHPEQLKEVQENPELYDAAIEEILRYDSPATEIPRYNRNACQLKDVHLEQGQTLAISLAGANHDPEVYSCPHQFNIHRDEPAHLSFGGGAHYCVGAPLARIESKIAFKRFFDEFPNAKLVDEKPKRKAIGGFGGYREIFVKIN

>CYP1479A1(HCH\_03600)Hahella\_chejuensis

MRPPTVQSQELALKLLSHKKLAAFSIEDYVEKLHQESGEDFSYLIQVTRAMLSFMEGASHLALKKVALSSLQHGLIIMDKLCLHAVTRERLQQLKLQSQVDLVNDLCDPLFTDMISILFGLDIPDRADFLALIDKAAAITEPLLPIRRLKEVQNAFLTLRDMIGGQWRTLRPGILSAMQQHGDGLGQEELLILMATLVIASRTTTETLAGVMLENSGKDGCRHGLMGDPQWVEEHIEGMIRLCASTEYLTRVAKESVQIGDLPLAAAGQVFIHAPSANRDPSYYPDNHFSGLERSKHCRHIAFGGGSHRCPGANLAKVTLSAVIPIIYSTLERIDIDPKAVRYKNSTFAKRPASIPAYVC

>CYP1480A1(TERTU\_2285)Teredinibacter\_turnerae

MSNDFLLPANIKFKTFSLGFRNDPFNTYKTLLSDAPIFYVKGLHGKEWVVAKYEYVSSALKDRSLVKPDVVNEIAGREKNNKNEKKYLYLKSMMSNWLFFMEADRHEKIRKIMAAWFTPSKVSEINKILLKSIEDNLSTLKAEHSFDVLGDLSTKVTLTTISHLLDCARMDNRETEKYALELFKIVNPPVPVNEYDSLEQAARYFAISLREDLDREHSKQGFVQYLLKKKSCADITEDEIIGALSLVMCVGLDTTKHLIGNSLQALYSDGKQLQAIRRDTSLLNQSILECGRYNAPVSMLPRVAIEDTYIGDAKIAAGERVYFLVSAACRDGERFSEPDSLNIHRSKRSTLIFGAGHHFCLGAHLSLVIAEQVIKRLITSPDLAIHFKDFSWVSSPGIRGLERVQASWVS

>CYP1481A1(PAM18\_5672)Pseudomonas\_aeruginosa\_M18

MNSKENSAPFPGLIAHHSGSCPATGHAEAFHHATVCQGLDASTYFARSGIAELAENNEGLCTFWLGDDLALYQTTNAPLVDDEDLAPSINANAELFGSFLGSLPAQDERRKAKRAVVERVLGSNRFVTSLDPHVREMAQHYLREVAGRSLPLQDFCLHMVARIDSGLPGVLDFHQKPLTHYLQSTEYGVIARDFFEIASEVISKMNPESIENADMIVEMTRDMLDSNYESIVRAPPTNMILAQFDCFSRPFTRETIRTLDAASLKELGTIIVATYDTTALSLLWTLTYLEDNPAEKERLLGVVDNPEQALDEAYLLVLEAIRLGGSNPTALWRRTNRPIRIRHRGTEVTIPANTMLWLDRRRANRDASLFPHAERFDTDNIRQLIRNQTSHGQAVSLLARNRYEINSFNMVNTHRSPRKCPGRLFSVREQALILTELYRLYKVCVTEADSTLAPHSSMPRPRRSGNIILTARAAAL

>CYP1481A1(AI22\_04035)Pseudomonas\_aeruginosa\_YL84

MNSKENSAPFPGLIAHHSGSCPATGHAEAFHHATVCQGLDASTYFARSGIAELAENNEGLCTFWLGDDLALYQTTNAPLVDDEDLAPSINANAELFGSFLGSLPAQDERRKAKRAVVERVLGSNRFVTSLDPHVREMAQHYLREVAGRSLPLQDFCLHMVARIDSGLPGVLDFHQKPLTHYLQSTEYGVIARDFFEIASEVISKMNPESIENADMIVEMTRDMLDSNYESIVRAPPTNMILAQFDCFSRPFTRETIRTLDAASLKELGTIIVATYDTTALSLLWTLTYLEDNPAEKERLLGVVDNPEQALDEAYLLVLEAIRLGGSNPTALWRRTNRPIRIRHRGTEVTIPANTMLWLDRRRANRDASLFPHAERFDTDNIRQLIRNQTSHGQAVSLLARNRYEINSFNMVNTHRSPRKCPGRLFSVREQALILTELYRLYKVCVTEADSTLAPHSSMPRPRRSGNIILTARAAAL

>CYP1482A1(Loa\_00739)Legionella\_oakridgensis

MRKNLSRFLVPSRLVNPIITEIESNMDAATDIQIRHAVCGIVRAVMVGNILGVKQLPTNTYDLMEAYRNDVKRWGAFPFPELLNLMPSLRKKRDVYRAFSRGILEQEFEKLVEVLHTDDHPENANLIAAAVVSLFRDEHPSLSVEELSSAIKSLSVDEIRRYFENPVVQSLPMILKAADNLTDAIVLCLEQIVLDPSKFQMLRDEIDGSGLVIGDGMDIGLLKSLPILNAFYKEAVRFDAPVAVPRYAQSGYSSDAMTIPPNTMIIFDLHALAKGEQYWTNPEEFDPKRFLPSGSEASRTTGQFPFVPFSVGLRNCPAFAVTEVLFKAAIAKFVSGYELRFVEKRDNDSIVHVTPREESLTLAV

>CYP1483A1P(HCH\_03601)Hahella\_chejuensis

MVLSDKAFHVPDLPGFLRKLETHATVDLRYLKLYVDNSPFFLEGEKHKQLRDICLRYLSGQGLKELDDVISSQTGVILESLPSAPFDAITLIGKPVFTLIIKPILGLRPAESDKFDRLAMVLQRLIEPMLSLNNLARINSELEWLTHQIQRQFEKEPSPGGVLARLMADEETPLSGEEKIALVITLYAAVAPLAQTLCNMIDVLYRNGAPAPCEPAQLLEQLPFYIHQGAAPRFIHRVASESRRIGGVAIRQGDTVMIDIARAALTEAGPPGQRLRHYSFGHGAHFCIGAPLSKRIVSEFIPRFFQQFPSLRVIEKQYDENNHIARALTSLIVSPDP

>CYP2242A2 (CT573326) Pseudomonas entomophila

MEALDNRSLHTHGGHPFTMVAATPLQSRLHRLLGVLAAPWLLPRR WRNSRALRDRTRPYHYIGKLARHADGSWRRYLRLPTFAGDYSVLIGVEEIRGLMQHPR

GQGELVGDGRQFLVIADALGRMRLSKERQDAKQKRNIIAHLVSGPERFIQTMRQLSEQR

VRRWWQGAPTLLVNAELSEFTAEVYLRSVMDLQGPVEGVGQMLEEQVDLLGQAF

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AGYVAPFPSFLALVDELGRHPRYRQALRQELLTKGDDHAAYIRRDDTLLHACVHEVLRL

HPAQPFLFRAASRDLMVNGHFVRQGSELVADIYHVLRLPELWGEDADAFRPERFQEAPE

RYRQPFLAYSSGPNNCTGQMFSRYSLKVLLAEMVRAGDWESTDEPLEHHFHFALAMSRP

VRIRLKEHHHG

>CYP159B4 (CP010896) Pseudomonas simiae PCL1751

MKQGCLVTNNSEVNVAPPTPLIIPDIQLPFSNPTPRSDHDVLRE VLAWAQRYGLIGRRGAHRLSTTALLDLGMALCGQAPTQQAETLVCWYLWALILDDRIDD

GPWAENGVLERFVTAVQAITENDGADPLDEIGRFDDPMLGVLIDDLWPRTRNWGNERWR

HRLVQNLLRHLRAQATLVNMRETGAALTLSEYLPLRRDSFGALFFFDLIDAAETLDPYQ

HSADIEWWSRLREHAADIITWTNDIHSIAKDVVCGERFNLVSILADSAGTDWPASIEAA

HQMVNAAVSAFTELAAKHTRQRPSAATDPDRLRQVARAAGDWHRSVSRYHLQANDPTGR

INQQVDLNLTPPTLKSRQFEIDPYPLYERLRTTLPIVYDEPTDVWLVSRYADVKAALTH PGASSNNYSWQIGPLLGHTLVAMDGCEHAQHRALLSPSFRSKALEVLEASITSASMDLL

AQMQGRHRVDLIADFTCALPVRVMARALGLPAQTTEEVEQLKKWCAIGFAYMGNYRQ TLLTGGLSNRDRFYDFIQPHIDARRTVPTDDLISHLLAARIDGQPLPEAFVRAYCA TAGSETSHGALANLIVNLLDEPGVKEAVMANPDLMDNALAETLRRNPPLQLVLREARES LELPSGTIPCGATFACLIGSANRDPDHFTDPDTFNMSRPHQETNHFAFGAGRHFCLG LARMEITIGARLLLQTFPGVRWAPGFQPAEHGFLNRCPDRLEVAL

>CYP163K1 (BX470251)Photorhabdus luminescens

MNLISNVAKVPDNINLTDPLTHLRPDIDNIWRQLRNESPVAWHPA

VNGQSGFWVVSTHELAMRVYRDSQTFTSVRGNVMATLLHDGDTAGGRMLAVSDGDRH IRKELLKSFSPKNLMSVQKRIKNAMHELVRNAVTSGQCDFATDVAPHIPLAAICDILKV PESDRAKLFVNASAALASNSLSVDKVDTRLARNEVLMYFYKCIQTRKIAPLEDDLISNL

IAMTQNSLALTEEELVFNCYSVLLGGDETTRLALIGIIKAFAEYPECWAQLRRGEAEI KAVEELLRWTTPALHGGRTATVDVELGGQQIRAGDIVIVWNRSANFDETVFTKPNQLDL

NRSDNRHISFSYGAHFCLGAALARIEIIALLEALVELVDQISLSGEPSPIYSTFLSGYH

RLPVKLTAAHYS

>CYP1779A1 (CP014544)Zhongshania aliphaticivorans

MLKYIRAKFRPANISHTAAPPTLAVIDPYSQAFIDSPYSALEQLR

HHSPVHRCTSGSWLLSRHRDISAALADPRLSNTPSDYAVVNQRHRDRYTCADVANNTLP

FMDAPQHTEARRNIARVFHEQLRRASLQSNLPTDTPSDLLHDFATPLCTKTLCSLFGI PRQQTAELDRQLKLWANWFFSLFSAIPSQQHRQQLDAELHSFRQFCSGLLNQKRQHPSD DLPSALAQLHDQTPSISDTFMADNCMLLLADGLNADYAIANALHCLLQQPEKINQLRAK

PELIPAAADELLRFDSPVLFIARRALEDIQLHDQLITENSGVLLMLAAANRDPDVFT NTLNFEREAKPYLSFGRGQHGCIGRVLVKQLLELSLRWLISEAPNFALVRTQPLWQHQA

GHRWLQDLPVKIP

**P450 fragments**

>Xanthomonas\_translucens (XOC\_0082)MAEMRVVVDQALCATTGQCALTLPAVFRQRVSDGVAEVCVAEVPPALHAAARLAASQCPVAAIRIIDADADAAGTGGGPASSQAEPSIASAPRNSGGHDGTM

**P450 false positive hits**

> Pseudomonas\_aeruginosa\_PA1R\_23(PA1R\_gp4505)

MTPQQLTEEYIFAHDLREASAKIYRAATKALLKHFGPTATVHDVDHRSVLGWRRKVLEQGLSKRSWNTYSNHLRTIWGYAIEHELVTHSQVNPFRKTTVIPPRRASKTVAAEAILRARNWLNMQVGAERCTGDRARITPAWFWLCTFEVFYYTGIRLNALLCIRKRDIDWDNQLILIRGETEKTHKEFVVPITEGLVPHLSRLLQEADRAGFADDDQLFNVNRFSPHYKSKVMNSDQVEAMYRKLTEKVGVRMTPHRFRHTLATDLMKAPERNIHLTKCLLNHSNIQTTMSYIEADYDHMRAVLHARSLAQGALENVRKVDYSGSPQASAKPKPCGQPLARMGEVPPPEARTEPAEPREHIPGTGIQGGPTVREEALPQPPDTFDQSVLFTLMAQHLSNRAASASAAPAATSGSGGSGGWGSTARSSLA

>Pseudomonas\_aeruginosa\_PA1R\_42(PA1R\_gp4503)

MNQKKAVILLSGGLDSATVVAMAKADGYACYTMSFDYGQRHRAELQAAERVARQLGVIEHKVIGLDLNGMGGSALTDESIAVPESPSEGIPVTYVPARNTVFLSLALGWAEVLDARDIFIGVNAVDYSGYPDCRPEFVEAFERMANLATKAGVEGNGFRIQAPLQYLSKAQIIQAGVARGVDYGLTVSCYQADEQGRACGKCDSCRLRADGFAAAGISDPTPYF

>Pseudomonas\_aeruginosa\_PA1R\_39(PA1R\_gp4509)

MAKYRISHDAQADIIDILRFTHNRFGDAARRRYQALIGAALEAVATDPQQVGSISREELGAGLRSIHLVYCRSMPNIGKVVRPRHFVFFRVATDQVLEVVRVLHDSMDLDHHLPQR

>Pseudomonas\_aeruginosa\_PA1R\_26(PA1R\_gp4501)

MPKHLRVLTFLALSLPLAAWAEVPVYDGVAANNGGNVPPSGYGTAGAGGAFAGGGVTTPTSVQGELFMQLQQMQDELARLRGTLEEQQNQIQQLKQESLERYQDLDRRISGGGAPAAQNSAPAGAINANGAPAAPAGNNAPAPSSEPGDPAKEKLYYDAAFDLIKSKDFDKASQAFNAFLRKYPNSQYSGNAQYWLGEVNLAKGDLQGAGQAFARVSQSYPSSQKVPDSLYKLADVERRLGNNDKAKGILQQVISQYPGTSAAQLAQRDLKNLR

>Pseudomonas\_aeruginosa\_PA1R\_42(PA1R\_gp4502)

MQQTLRITEIFYSLQGETRTAGLPTVFVRLTGCPLRCHYCDTAYAFSGGDVVSLDAIFERVAAYKPRYICVTGGEPLAQPNCISLLERLCDAGYEVSLETSGALDVSRVDPRVSKVLDLKTPGSGEVGRNRYENIPLLTDNDQVKFVVCSREDYDWAVSKLIEYRLDQRAGEVLFSPSHHQVSARELADWIVADNLPVRLQLQLHKILWNDEPGH

>Pseudomonas\_aeruginosa\_PA1R\_24(PA1R\_gp4507)

MHLVRVRVRNFRGIAYGEVHLNGHTAFIGDNNAGKSTLLEAVDLVLGPERLSRRPVIDEHDFYAGTYVDPAKNEVVPIQVEVIVGGLSDEQLRHFRDHIEWWDTQTKSLLVGAPPEGTDAPHVGAAIRVFFNGWYDVDEDDFAGDTYYATPEMPDGSYPRFSAPDKRKCGFLYLRTLRTGARALSLERGSLLDVILRLKETRLTMWEDLLDQLRALPVGETEDIGELLVAVQDAVRHYVPSDWAEQPHMRVSDLTRDMLRRTLTVFMGTGAKRPDGSVYSAPYQHQGTGTINTLVLALLSIIAELKQSVIFAMEEPEIALPPHTQKRIINSLRQKSAQAIFTSHSPYVLEEFEPAQVVVLKRTAGVMTGVPATYPPAVKPKAYRTEFKARFCEALLARYVLVLEGRTEFDALPAAARRLAELDPTRFKSLENLGVAIVDARGETNVAPLGAFFRSLGKVVFAVFDKQTPEALATITASVDHAYESATKGFENLVLYGASEVALRSYAAVVVVGGDWPQHLAAYTPTPATPLANLQVALSHYFGWAKGGGDAGDLLASCPTANDMPEYVRTTLAAIKNVIEPPQPPPLPHQLAGVPPLPEAAAKPPPLAAAYGKFHPSPPQPLA

>Pseudomonas\_aeruginosa\_PA1R\_36(PA1R\_gp4500)

MMEMLKFGKFAALALAMAVAVGCSSKGGDASGEGANGGVDPNAGYGANSGAVDGSLSDEAALRAITTFYFEYDSSDLKPEAMRALDVHAKDLKGSGQRVVLEGHTDERGTREYNMALGERRAKAVQRYLVLQGVSPAQLELVSYGKERPVATGHDEQSWAQNRRVELKK

>Pseudomonas\_aeruginosa\_PA1R\_25(PA1R\_gp4508)

MTEVWSDQKRGFLACAGHTLALGGPGAGKTHVALVKARDEIRSGVLKPGQKILFLSFARPTVARIIEKASELISREDLKQLEVSTYHGFAWSILRSHAYLLNGRPSLQLLPPPEAAAHLADIDKAQHENEKRRLFEHEGRLHFDLFASLVSELLSRSDRLSAIFSDAYPIIILDEFQDTNCDEWALIQQLGKRSRLIALADPEQRIYEFRGADPRRVGDFLELFGAVHFDFAGENHRSSGTDITTYGNDLLTGANKGKVYQQVKITRYGFMYGKSLHFTAKAAVLSALDRLKAIPDKSIAILVPSKRLMLELSDYLSSAADGLPELHHDVAMDAEPPALAAGVIATLLEGGTAGDLASRMLGALHSHIRGRRGGKPTPQSELDLAGALSGFLSSGKIRGAKRQLIVSEVQRIAELRQQLQLTGDPAEDWLQLRGLLQSSAAVALKQVATDARYLRLLHRGSVLRANLGALWRAQGEYKGAEEAVRSALMQEHFAAAQKDWRGIHLMTIHKSKGKEFDEVIIYDGLFQRIAKAPQDPKICAQDLLVLRVGVTRAIRRTTILTPKRDTCPFL

>Pseudomonas\_aeruginosa\_PA1R\_46(PA1R\_gp4506)

MELLGTPRRRQLLENIWQRASLSKQQFEEIYRRPLANYAELVQQLPASENHHHAHPGGMIDHGLEIVAYALKVRQTYLLPIGAAPESQSAQAEAWSAAAAYGALAHDIGKIVVDLQVELQDGSTWHPWNGPINQPYRFKYVKSREYQLHGAASALLIHQLLPRTALDWLSRFPELWAQLIYLFAGQYEHAGILGEIIVKADQASVAQELGGNPDRALAAPKQSLQRQLADGLRFLVKDKFKLNQPGGPSDGWLTQDALWLVSKPAADQLRAYLLAQGIEGVPSSNSTFFNMLQDQAVIQTNAEDKAIWTATIDNGAGWRNKFTLLKIAPALIWADPAERPDSYSGSLVIEEGNASPEKPETTCEIPNDPIEQRQAPEAKMTLRQPTPSVAKPSNEMRAIAKPSAEDQEETDDLYALLGNINSPPEELDTSHDSPAASSTNTRGEENLQQPLGTKEPTDCAPEAVEDVFMPSRSTDLGQGFVGWMKSGIAARRLFINDTKALVHTVDGTAMLVTPGIFKRYVQEHPELEKLAQAKETTGWKLVQRAFEKQGLHRKTSKSLNIWTIKVSGPRKTKELKAYLLQDPKLLFPEQPLDNPSLTVITDAEGGVE

>Pseudomonas\_pseudoalcaligenes\_26(BN5\_1177)

MKVAILSGSVYGTAEEVARHAERQLKAAGLDAWHKANVSLEELLAFAPDAFLTVTSTTGMGELPDNLLPLYSEIRDRLPAWSGKPAAVLALGDSSYDTFCGGGELMRELYAELGLREVVEMLRLDSSETVTPETDAEPWLQAFVAALKA