Article

More P450s are involved in secondary metabolite biosynthesis in *Streptomyces* compared to *Bacillus*, *Cyanobacteria* and *Mycobacterium*

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Received: date; Accepted: date; Published: date

**Table S1. List of the species used in the study.**

|  |  |
| --- | --- |
| **Species name** | **Reference** |
| *Streptomyces* sp. Tu6071 | This work |
| *Streptomyces purpureus* KA281, ATCC 21405 | This work |
| *Streptomyces* sp. W007 | This work |
| *Streptomyces* sp. TAA486 | This work |
| *Streptomyces* *lysosuperificus* ATCC 31396 | This work |
| *Streptomyces* sp. PVA 94-07 | This work |
| *Streptomyces* sp. SPB78 | This work |
| *Streptomyces* *canus* 299MFChir4.1 | This work |
| *Streptomyces* sp. FxanaA7 | This work |
| *Streptomyces* *sulphureus* DSM 40104 | This work |
| *Streptomyces* sp. MspMP-M5 | This work |
| *Streptomyces* *coelicoflavus* ZG0656 | This work |
| *Streptomyces* *pristinaespiralis* ATCC 25486 | This work |
| *Streptomyces* sp. LaPpAH-201 | This work |
| *Streptomyces* *albulus* CCRC 11814 | This work |
| *Streptomyces* *viridochromogenes* DSM 40736 | This work |
| *Streptomyces* sp. LaPpAH-95 | This work |
| *Streptomyces* *mirabilis* YR139 | This work |
| *Streptomyces* sp. AA1529 | This work |
| *Streptomyces* *atratus* OK008 | This work |
| *Streptomyces* sp. PsTaAH-130 | This work |
| *Streptomyces* sp. CNT318 | This work |
| *Streptomyces* sp. CNH099 | This work |
| *Streptomyces* sp. CNH287 | This work |
| *Streptomyces* sp. MnatMP-M77 | This work |
| *Streptomyces* *zinciresistens* K42 | This work |
| *Streptomyces* sp. So1WspMP-so12th | This work |
| *Streptomyces* sp. GXT6 | This work |
| *Streptomyces* *roseosporus* NRRL 15998 | This work |
| *Streptomyces* sp. LaPpAH-108 | This work |
| *Streptomyces* *aurantiacus J*A 4570 | This work |
| *Streptomyces* *hygroscopicus* ATCC 53653 | This work |
| *Streptomyces* sp. Tu 6176 | This work |
| *Streptomyces* *ghanaensis* ATCC 14672 | This work |
| *Streptomyces* sp. KhCrAH-337 | This work |
| *Streptomyces* sp. LaPpAH-202 | This work |
| *Streptomyces* sp. UNC401CLCol | This work |
| *Streptomyces* sp. SirexAA-H | This work |
| *Streptomyces* *turgidiscabies* Car8 | This work |
| *Streptomyces* sp. KhCrAH-40 | This work |
| *Streptomyces* *rimosus rimosus* ATCC 10970 | This work |
| *Streptomyces* *gancidicus* BKS 13-15 | This work |
| *Streptomyces* *auratus* AGR0001 | This work |
| *Kitasatospora* sp. SolWspMP-SS2h | This work |
| *Streptomyces* sp. NTK 937 | This work |
| *Streptomyces* sp. ScaeMP-e48 | This work |
| *Streptomyces* sp. HmicA12 | This work |
| *Streptomyces* *griseoaurantiacus* M045 | This work |
| *Streptomyces* *afghaniensis* 772 | This work |
| *Streptomyces* *sulphureus* L180 | This work |
| *Streptomyces* sp. KhCrAH-340 | This work |
| *Streptomyces* sp. C | This work |
| *Streptomyces* *violaceusniger* SPC6 | This work |
| *Streptomyces* sp. HGB0020 | This work |
| *Streptomyces* sp. CNS615 | This work |
| *Streptomyces* *tsukubaensis* NRRL 18488 | This work |
| *Streptomyces* *vitaminophilus* DSM 41686 | This work |
| *Streptomyces* sp. SA3\_actG | This work |
| *Streptomyces* *bottropensis* ATCC 25435 | This work |
| *Streptomyces* sp. CNQ865 | This work |
| *Streptomyces* sp. CNT360 | This work |
| *Streptomyces* sp. 142MFCol3.1 | This work |
| *Streptomyces* sp. ScaeMP-e122 | This work |
| *Streptomyces* sp. ACT-1 XylebKG-1 | This work |
| *Streptomyces* sp. TAA204 | This work |
| *Streptomyces* sp. SPB74 | This work |
| *Streptomyces* sp. CNQ329 | This work |
| *Streptomyces* sp. KhCrAH-244 | This work |
| *Streptomyces* *chartreusis* NRRL 12338 | This work |
| *Streptomyces* *sviceus* ATCC 29083 | This work |
| *Streptomyces* sp. CcalMP-8W | This work |
| *Streptomyces* sp. SS | This work |
| *Streptomyces* sp. CNQ766 | This work |
| *Streptomyces* sp. URHA0041 | This work |
| *Streptomyces* sp. CNB091 | This work |
| *Streptomyces* *flavidovirens* DSM 40150 | This work |
| *Streptomyces* *yeochonensis* CN732 | This work |
| *Streptomyces* *viridosporus* T7A, ATCC 39115 | This work |
| *Streptomyces* sp. FXJ7.023 | This work |
| *Streptomyces* *mirabilis* OV308 | This work |
| *Streptomyces* sp. AW19M42 | This work |
| *Streptomyces* sp. ATexAB-D23 | This work |
| *Streptomyces* sp. BoleA5 | This work |
| *Streptomyces* sp. AA4 | This work |
| *Streptomyces* sp. CNS654 | This work |
| *Streptomyces* *ipomoeae* 91-03 | This work |
| *Streptomyces* sp. DpondAA-B6 | This work |
| *Streptomyces* sp. PCS3-D2 | This work |
| *Streptomyces* sp. PRh5 | This work |
| *Streptomyces* sp. CNR698 | This work |
| *Amycolatopsis* sp. 75iv2, ATCC 39116 | This work |
| *Streptomyces* *cattleya* ATCC 35852 | This work |
| *Streptomyces* sp. WMMB 714 | This work |
| *Streptomyces* *scabrisporus* DSM 41855 | This work |
| *Streptomyces* sp. Ncost-T6T-1 | This work |
| *Streptomyces* sp. CNB632 | This work |
| *Streptomyces* *mobaraensis* NBRC 13819 | This work |
| *Streptomyces* sp. KhCrAH-43 | This work |
| *Streptomyces* sp. PsTaAH-124 | This work |
| *Streptomyces* sp. Amel2xC10 | This work |
| *Streptomyces* *griseoflavus* Tu4000 | This work |
| *Streptomyces* sp. CNT372 | This work |
| *Streptomyces* sp. CNS606 | This work |
| *Streptomyces* sp. 303MFCol5.2 | This work |
| *Streptomyces* *acidiscabies* 84-104 | This work |
| *Streptomyces* *roseosporus* NRRL 11379 | This work |
| *Streptomyces* sp. OspMP-M45 | This work |
| *Streptomyces* sp. AmelKG-A3 | This work |
| *Streptomyces* sp. S4 | This work |
| *Streptomyces* sp. SM8 | This work |
| *Streptomyces* sp. LaPpAH-199 | This work |
| *Streptomyces* sp. 140Col2.1E | This work |
| *Streptomyces* sp. DvalAA-21 | This work |
| *Streptomyces* sp. CNT371 | This work |
| *Streptomyces* *somaliensis* DSM 40738 | This work |
| *Streptomyces* sp. 351MFTsu5.1 | This work |
| *Streptomyces* sp. Dva1AA-83 | This work |
| *Streptomyces* sp. AmelKG-F2B | This work |
| *Streptomyces* sp. CNT302 | This work |
| *Streptomyces* *olindensis* DAUFPE 5622 | This work |
| *Streptomyces* sp. CNY243 | This work |
| *Streptomyces* sp. AA0539 | This work |
| *Streptomyces* *atratus* OK807 | This work |
| *Streptomyces* sp. CNS335 | This work |
| *Streptomyces* sp. FxanaC1 | This work |
| *Streptomyces* sp. WMMB 322 | This work |
| *Streptomyces* sp. TOR3209 | This work |
| *Streptomyces* sp. AmelKG-E11A | This work |
| *Streptomyces* sp. PP-C42 | This work |
| *Streptomyces* sp. DpondAA-E10 | This work |
| *Streptomyces* sp. HPH0547 | This work |
| *Streptomyces* sp. DpondAA-A50 | This work |
| *Streptomyces* sp. TAA040 | This work |
| *Streptomyces* sp. PgraA7 | This work |
| *Streptomyces* sp. FxanaD5 | This work |
| *Streptomyces* sp. LamerLS-316 | This work |
| *Streptomyces* *viridochromogenes* Tue57 | This work |
| *Streptomyces* sp. GBA 94-10 | This work |
| *Streptomyces* sp. CNQ-525 | This work |
| *Streptomyces* sp. SceaMP-e96 | This work |
| *Streptomyces* *mirabilis* OK461 | This work |
| *Streptomyces* sp. LaPpAH-185 | This work |
| *Streptomyces* *exfoliatus* DSMZ 41693 | This work |
| *Streptomyces* sp. PsTaAH-137 | This work |
| *Streptomyces* sp. Ame12xE9 | This work |
| *Streptomyces* sp. AmelKG-D3 | This work |
| *Streptomyces* *prunicolor* NBRC 13075 | This work |
| *Streptomyces* sp. e14 | This work |
| *Streptomyces* sp. CNX435 | This work |
| *Streptomyces* sp. HCCB10043 | This work |
| *Streptomyces* sp. JS01 | This work |
| *Streptomyces* *chartreusis* NRRL 3882 | This work |
| *Streptomyces* sp. CNY228 | This work |
| *Streptomyces* sp. Amel2xB2 | This work |
| *Streptomyces* sp. LaPpAH-165 | This work |
| *Streptomyces* *albulus* ZPM | [1] |
| *Streptomyces* *albulus* NK660 | [1] |
| *Streptomyces* *noursei* | [1] |
| *Streptomyces* *violaceusniger* | [1] |
| *Streptomyces* *bingchenggensis* | [1] |
| *Streptomyces* *rapamycinicus* | [1] |
| *Streptomyces* sp. 769 | [1] |
| *Streptomyces* *hygroscopicus* subsp. jinggangensis 5008 | [1] |
| *Streptomyces* *cattleya* NRRL 8058 = DSM 46488 | [1] |
| *Streptomyces cattleya* NRRL 8057 | [1] |
| *Streptomyces* *hygroscopicus* subsp. jinggangensis TL01 | [1] |
| *Streptomyces* *avermitilis* | [1] |
| *Streptomyces* *collinus* | [1] |
| *Streptomyces lydicus* A02 | [1] |
| *Streptomyces lydicus* 103 | [1] |
| *Streptomyces* sp. Mg1 | [1] |
| *Streptomyces* *leeuwenhoekii* | [1] |
| *Streptomyces* *pratensis* | [1] |
| *Streptomyces* *reticuli* | [1] |
| *Streptomyces* *griseus* | [1] |
| *Streptomyces* sp. PAMC 26508 | [1] |
| *Streptomyces* sp. SirexAA-E | [1] |
| *Streptomyces* *davawensis* | [1] |
| *Streptomyces* *cyaneogriseus* | [1] |
| *Streptomyces* *lincolnensis* | [1] |
| *Streptomyces* *pristinaespiralis* | [1] |
| *Streptomyces* *venezuelae* | [1] |
| *Streptomyces* sp. CFMR 7 | [1] |
| *Streptomyces* *vietnamensis* | [1] |
| *Streptomyces* *xiamenensis* | [1] |
| *Streptomyces* *coelicolor* | [1] |
| *Streptomyces* *albus* J1074 | [1] |
| *Streptomyces* *ambofaciens* | [1] |
| *Streptomyces* *lividans* | [1] |
| *Streptomyces* *scabiei* | [1] |
| *Streptomyces* *glaucescens* | [1] |
| *Streptomyces* *albus* DSM 41398 | [1] |
| *Streptomyces* *fulvissimus* | [1] |
| *Streptomyces* sp. CNQ-509 | [1] |
| *Streptomyces* *rubrolavendulae* | [1] |
| *Streptomyces* *clavuligerus* | [1] |
| *Streptomyces* *griseochromogenes* | [1] |
| *Streptomyces* sp. S10(2016) | [1] |
| *Streptomyces* *globisporus* | [1] |
| *Streptomyces* sp. CdTB01 | [1] |
| *Streptomyces* *parvulus* | [1] |
| *Streptomyces* sp. SAT1 | [1] |
| *Streptomyces* sp. 4F | [1] |

Table S2. Information on hit proteins that are not part of the P450 analysis. Hit proteins along with their protein IDs and species in which they were found were listed at the bottom of the table according to the different categories.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Species name | Pseudo P450 genes | fragments | P450-derived glycosyltransferase activator | false positive | New P450 families |
| *Streptomyces* sp. Tu6071 |  |  |  |  | 2 (CYP1200A1; CYP1972A1) |
| *Streptomyces purpureus* KA281, ATCC 21405 | 1 |  |  |  |  |
| *Streptomyces* sp. W007 |  | 3 |  |  |  |
| *Streptomyces* sp*.* TAA486-18 |  |  |  |  |  |
| *Streptomyces lysosuperificus* ATCC 31396 |  | 11 | 2 |  |  |
| *Streptomyces* sp. PVA 94-07 |  | 1 |  |  |  |
| *Streptomyces* sp. SPB78 |  |  |  |  | 2(CYP1200A1; CYP1972A1) |
| *Streptomyces canus* 299MFChir4.1 |  | 2 |  |  |  |
| *Streptomyces* sp. FxanaA7 |  |  |  |  |  |
| *Streptomyces sulphureus* DSM 40104 |  |  |  |  | 1(CYP1265A1) |
| *Streptomyces sp.* MspMP-M5 |  |  |  |  |  |
| *Streptomyces coelicoflavus* ZG0656 |  | 1 |  |  |  |
| *Streptomyces pristinaespiralis* ATCC 25486 |  | 1 |  |  |  |
| *Streptomyces sp.* LaPpAH-201 |  |  |  |  |  |
| *Streptomyces albulus* CCRC 11814 |  |  |  |  |  |
| *Streptomyces viridochromogenes* DSM 40736 |  | 2 |  |  |  |
| *Streptomyces sp.* LaPpAH-95 |  |  |  |  |  |
| *Streptomyces mirabilis* YR139 |  | 2 |  |  |  |
| *Streptomyces sp.* AA1529 |  |  |  |  |  |
| *Streptomyces atratus* OK008 |  | 1 |  |  |  |
| *Streptomyces* sp. PsTaAH-130 |  |  |  |  |  |
| *Streptomyces* sp.CNT318 |  |  |  |  |  |
| *Streptomyces* sp. CNH099 |  |  |  |  |  |
| *Streptomyces* sp. CNH287 |  | 1 |  |  |  |
| *Streptomyces* sp. MnatMP-M77 |  |  |  |  |  |
| *Streptomyces zinciresistens* K42 |  | 1 | 2 |  |  |
| *Streptomyces* sp. So1WspMP-so12th |  |  |  |  |  |
| *Streptomyces* sp. GXT6 |  |  |  |  |  |
| *Streptomyces roseosporus* NRRL 15998 |  |  | 1 |  |  |
| *Streptomyces* sp. LaPpAH-108 |  |  |  |  | 1(CYP159A1) |
| *Streptomyces aurantiacus* JA 4570 |  | 1 | 1 |  | 1(CYP1658A1) |
| *Streptomyces hygroscopicus* ATCC 53653 |  | 3 |  |  | 1(CYP1940A1) |
| *Streptomyces* sp. Tu 6176 |  | 1 |  |  |  |
| *Streptomyces ghanaensis* ATCC 14672 |  |  |  |  |  |
| *Streptomyces* sp. KhCrAH-337 |  |  |  |  |  |
| *Streptomyces* sp. LaPpAH-202 |  |  |  |  |  |
| *Streptomyces* sp. UNC401CLCol |  |  |  |  | 1(CYP1216A1) |
| *Streptomyces* sp. SirexAA-H |  | 2 |  |  | 2(CYP1200A1; CYP1972A1) |
| *Streptomyces turgidiscabies* Car8 |  |  |  |  | 1(CYP2134A1) |
| *Streptomyces sp.* KhCrAH-40 |  |  |  |  |  |
| *Streptomyces rimosus rimosus* ATCC 10970 | 1 | 1 |  |  | 4(CYP1236A1; CYP1896A1; CYP1929A1; CYP2349A1) |
| *Streptomyces gancidicus* BKS 13-15 |  |  |  |  |  |
| *Streptomyces auratus* AGR0001 |  |  |  |  |  |
| *Kitasatospora* sp. SolWspMP-SS2h |  |  |  |  |  |
| *Streptomyces* sp. NTK 937 |  |  |  |  |  |
| *Streptomyces* sp.ScaeMP-e48 |  | 1 |  |  |  |
| *Streptomyces* sp. HmicA12 |  |  |  |  | 1(CYP1238A1) |
| *Streptomyces griseoaurantiacus* M045 |  |  |  |  | 1(CYP2080A1) |
| *Streptomyces afghaniensis* 772 |  | 2 |  |  |  |
| *Streptomyces sulphureus* L180 |  |  |  |  |  |
| *Streptomyces* sp. KhCrAH-340 |  |  |  |  |  |
| *Streptomyces* sp. C |  | 1 |  |  |  |
| *Streptomyces violaceusniger* SPC6 |  |  |  |  |  |
| *Streptomyces* sp. HGB0020 |  | 1 |  |  | 1(CYP1943A1) |
| *Streptomyces* sp. CNS615 |  |  | 2 |  |  |
| *Streptomyces tsukubaensis* NRRL 18488 |  | 2 | 2 |  | 1(CYP1866A1) |
| *Streptomyces vitaminophilus* DSM 41686 |  |  |  |  | 1(CYP2180A1) |
| *Streptomyces* sp. SA3\_actG |  | 1 |  |  | 2(CYP1200A1; CYP1972A1) |
| *Streptomyces bottropensis* ATCC 25435 |  |  |  |  |  |
| *Streptomyces* sp. CNQ865 |  | 1 |  |  | 1(CYP1279A1) |
| *Streptomyces* sp. CNT360 |  |  |  |  |  |
| *Streptomyces* sp. 142MFCol3.1 |  |  |  |  |  |
| *Streptomyces* sp. ScaeMP-e122 |  |  |  |  |  |
| *Streptomyces* sp. ACT-1 |  |  |  |  |  |
| *Streptomyces* sp. TAA204 |  | 1 |  |  | 1(CYP1832A1) |
| *Streptomyces* sp. SPB74 |  | 1 | 1 | 1 |  |
| *Streptomyces* sp. CNQ329 |  |  |  |  |  |
| *Streptomyces* sp. KhCrAH-244 |  |  | 1 |  |  |
| *Streptomyces chartreusis* NRRL 12338 |  |  |  |  |  |
| *Streptomyces sviceus* ATCC 29083 |  |  |  |  | 1(CYP1518A1) |
| *Streptomyces* sp. CcalMP-8W |  |  | 1 |  | 1(CYP1984A1) |
| *Streptomyces* sp. SS |  | 1 |  |  |  |
| *Streptomyces* sp. CNQ766 |  |  |  |  | 1(CYP1279A1) |
| *Streptomyces* sp. URHA0041 |  |  | 1 |  |  |
| *Streptomyces* sp. CNB091 |  |  |  |  |  |
| *Streptomyces flavidovirens* DSM 40150 |  |  |  |  | 1(CYP1228A1) |
| *Streptomyces yeochonensis* CN732 |  |  |  |  |  |
| *Streptomyces viridosporus* T7A, ATCC 39115 |  |  |  |  |  |
| *Streptomyces* sp. FXJ7.023 |  |  |  |  |  |
| *Streptomyces mirabilis* OV308 |  | 1 |  |  |  |
| *Streptomyces* sp. AW19M42 |  |  |  | 1 |  |
| *Streptomyces* sp. ATexAB-D23 |  |  |  |  |  |
| *Streptomyces* sp. BoleA5 |  | 3 |  |  |  |
| *Streptomyces* sp. AA4 |  |  |  |  | 3(CYP1543A1; CYP1759A1; CYP2076A1) |
| *Streptomyces* sp. CNS654 |  |  |  |  |  |
| *Streptomyces ipomoeae* 91-03 |  |  |  |  | (CYP1931A1) |
| *Streptomyces* sp. DpondAA-B6 |  |  |  |  |  |
| *Streptomyces* sp. PCS3-D2 |  |  |  |  |  |
| *Streptomyces* sp. PRh5 |  | 4 |  |  |  |
| *Streptomyces* sp. CNR698 |  |  |  |  | 1(CYP1223A1) |
| *Amycolatopsis* sp. 75iv2, ATCC 39116 |  |  |  |  | 2(CYP1432A1; CYP1994A1) |
| *Streptomyces cattleya* ATCC 35852 |  | 1 |  |  |  |
| *Streptomyces* sp. WMMB 714 |  | 1 |  |  |  |
| *Streptomyces scabrisporus* DSM 41855 | 1 | 4 |  |  | 2(CYP1369A1; CYP1568A1) |
| *Streptomyces* sp. Ncost-T6T-1 |  |  |  |  |  |
| *Streptomyces* sp. CNB632 |  |  |  |  |  |
| *Streptomyces mobaraensis* NBRC 13819 |  |  |  |  | 1(CYP1810A1) |
| *Streptomyces* sp. KhCrAH-43 |  | 1 |  |  |  |
| *Streptomyces* sp. PsTaAH-124 |  |  |  |  |  |
| *Streptomyces* sp. Amel2xC10 |  |  |  |  |  |
| *Streptomyces griseoflavus Tu4000* |  | 2 |  |  |  |
| *Streptomyces* sp. CNT372 | 1 |  |  |  |  |
| *Streptomyces* sp. CNS606 |  |  |  |  |  |
| *Streptomyces* sp. 303MFCol5.2 |  |  |  |  |  |
| *Streptomyces acidiscabies* 84-104 | 1 | 1 |  |  | 1(CYP1607A1) |
| *Streptomyces roseosporus* NRRL 11379 |  |  | 1 |  |  |
| *Streptomyces* sp. OspMP-M45 |  |  |  |  |  |
| *Streptomyces* sp. AmelKG-A3 |  |  |  |  |  |
| *Streptomyces* sp. S4 |  |  |  |  |  |
| *Streptomyces* sp. SM8 |  |  | 1 |  |  |
| *Streptomyces* sp. LaPpAH-199 |  |  |  |  |  |
| *Streptomyces* sp. 140Col2.1E |  |  |  |  |  |
| *Streptomyces* sp. DvalAA-21 |  |  |  |  |  |
| *Streptomyces* sp. CNT371 |  |  |  |  | 1(CYP1279A1) |
| *Streptomyces somaliensis* DSM 40738 |  |  |  |  |  |
| *Streptomyces* sp. 351MFTsu5.1 |  |  |  |  |  |
| *Streptomyces* sp. Dva1AA-83 |  |  |  |  |  |
| *Streptomyces* sp. AmelKG-F2B |  |  |  |  |  |
| *Streptomyces* sp. CNT302 |  |  | 2 |  |  |
| *Streptomyces olindensis* DAUFPE 5622 |  | 1 | 2 |  |  |
| *Streptomyces* sp. CNY243 |  |  |  |  | 1(CYP1279A1) |
| *Streptomyces* sp. AA0539 |  |  |  |  |  |
| *Streptomyces atratus* OK807 |  | 2 |  |  |  |
| *Streptomyces* sp. CNS335 |  |  |  |  | 1(CYP1279A1) |
| *Streptomyces* sp. FxanaC1 |  |  |  |  |  |
| *Streptomyces* sp. WMMB 322 |  |  |  |  |  |
| *Streptomyces* sp. TOR3209 |  |  |  |  |  |
| *Streptomyces* sp. AmelKG-E11A |  |  |  |  | 1(CYP2427A1) |
| *Streptomyces* sp. PP-C42 |  | 10 |  |  |  |
| *Streptomyces* sp. DpondAA-E10 |  |  |  |  |  |
| *Streptomyces* sp. HPH0547 |  |  |  |  | 2(CYP1920A1; CYP1941A1) |
| *Streptomyces* sp. DpondAA-A50 |  |  |  |  |  |
| *Streptomyces* sp. TAA040 |  | 1 |  |  |  |
| *Streptomyces* sp. PgraA7 |  | 1 |  |  |  |
| *Streptomyces* sp. FxanaD5 |  |  |  |  | 1(CYP1216A1) |
| *Streptomyces* sp. LamerLS-316 |  |  |  |  |  |
| *Streptomyces viridochromogenes* Tue57 |  | 2 |  |  |  |
| *Streptomyces* sp. GBA 94-10 |  |  |  |  |  |
| *Streptomyces* sp. CNQ-525 |  |  |  |  | 2(CYP1279A1; CYP1529A1) |
| *Streptomyces* sp. SceaMP-e96 |  |  |  |  |  |
| *Streptomyces mirabilis* OK461 |  | 1 |  |  |  |
| *Streptomyces* sp. LaPpAH-185 |  |  |  |  | 1(CYP2723A1) |
| *Streptomyces exfoliatus* DSMZ 41693 |  | 1 | 1 |  |  |
| *Streptomyces* sp. PsTaAH-137 |  |  |  |  |  |
| *Streptomyces* sp. Amel2xE9 |  |  |  |  |  |
| *Streptomyces* sp. AmelKG-D3 |  |  |  |  |  |
| *Streptomyces prunicolor* NBRC 13075 |  | 2 |  |  |  |
| *Streptomyces* sp. e14 |  |  |  |  |  |
| *Streptomyces* sp. CNX435 |  |  |  |  |  |
| *Streptomyces* sp. HCCB10043 |  |  | 1 |  |  |
| *Streptomyces* sp. JS01 |  |  |  |  |  |
| *Streptomyces chartreusis* NRRL 3882 |  | 17 |  |  |  |
| *Streptomyces* sp. CNY228 |  |  |  |  |  |
| *Streptomyces* sp. Amel2xB2 |  |  |  |  |  |
| *Streptomyces* sp. LaPpAH-165 |  |  |  |  |  |
| *Streptomyces albulus* ZPM |  | 1 |  |  |  |
| *Streptomyces albulus* NK660 |  |  |  |  |  |
| *Streptomyces noursei* |  |  |  |  |  |
| *Streptomyces violaceusniger* |  | 1 |  |  |  |
| *Streptomyces bingchenggensis* |  | 1 |  |  |  |
| *Streptomyces rapamycinicus* |  |  |  |  |  |
| *Streptomyces* *sp. 769* |  |  |  |  |  |
| *Streptomyces hygroscopicus* subsp. *jinggangensis* 5008 |  |  |  |  |  |
| *Streptomyces cattleya* NRRL 8058 = DSM 46488 |  | 1 |  |  |  |
| *Streptomyces cattleya* NRRL 8057 |  | 1 |  |  |  |
| *Streptomyces hygroscopicus* subsp. *jinggangensis* TL01 |  |  |  |  |  |
| *Streptomyces avermitilis* |  | 1 |  |  |  |
| *Streptomyces collinus* |  |  |  |  |  |
| *Streptomyces lydicus* A02 | 1 | 1 |  |  |  |
| *Streptomyces lydicus* 103 |  |  |  |  |  |
| *Streptomyces* sp. Mg1 |  |  |  |  |  |
| *Streptomyces leeuwenhoekii* |  |  |  |  |  |
| *Streptomyces pratensis* |  |  |  |  |  |
| *Streptomyces reticuli* |  |  |  |  |  |
| *Streptomyces griseus* |  |  |  |  |  |
| *Streptomyces* sp. PAMC 26508 |  |  |  |  |  |
| *Streptomyces* sp. SirexAA-E |  |  |  |  |  |
| *Streptomyces davawensis* |  |  |  |  |  |
| *Streptomyces cyaneogriseus* |  | 3 |  |  |  |
| *Streptomyces lincolnensis* |  |  |  |  |  |
| *Streptomyces pristinaespiralis* |  |  |  |  |  |
| *Streptomyces venezuelae* |  |  |  |  |  |
| *Streptomyces* sp. CFMR 7 |  |  |  |  |  |
| *Streptomyces vietnamensis* |  |  |  |  |  |
| *Streptomyces xiamenensis* |  | 1 |  |  |  |
| *Streptomyces coelicolor* |  |  |  |  |  |
| *Streptomyces* albus J1074 |  |  |  |  |  |
| *Streptomyces ambofaciens* |  |  |  |  |  |
| *Streptomyces lividans* |  |  |  |  |  |
| *Streptomyces scabiei* |  |  |  |  |  |
| *Streptomyces glaucescens* |  |  |  |  |  |
| *Streptomyces albus* DSM 41398 |  |  |  |  |  |
| *Streptomyces fulvissimus* |  |  |  |  |  |
| *Streptomyces* sp. CNQ-509 |  |  |  |  |  |
| *Streptomyces rubrolavendulae* |  |  |  |  |  |
| *Streptomyces clavuligerus* |  | 1 |  |  |  |
| *Streptomyces griseochromogenes* |  |  |  |  |  |
| *Streptomyces* sp. S10(2016) |  |  |  |  |  |
| *Streptomyces globisporus* |  |  |  |  |  |
| *Streptomyces* sp. CdTB01 |  |  |  |  |  |
| *Streptomyces parvulus* |  |  |  |  |  |
| *Streptomyces* sp. SAT1 |  |  |  |  |  |
| *Streptomyces* sp. 4F |  |  |  |  |  |
|  | 6 | 114 | 22 | 2 |  |

**PseudoP450s:**

(2516522252) *Streptomyces purpureus* KA281, ATCC 21405

(2545383032) *Streptomyces* rimosus rimosus ATCC 10970

(2516057102) *Streptomyces* scabrisporus DSM 41855

(2518016638) *Streptomyces* sp. CNT372

(2547558849) *Streptomyces* acidiscabies 84-104

>CYP107L52P(2652740080) Streptomyces lydicus A02

**Fragments:**

(2514827772) *Streptomyces* sp. W007

(2514827914) *Streptomyces* sp. W007

(2514822429) *Streptomyces* sp. W007

(2547449594) *Streptomyces* lysosuperificus ATCC 31396

(2547449800) *Streptomyces* lysosuperificus ATCC 31396

(2547450809) *Streptomyces* lysosuperificus ATCC 31396

(2547450877) *Streptomyces* lysosuperificus ATCC 31396

(2547450898) *Streptomyces* lysosuperificus ATCC 31396

(2547450924) *Streptomyces* lysosuperificus ATCC 31396

(2547454471) *Streptomyces* lysosuperificus ATCC 31396

(2547454745) *Streptomyces* lysosuperificus ATCC 31396

(2547454761) *Streptomyces* lysosuperificus ATCC 31396

(2547455540) *Streptomyces* lysosuperificus ATCC 31396

(2547455305) *Streptomyces* lysosuperificus ATCC 31396

(2597943189) *Streptomyces* sp. PVA 94-07

(2521769196) *Streptomyces* canus 299MFChir4.1

(2521769197) *Streptomyces* canus 299MFChir4.1

(2536367479) *Streptomyces* coelicoflavus ZG0656

(648861739) *Streptomyces* pristinaespiralis ATCC 25486

(645408928) *Streptomyces* viridochromogenes DSM 40736

(645414127) *Streptomyces* viridochromogenes DSM 40736

(2585311799) *Streptomyces* mirabilis YR139

(2585313749) *Streptomyces* mirabilis YR139

(2585298836) *Streptomyces* atratus OK008

(2524584987) *Streptomyces* sp. CNH287

(2532535361) *Streptomyces* zinciresistens K42

(2546763799) *Streptomyces* aurantiacus JA 4570

(645393084) *Streptomyces* hygroscopicus ATCC 53653

(645397707) *Streptomyces* hygroscopicus ATCC 53653

(645397708) *Streptomyces* hygroscopicus ATCC 53653

(2580702290) *Streptomyces* sp. Tu 6176

(2519147290) *Streptomyces* sp. SirexAA-H

(2519149156) *Streptomyces* sp. SirexAA-H

(2545383737) *Streptomyces* rimosus rimosus ATCC 10970

(2519058509) *Streptomyces* sp. ScaeMP-e48

(2546774595) *Streptomyces* afghaniensis 772

(2546776814) *Streptomyces* afghaniensis 772

(645383576) *Streptomyces* sp. C

(2541394753) *Streptomyces* sp. HGB0020

(2530555715) *Streptomyces* tsukubaensis NRRL 18488

(2530556468) *Streptomyces* tsukubaensis NRRL 18488

(650124476) *Streptomyces* sp. SA3\_actG

(2524937753) *Streptomyces* sp. CNQ865

(2524962433) *Streptomyces* sp. TAA204

(648006388) *Streptomyces* sp. SPB74

(2551975180) *Streptomyces* sp. SS

(2585302911) *Streptomyces* mirabilis OV308

(2515915956) *Streptomyces* sp. BoleA5

(2515922864) *Streptomyces* sp. BoleA5

(2515922865)*Streptomyces* sp. BoleA5

(2580420291) *Streptomyces* sp. PRh5

(2580425623) *Streptomyces* sp. PRh5

(2580426841) *Streptomyces* sp. PRh5

(2580426890) *Streptomyces* sp. PRh5

(2504911443) *Streptomyces* cattleya ATCC 35852

(2522462118) *Streptomyces* sp. WMMB 714

(2516053686) *Streptomyces* scabrisporus DSM 41855

(2516055596) *Streptomyces* scabrisporus DSM 41855

(2516062277) *Streptomyces* scabrisporus DSM 41855

(2516062278) *Streptomyces* scabrisporus DSM 41855

(2525013413) *Streptomyces* sp. KhCrAH-43

(645415805) *Streptomyces* griseoflavus Tu4000

(645422196) *Streptomyces* griseoflavus Tu4000

(2547561509) *Streptomyces* acidiscabies 84-104

(2587272320) *Streptomyces* olindensis DAUFPE 5622

(2616905248) *Streptomyces* atratus OK807

(2616905545) *Streptomyces* atratus OK807

(2548248266) *Streptomyces* sp. PP-C42

(2548249058) *Streptomyces* sp. PP-C42

(2548249641) *Streptomyces* sp. PP-C42

(2548249834) *Streptomyces* sp. PP-C42

(2548251009) *Streptomyces* sp. PP-C42

(2548251411) *Streptomyces* sp. PP-C42

(2548251993) *Streptomyces* sp. PP-C42

(2548253201) *Streptomyces* sp. PP-C42

(2548253624) *Streptomyces* sp. PP-C42

(2548254890) *Streptomyces* sp. PP-C42

(2524959868) *Streptomyces* sp. TAA040

(2525360972) *Streptomyces* sp. PgraA7

(2533804035) *Streptomyces* viridochromogenes Tue57

(2533804524) *Streptomyces* viridochromogenes Tue57

(2616703446) *Streptomyces* mirabilis OK461

(2586355063) *Streptomyces* exfoliatus DSMZ 41693

(2567286375) *Streptomyces* prunicolor NBRC 13075

(2567286376) *Streptomyces* prunicolor NBRC 13075

(2547455945) *Streptomyces* chartreusis NRRL 3882

(2547456809) *Streptomyces* chartreusis NRRL 3882

(2547457179) *Streptomyces* chartreusis NRRL 3882

(2547458319) *Streptomyces* chartreusis NRRL 3882

(2547458439) *Streptomyces* chartreusis NRRL 3882

(2547459156) *Streptomyces* chartreusis NRRL 3882

(2547459757) *Streptomyces* chartreusis NRRL 3882

(2547461528) *Streptomyces* chartreusis NRRL 3882

(2547462429) *Streptomyces* chartreusis NRRL 3882

(2547462429) *Streptomyces* chartreusis NRRL 3882

(2547462635) *Streptomyces* chartreusis NRRL 3882

(2547463578) *Streptomyces* chartreusis NRRL 3882

(2547463766) *Streptomyces* chartreusis NRRL 3882

(2547464297) *Streptomyces* chartreusis NRRL 3882

(2547465028) *Streptomyces* chartreusis NRRL 3882

(2547466045) *Streptomyces* chartreusis NRRL 3882

(2547466069) *Streptomyces* chartreusis NRRL 3882

(2641170384) *Streptomyces* albulus ZPM

(2712578143) *Streptomyces* avermitilis

(646978401) *Streptomyces* bingchenggensis

(647544071) *Streptomyces* clavuligerus

(2649527539) *Streptomyces* cyaneogriseus

(2649527540) *Streptomyces* cyaneogriseus

(2649527873) *Streptomyces* cyaneogriseus

(648750691) *Streptomyces* violaceusniger

(2633776877) *Streptomyces* xiamenensis

CYP107CJ2(2652740805) Streptomyces lydicus A02

CYP107AS(2511977159) Streptomyces cattleya NRRL 8058 = DSM 46488

CYP107AS-fragment1(2511677887) Streptomyces cattleya NRRL 8057

**P450-derived glycosyltransferase activator:**

(2547446153) *Streptomyces* lysosuperificus ATCC 31396

(2547454902) *Streptomyces* lysosuperificus ATCC 31396

(2532534676) *Streptomyces* zinciresistens K42

(2532534687) *Streptomyces* zinciresistens K42

(645215040) *Streptomyces* roseosporus NRRL 15998

(2546764930) *Streptomyces* aurantiacus JA 4570

(2518400808) *Streptomyces* sp. CNS615

(2518400829) *Streptomyces* sp. CNS615

(2530553835) *Streptomyces* tsukubaensis NRRL 18488

(2530553842) *Streptomyces* tsukubaensis NRRL 18488

(648009744) *Streptomyces* sp. SPB74

(2515591352) *Streptomyces* sp. KhCrAH-244

(2515529209) *Streptomyces* sp. CcalMP-8W

(2562037229) *Streptomyces* sp. URHA0041

(645232145) *Streptomyces* roseosporus NRRL 11379

(2512067890) *Streptomyces* sp. SM8

(2518083496) *Streptomyces* sp. CNT302

(2518083517) *Streptomyces* sp. CNT302

(2587271846) *Streptomyces* olindensis DAUFPE 5622

(2587271867) *Streptomyces* olindensis DAUFPE 5622

(2586355969) *Streptomyces* exfoliatus DSMZ 41693

(2570466035) *Streptomyces* sp. HCCB10043

**False positives**

(648008380) *Streptomyces* sp. SPB74

(2598227426) *Streptomyces* sp. AW19M42

Table S3: P450 family and subfamily analysis in *Streptomyces* species.

|  |  |  |
| --- | --- | --- |
| Family | Subfamily | P450 count |
| CYP1004 | B | 1 |
|  | E | 7 |
|  | F | 7 |
| CYP1005 | B | 17 |
| CYP1012 | B | 1 |
| CYP1013 | A | 3 |
|  | D | 1 |
| CYP1027 | G | 4 |
| CYP1029 | A | 4 |
| CYP102 | B | 78 |
|  | D | 6 |
|  | G | 48 |
| CYP1031 | A | 8 |
| CYP1035 | A | 79 |
| CYP1036 | A | 8 |
| CYP1037 | A | 3 |
|  | B | 6 |
|  | C | 1 |
| CYP1038 | A | 22 |
|  | C | 2 |
|  | D | 1 |
| CYP1039 | A | 1 |
|  | C | 1 |
| CYP1041 | A | 1 |
| CYP1042 | A | 4 |
| CYP1043 | A | 17 |
| CYP1044 | A | 2 |
| CYP1045 | A | 1 |
|  | B | 1 |
| CYP1046 | A | 21 |
| CYP1047 | A | 43 |
|  | B | 3 |
| CYP1048 | A | 6 |
| CYP1050 | B | 1 |
|  | C | 1 |
|  | D | 1 |
| CYP1051 | F | 1 |
| CYP1053 | A | 1 |
| CYP1054 | A | 4 |
| CYP1055 | A | 1 |
| CYP1056 | A | 1 |
|  | B | 1 |
| CYP1057 | A | 1 |
| CYP1058 | A | 1 |
| CYP1059 | A | 2 |
| CYP105 | A | 27 |
|  | AA | 25 |
|  | AB | 14 |
|  | AC | 81 |
|  | AD | 2 |
|  | AE | 2 |
|  | AG | 1 |
|  | AH | 4 |
|  | AJ | 2 |
|  | AK | 42 |
|  | AN | 4 |
|  | AQ | 4 |
|  | AR | 1 |
|  | AT | 1 |
|  | AU | 1 |
|  | AV | 5 |
|  | AW | 1 |
|  | AX | 4 |
|  | AY | 3 |
|  | AZ | 22 |
|  | B | 127 |
|  | BA | 14 |
|  | BB | 2 |
|  | BC | 3 |
|  | BD | 3 |
|  | BE | 3 |
|  | BF | 3 |
|  | BG | 2 |
|  | BH | 1 |
|  | BK | 3 |
|  | BM | 1 |
|  | BN | 3 |
|  | BP | 3 |
|  | BQ | 2 |
|  | BR | 1 |
|  | BS | 1 |
|  | BT | 10 |
|  | BU | 2 |
|  | BV | 3 |
|  | BW | 1 |
|  | CD | 6 |
|  | CF | 4 |
|  | CK | 1 |
|  | CY | 1 |
|  | D | 110 |
|  | DB | 6 |
|  | DC | 1 |
|  | DD | 2 |
|  | DE | 1 |
|  | DF | 1 |
|  | DG | 1 |
|  | DH | 2 |
|  | DK | 1 |
|  | DL | 1 |
|  | DM | 2 |
|  | DN | 1 |
|  | DP | 2 |
|  | DQ | 1 |
|  | DR | 5 |
|  | DS | 2 |
|  | DT | 2 |
|  | DU | 2 |
|  | DV | 1 |
|  | DW | 3 |
|  | DX | 1 |
|  | DY | 6 |
|  | DZ | 1 |
|  | EA | 1 |
|  | EB | 1 |
|  | EC | 1 |
|  | ED | 1 |
|  | EE | 1 |
|  | EF | 1 |
|  | EG | 1 |
|  | EH | 1 |
|  | H | 26 |
|  | K | 1 |
|  | L | 1 |
|  | M | 5 |
|  | N | 20 |
|  | P | 2 |
|  | Q | 6 |
|  | R | 1 |
|  | S | 4 |
|  | U | 2 |
|  | V | 1 |
|  | Z | 6 |
| CYP1060 | A | 12 |
| CYP1061 | A | 3 |
| CYP1062 | A | 5 |
| CYP1063 | A | 1 |
| CYP1064 | A | 22 |
| CYP1065 | A | 1 |
| CYP1066 | A | 1 |
| CYP107 | A | 2 |
|  | AD | 4 |
|  | AE | 48 |
|  | AF | 1 |
|  | AH | 23 |
|  | AK | 2 |
|  | AL | 6 |
|  | AM | 34 |
|  | AQ | 3 |
|  | AT | 10 |
|  | AW | 2 |
|  | B | 10 |
|  | BB | 1 |
|  | BC | 1 |
|  | BJ | 1 |
|  | BK | 3 |
|  | BM | 17 |
|  | BS | 2 |
|  | BT | 5 |
|  | BU | 11 |
|  | BV | 1 |
|  | BW | 4 |
|  | BX | 57 |
|  | BY | 8 |
|  | BZ | 4 |
|  | C | 1 |
|  | CA | 6 |
|  | CD | 4 |
|  | CE | 3 |
|  | CF | 3 |
|  | CG | 4 |
|  | CH | 13 |
|  | CJ | 26 |
|  | CK | 1 |
|  | CL | 2 |
|  | CM | 3 |
|  | CN | 1 |
|  | CP | 1 |
|  | CQ | 2 |
|  | CR | 4 |
|  | CS | 5 |
|  | CT | 4 |
|  | CU | 2 |
|  | CV | 1 |
|  | CW | 2 |
|  | DD | 2 |
|  | DK | 1 |
|  | DU | 2 |
|  | DW | 5 |
|  | E | 60 |
|  | EA | 15 |
|  | EB | 4 |
|  | EC | 3 |
|  | ED | 2 |
|  | EE | 1 |
|  | EF | 1 |
|  | EG | 2 |
|  | EH | 4 |
|  | EJ | 1 |
|  | EK | 1 |
|  | EL | 2 |
|  | EM | 3 |
|  | EN | 2 |
|  | EP | 1 |
|  | EQ | 1 |
|  | ER | 1 |
|  | F | 65 |
|  | FF | 1 |
|  | FH | 2 |
|  | FV | 2 |
|  | G | 4 |
|  | JB | 3 |
|  | JK | 3 |
|  | JP | 1 |
|  | JS | 1 |
|  | JU | 1 |
|  | KT | 1 |
|  | KW | 2 |
|  | KX | 2 |
|  | KY | 2 |
|  | KZ | 1 |
|  | L | 175 |
|  | LA | 1 |
|  | LB | 1 |
|  | LC | 1 |
|  | LD | 1 |
|  | LE | 1 |
|  | LF | 6 |
|  | LG | 1 |
|  | LW | 1 |
|  | LX | 1 |
|  | LY | 1 |
|  | LZ | 1 |
|  | MA | 1 |
|  | MB | 1 |
|  | MC | 2 |
|  | MD | 3 |
|  | ME | 1 |
|  | MF | 1 |
|  | MG | 2 |
|  | MH | 3 |
|  | MJ | 1 |
|  | MK | 2 |
|  | ML | 1 |
|  | MM | 1 |
|  | MN | 1 |
|  | MP | 2 |
|  | MQ | 1 |
|  | MR | 1 |
|  | MS | 1 |
|  | MT | 1 |
|  | MU | 1 |
|  | MV | 3 |
|  | MW | 2 |
|  | MX | 1 |
|  | MY | 1 |
|  | MZ | 1 |
|  | NA | 1 |
|  | NB | 1 |
|  | NC | 1 |
|  | ND | 1 |
|  | P | 148 |
|  | Q | 2 |
|  | R | 4 |
|  | T | 17 |
|  | U | 203 |
|  | V | 1 |
|  | W | 6 |
|  | X | 46 |
|  | Y | 9 |
|  | Z | 16 |
| CYP108 | B | 5 |
|  | N | 2 |
| CYP1095 | A | 1 |
| CYP1112 | A | 8 |
| CYP1113 | A | 3 |
| CYP1115 | A | 1 |
| CYP112 | B | 1 |
| CYP1133 | D | 2 |
| CYP113 | AA | 1 |
|  | AB | 2 |
|  | AC | 1 |
|  | AD | 1 |
|  | AE | 1 |
|  | AF | 4 |
|  | AG | 1 |
|  | B | 2 |
|  | C | 4 |
|  | D | 9 |
|  | F | 1 |
|  | G | 1 |
|  | H | 1 |
|  | J | 2 |
|  | K | 11 |
|  | R | 2 |
|  | V | 1 |
|  | Y | 5 |
|  | Z | 2 |
| CYP1147 | A | 1 |
| CYP1151 | A | 1 |
| CYP116 | B | 1 |
|  | D | 2 |
|  | H | 1 |
| CYP1189 | A | 6 |
| CYP1190 | A | 3 |
| CYP1191 | A | 3 |
| CYP1192 | A | 6 |
| CYP1193 | A | 1 |
| CYP1194 | A | 2 |
| CYP1195 | A | 2 |
| CYP1196 | A | 1 |
| CYP1197 | A | 2 |
| CYP1198 | A | 3 |
| CYP1199 | A | 25 |
|  | B | 1 |
| CYP1200 | A | 5 |
| CYP1207 | A | 7 |
| CYP1215 | A | 6 |
| CYP1216 | A | 3 |
| CYP121 | A | 14 |
| CYP1222 | C | 1 |
|  | D | 1 |
| CYP1223 | A | 2 |
|  | B | 1 |
| CYP1228 | A | 1 |
| CYP122 | A | 3 |
| CYP1231 | A | 1 |
| CYP1232 | C | 2 |
|  | G | 2 |
| CYP1236 | A | 2 |
| CYP1237 | A | 4 |
|  | B | 1 |
|  | C | 1 |
| CYP1238 | A | 7 |
| CYP123 | D | 2 |
|  | H | 1 |
| CYP1240 | A | 3 |
|  | B | 21 |
|  | C | 5 |
| CYP1242 | A | 1 |
| CYP1248 | A | 1 |
| CYP124 | B | 9 |
|  | G | 50 |
|  | N | 1 |
| CYP1251 | A | 3 |
|  | C | 3 |
| CYP1253 | B | 3 |
| CYP125 | A | 104 |
|  | B | 1 |
|  | G | 1 |
|  | L | 1 |
| CYP1265 | A | 1 |
|  | B | 2 |
|  | C | 1 |
| CYP126 | B | 10 |
| CYP1274 | A | 3 |
| CYP1278 | B | 5 |
| CYP1279 | A | 6 |
| CYP1282 | B | 1 |
| CYP129 | B | 3 |
| CYP1301 | A | 2 |
| CYP130 | A | 3 |
| CYP1313 | A | 2 |
| CYP1316 | C | 1 |
| CYP1339 | B | 1 |
| CYP1341 | E | 2 |
|  | F | 2 |
| CYP134 | A | 5 |
| CYP135 | D | 1 |
|  | E | 2 |
|  | G | 1 |
| CYP1369 | A | 1 |
| CYP136 | C | 1 |
|  | D | 2 |
|  | E | 1 |
|  | F | 1 |
| CYP1373 | A | 2 |
| CYP1385 | A | 2 |
| CYP1386 | A | 1 |
|  | B | 1 |
| CYP1392 | A | 1 |
| CYP1394 | A | 1 |
|  | B | 1 |
| CYP139 | C | 1 |
| CYP1408 | B | 1 |
| CYP140 | C | 4 |
| CYP1416 | A | 2 |
|  | B | 1 |
| CYP1417 | A | 9 |
| CYP1418 | A | 1 |
| CYP1419 | A | 11 |
| CYP1420 | A | 3 |
| CYP1422 | A | 3 |
| CYP1423 | A | 3 |
| CYP1424 | A | 3 |
| CYP142 | F | 1 |
| CYP1432 | A | 1 |
| CYP143 | C | 3 |
| CYP1441 | A | 1 |
| CYP1448 | A | 1 |
| CYP144 | E | 1 |
| CYP1453 | B | 5 |
| CYP1455 | A | 1 |
| CYP1457 | B | 5 |
| CYP1459 | A | 1 |
|  | B | 6 |
| CYP145 | B | 7 |
|  | C | 6 |
|  | D | 2 |
|  | H | 1 |
|  | J | 2 |
|  | K | 1 |
| CYP1460 | B | 4 |
| CYP1469 | A | 1 |
|  | B | 3 |
|  | D | 1 |
| CYP146 | A | 8 |
|  | C | 2 |
| CYP147 | A | 2 |
|  | B | 25 |
|  | C | 2 |
|  | F | 73 |
|  | K | 4 |
|  | M | 1 |
| CYP1509 | A | 1 |
| CYP150 | A | 4 |
| CYP1510 | A | 1 |
| CYP1518 | A | 2 |
| CYP151 | A | 4 |
|  | B | 1 |
|  | D | 1 |
| CYP1524 | A | 1 |
| CYP1529 | A | 1 |
| CYP152 | D | 42 |
| CYP1530 | A | 3 |
| CYP1543 | A | 1 |
| CYP154 | A | 127 |
|  | AB | 1 |
|  | AD | 1 |
|  | AH | 2 |
|  | AJ | 4 |
|  | AK | 1 |
|  | AL | 2 |
|  | AM | 2 |
|  | AN | 1 |
|  | AP | 2 |
|  | AQ | 1 |
|  | AR | 1 |
|  | B | 16 |
|  | C | 164 |
|  | D | 76 |
|  | K | 12 |
|  | L | 5 |
|  | M | 12 |
|  | P | 3 |
|  | Q | 6 |
|  | R | 1 |
|  | S | 4 |
|  | T | 25 |
|  | U | 32 |
|  | V | 7 |
|  | Z | 2 |
| CYP155 | A | 19 |
| CYP1562 | A | 3 |
| CYP1568 | A | 1 |
| CYP156 | A | 20 |
|  | B | 120 |
|  | C | 24 |
|  | D | 2 |
|  | E | 5 |
|  | F | 2 |
|  | G | 26 |
|  | H | 20 |
|  | M | 1 |
|  | N | 1 |
|  | Q | 3 |
|  | R | 3 |
|  | S | 7 |
|  | T | 3 |
| CYP1571 | A | 1 |
| CYP1578 | A | 1 |
| CYP157 | A | 174 |
|  | B | 78 |
|  | C | 177 |
|  | F | 17 |
|  | G | 9 |
|  | H | 1 |
|  | J | 26 |
|  | K | 33 |
|  | P | 1 |
|  | V | 1 |
|  | W | 5 |
|  | X | 1 |
|  | Y | 1 |
|  | Z | 1 |
| CYP158 | A | 91 |
|  | B | 2 |
|  | C | 1 |
| CYP159 | A | 125 |
|  | F | 1 |
| CYP1607 | A | 1 |
| CYP1618 | A | 15 |
| CYP161 | A | 10 |
|  | B | 1 |
|  | C | 8 |
|  | D | 1 |
|  | E | 4 |
|  | F | 1 |
|  | G | 1 |
|  | H | 5 |
|  | N | 2 |
|  | NSF | 1 |
|  | S | 2 |
| CYP162 | A | 5 |
|  | B | 3 |
|  | C | 3 |
|  | T | 1 |
| CYP1634 | A | 1 |
| CYP163 | A | 6 |
|  | B | 50 |
|  | C | 8 |
|  | D | 4 |
|  | G | 1 |
|  | H | 3 |
|  | J | 5 |
| CYP164 | C | 1 |
| CYP1658 | A | 1 |
| CYP165 | B | 11 |
|  | E | 11 |
| CYP166 | A | 4 |
|  | C | 1 |
| CYP1694 | A | 3 |
|  | B | 1 |
| CYP170 | A | 57 |
|  | B | 18 |
| CYP171 | A | 3 |
| CYP1722 | A | 3 |
| CYP1759 | A | 1 |
| CYP177 | A | 1 |
|  | F | 1 |
| CYP178 | A | 2 |
|  | B | 3 |
| CYP179 | A | 13 |
|  | B | 1 |
| CYP180 | A | 54 |
|  | B | 22 |
| CYP1810 | A | 1 |
| CYP1813 | A | 18 |
| CYP181 | A | 8 |
| CYP1824 | A | 1 |
| CYP182 | A | 11 |
|  | B | 21 |
|  | C | 3 |
| CYP1832 | A | 2 |
| CYP183 | A | 11 |
|  | AR | 2 |
|  | AS | 1 |
|  | AV | 1 |
|  | AW | 1 |
|  | AX | 1 |
|  | AY | 1 |
|  | AZ | 1 |
|  | B | 9 |
|  | BA | 1 |
|  | BB | 1 |
|  | BC | 1 |
|  | BD | 1 |
|  | C | 1 |
|  | D | 1 |
|  | E | 4 |
|  | F | 3 |
|  | G | 8 |
|  | H | 8 |
|  | J | 10 |
|  | K | 1 |
|  | L | 4 |
|  | M | 4 |
|  | N | 1 |
|  | P | 1 |
|  | Q | 1 |
|  | R | 2 |
|  | S | 1 |
|  | T | 1 |
|  | U | 2 |
|  | V | 1 |
|  | W | 2 |
|  | X | 13 |
|  | Y | 1 |
| CYP184 | A | 33 |
| CYP1859 | A | 1 |
| CYP1866 | A | 1 |
| CYP186 | B | 8 |
|  | D | 1 |
|  | Q | 1 |
| CYP1882 | B | 1 |
| CYP188 | A | 4 |
| CYP1896 | A | 2 |
| CYP189 | A | 1 |
| CYP1914 | A | 1 |
| CYP1917 | A | 1 |
| CYP1920 | A | 1 |
| CYP1928 | A | 1 |
| CYP1929 | A | 1 |
| CYP1931 | A | 1 |
| CYP1940 | A | 1 |
| CYP1941 | A | 1 |
| CYP1943 | A | 1 |
| CYP194 | B | 4 |
| CYP1959 | B | 5 |
|  | C | 1 |
| CYP1972 | A | 4 |
| CYP197 | T | 2 |
| CYP1984 | A | 1 |
| CYP1994 | A | 1 |
| CYP1995 | B | 1 |
|  | C | 1 |
| CYP199 | A | 4 |
|  | R | 1 |
| CYP2006 | A | 1 |
| CYP2018 | B | 1 |
| CYP2027 | A | 5 |
| CYP2035 | A | 1 |
| CYP2045 | A | 2 |
|  | B | 1 |
| CYP204 | D | 2 |
| CYP2054 | A | 1 |
| CYP206 | D | 3 |
| CYP2073 | A | 1 |
| CYP2076 | A | 1 |
| CYP2080 | A | 1 |
|  | B | 1 |
| CYP208 | A | 17 |
| CYP2108 | A | 1 |
| CYP211 | A | 3 |
|  | D | 1 |
|  | F | 3 |
|  | K | 1 |
| CYP2134 | A | 1 |
|  | B | 1 |
| CYP215 | A | 1 |
| CYP217 | A | 1 |
| CYP2180 | A | 1 |
| CYP2189 | A | 1 |
| CYP2238 | A | 1 |
| CYP2266 | A | 3 |
| CYP2286 | A | 1 |
| CYP228 | A | 2 |
| CYP229 | K | 1 |
| CYP2307 | A | 2 |
| CYP2340 | B | 1 |
| CYP2349 | A | 1 |
| CYP2357 | B | 1 |
| CYP2365 | C | 1 |
| CYP2378 | A | 2 |
|  | B | 5 |
|  | C | 2 |
|  | D | 1 |
| CYP238 | B | 3 |
| CYP2427 | A | 3 |
| CYP244 | A | 3 |
| CYP245 | A | 8 |
|  | B | 1 |
| CYP246 | A | 3 |
| CYP247 | A | 8 |
| CYP251 | A | 23 |
|  | B | 1 |
|  | D | 1 |
|  | E | 1 |
|  | F | 3 |
|  | G | 6 |
|  | M | 2 |
|  | R | 1 |
|  | S | 1 |
|  | T | 1 |
|  | U | 1 |
| CYP253 | A | 1 |
|  | B | 1 |
| CYP2540 | A | 1 |
| CYP255 | A | 2 |
| CYP256 | A | 1 |
| CYP268 | A | 1 |
|  | D | 1 |
|  | H | 2 |
|  | NSF | 1 |
| CYP2723 | A | 2 |
| CYP274 | B | 1 |
|  | C | 1 |
| CYP282 | A | 1 |
| CYP283 | A | 5 |
| CYP285 | A | 13 |
|  | B | 3 |
|  | D | 1 |
|  | G | 1 |
|  | H | 1 |
| CYP291 | D | 1 |
| CYP294 | A | 2 |
|  | B | 1 |
| CYP295 | B | 1 |
| CYP298 | B | 1 |
| **253** | **698** | **5460** |

Table S4. Secondary metabolite biosynthetic gene clusters (BGCs) and P450s that are associated with BGCs in *Streptomyces* species. Standard gene cluster abbreviation terminology available at anti-SMASH database [2] was used in the table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Specie name | P450 count | BGCs | No. of P450s part of BGCs | P450 name | BGC type |
| *Streptomyces coelicolor* | 18 | 27 | 3 | CYP158A2 | T3pks |
|  |  |  |  | CYP170A1 | Terpene |
|  |  |  |  | CYP105N1 | T3pks-Terpene-Nrps |
| *Streptomyces avermitilis* MA-4680 | 52 | 37 | 17 | CYP105D6 | T1pks |
|  |  |  |  | CYP105P1 | T1pks |
|  |  |  |  | CYP147B1 | Nrps |
|  |  |  |  | CYP178A1 | Nrps-T1pks-Otherks |
|  |  |  |  | CYP178A3P | Nrps-T1pks-Otherks |
|  |  |  |  | CYP171A1 | T1pks |
|  |  |  |  | CYP180A1 | Terpene |
|  |  |  |  | CYP107Y1 | T2pks-T1pks-Otherks |
|  |  |  |  | CYP181A1 | T2pks-T1pks-Otherks |
|  |  |  |  | CYP107W1 | T1pks |
|  |  |  |  | CYP105B23 | T1pks |
|  |  |  |  | CYP183A1 | Terpene |
|  |  |  |  | CYP170A2 | Terpene |
|  |  |  |  | CYP107V1 | Butyrolactone-Otherks |
|  |  |  |  | CYP107U2 | Butyrolactone-Otherks |
|  |  |  |  | CYP158A3 | T3pks |
|  |  |  |  | CYP105R1 | T1pks |
| *Streptomyces griseus* | 28 | 36 | 11 | CYP105D1 | T1pks-Nrps |
|  |  |  |  | CYP124G2 | Melanin |
|  |  |  |  | CYP162C1 | T1pks-Nrps |
|  |  |  |  | CYP208A1 | T1pks-Nrps |
|  |  |  |  | CYP154M2 | T1pks-Nrps |
|  |  |  |  | CYP107BX5 | T1pks-Nrps |
|  |  |  |  | CYP107BY1 | Nrps |
|  |  |  |  | CYP163B5 | Ladderane-Arylpolyene-Nrps |
|  |  |  |  | CYP107BZ1 | Ladderane-Arylpolyene-Nrps |
|  |  |  |  | CYP107F4 | T3pks |
|  |  |  |  | CYP107CA2 | Transatpks-T1pks-Otherks-Nrps |
| *Streptomyces globisporus* | 23 | 27 | 5 | CYP107F4 | T3pks |
|  |  |  |  | CYP1373A2 | Arylpolyene-Ladderane |
|  |  |  |  | CYP107BX10 | Bacteriocin-T1pks-Nrps |
|  |  |  |  | CYP124G14 | Melanin |
|  |  |  |  | CYP105D30 | T1pks-Nrps |
| *Streptomyces scabiei* 87.22 | 30 | 32 | 11 | CYP154A4 | Terpene |
|  |  |  |  | CYP246A1 | Lantipeptide-Nrps |
|  |  |  |  | CYP1048A1 | Lantipeptide-Nrps |
|  |  |  |  | CYP156D1 | Lantipeptide-Nrps |
|  |  |  |  | CYP154L1 | Lantipeptide-Nrps |
|  |  |  |  | CYP107AM1 | T1pks-Nrps |
|  |  |  |  | CYP283A1 | Bacteriocin-Bottromycin |
|  |  |  |  | CYP107AL1 | Butyrolactone-T1pks-Otherks |
|  |  |  |  | CYP157C5 | Terpene |
|  |  |  |  | CYP156B2 | Indole-T1pks |
|  |  |  |  | CYP107AK1 | T1pks |
| *Streptomyces* sp. Sirex AA-E | 24 | 22 | 8 | CYP124G3 | Melanin |
|  |  |  |  | CYP105N1 | Nrps |
|  |  |  |  | CYP181A1 | T2pks-T1pks-Otherks |
|  |  |  |  | CYP107Y1 | T2pks-T1pks-Otherks |
|  |  |  |  | CYP105AZ1 | T1pks |
|  |  |  |  | CYP105AZ2 | T1pks |
|  |  |  |  | CYP107BX4 | T1pks-Nrps |
|  |  |  |  | CYP105A4 | T2pks-Butyrolactone-Nrps |
| *Streptomyces violaceusniger* Tu 4113 | 50 | 41 | 24 | CYP107BW1 | Terpene |
|  |  |  |  | CYP1013A2 | Terpene |
|  |  |  |  | CYP162A3 | Nrps |
|  |  |  |  | CYP107CK1 | Nrps |
|  |  |  |  | CYP124B3 | T1pks |
|  |  |  |  | CYP107BW1 | T1pks |
|  |  |  |  | CYP105AX1 | T1pks |
|  |  |  |  | CYP183F2; | Otherks |
|  |  |  |  | CYP105AV1 | Otherks |
|  |  |  |  | CYP105AQ2 | Bacteriocin-Lantipeptide-T1pks-Otherks-Nrps |
|  |  |  |  | CYP155A5 | Bacteriocin-Lantipeptide-T1pks-Otherks-Nrps |
|  |  |  |  | CYP107E9 | Bacteriocin-Lantipeptide-T1pks-Otherks-Nrps |
|  |  |  |  | CYP105AN3 | Bacteriocin-Lantipeptide-T1pks-Otherks-Nrps |
|  |  |  |  | CYP107AD1 | T1pks |
|  |  |  |  | CYP105AY1 | Lantipeptide-T1pks-Nrps |
|  |  |  |  | CYP105U1 | T1pks |
|  |  |  |  | CYP156C9 | Terpene |
|  |  |  |  | CYP125A20 | Terpene |
|  |  |  |  | CYP107U9 | Indole |
|  |  |  |  | CYP156B6 | Indole |
|  |  |  |  | CYP163B4 | Ladderane-Arylpolyene-Nrps |
|  |  |  |  | CYP107CF1 | Ladderane-Arylpolyene-Nrps |
|  |  |  |  | CYP107CE1 | Ladderane-Arylpolyene-Nrps |
|  |  |  |  | CYP147F5 | Terpene |
| *Streptomyces cattleya* NRRL 8057 | 40 | 24 | 10 | CYP107AS | T1pks |
|  |  |  |  | CYP107CR1 | T1pks |
|  |  |  |  | CYP107AE6 | Lantipeptide |
|  |  |  |  | CYP184A4 | T1pks-Nrps |
|  |  |  |  | CYP107CS1 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP107W2 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP158A13 | T3pks-Terpene |
|  |  |  |  | CYP105AA10 | Lantipeptide |
|  |  |  |  | CYP107CT1 | T1pks-Butyrolactone-Nrps |
|  |  |  |  | CYP105B25 | T1pks-Butyrolactone-Nrps |
| *Streptomyces cattleya* NRRL 8058 = DSM 46488 | 41 | 25 | 11 | CYP107AS | T1pks |
|  |  |  |  | CYP1274A1 | T1pks |
|  |  |  |  | CYP107CR1 | T1pks |
|  |  |  |  | CYP107AE6 | Lantipeptide |
|  |  |  |  | CYP184A4 | T1pks-Nrps |
|  |  |  |  | CYP107CS1 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP107W2 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP158A13 | T3pks-Terpene |
|  |  |  |  | CYP105AA10 | Lantipeptide |
|  |  |  |  | CYP107CT1 | T1pks-Butyrolactone-Nrps |
|  |  |  |  | CYP105B25 | T1pks-Butyrolactone-Nrps |
| *Streptomyces pratensis/flavogriseus* IAF 45 | 29 | 26 | 11 | CYP247A3 | Blactam-T1pks-Nrps |
|  |  |  |  | CYP107BX5 | Blactam-T1pks-Nrps |
|  |  |  |  | CYP105AZ2 | T1pks |
|  |  |  |  | CYP105AZ1 | T1pks |
|  |  |  |  | CYP1029A2 | T1pks-Nrps |
|  |  |  |  | CYP1423A2 | T1pks-Nrps |
|  |  |  |  | CYP285A2 | T1pks-Nrps |
|  |  |  |  | CYP157K1 | Terpene |
|  |  |  |  | CYP124G4 | Melanin |
|  |  |  |  | CYP1035A4 | Nrps |
|  |  |  |  | CYP156B9 | Nrps |
| *Streptomyces bingchenggensis* | 49 | 47 | 17 | CYP183C1 | Bacteriocin-T1pks-Nrps |
|  |  |  |  | CYP183D1 | Bacteriocin-T1pks-Nrps |
|  |  |  |  | CYP183E1 | Terpene |
|  |  |  |  | CYP1039A1 | Bacteriocin-Lantipeptide-T1pks |
|  |  |  |  | CYP105H6 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP107BK1 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP171A2 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP107BM3 | Nrps |
|  |  |  |  | CYP157B13 | Nrps |
|  |  |  |  | CYP113G1 | T1pks-Nrps |
|  |  |  |  | CYP154P1 | Other |
|  |  |  |  | CYP1037A1 | T1pks-Nrps |
|  |  |  |  | CYP268A4 | Otherks |
|  |  |  |  | CYP124B2 | T1pks |
|  |  |  |  | CYP163C1 | Otherks-Nrps |
|  |  |  |  | CYP161C1 | Transatpks-Terpene-Nrps |
|  |  |  |  | CYP183A2 | Transatpks-Terpene-Nrps |
| *Streptomyces hygroscopicus* subsp. *jinggangensis* 5008 | 38 | 38 | 10 | CYP105B22 | T1pks |
|  |  |  |  | CYP107X1 | Terpene |
|  |  |  |  | CYP163B6 | Nrps |
|  |  |  |  | CYP285B1 | Nrps |
|  |  |  |  | CYP105AZ2 | T1pks |
|  |  |  |  | CYP105AZ1 | T1pks |
|  |  |  |  | CYP158A14 | T3pks |
|  |  |  |  | CYP170A10 | Terpene |
|  |  |  |  | CYP180A6 | Terpene |
|  |  |  |  | CYP113K3 | Bacteriocin-Nrps |
| *Streptomyces hygroscopicus* subsp. *jinggangensis* TL01 | 37 | 38 | 10 | CYP105B22 | T1pks |
|  |  |  |  | CYP107X1 | Terpene |
|  |  |  |  | CYP163B6 | Nrps |
|  |  |  |  | CYP285B1 | Nrps |
|  |  |  |  | CYP105AZ2 | T1pks |
|  |  |  |  | CYP105AZ1 | T1pks |
|  |  |  |  | CYP158A14 | T3pks |
|  |  |  |  | CYP170A10 | Terpene |
|  |  |  |  | CYP180A6 | Terpene |
|  |  |  |  | CYP113K3 | Bacteriocin-Nrps |
| *Streptomyces venezuelae* | 23 | 30 | 10 | CYP157C14 | Lantipeptide-Terpene |
|  |  |  |  | CYP245A3 | Indole |
|  |  |  |  | CYP121A2 | Other |
|  |  |  |  | CYP158A5 | T3pks |
|  |  |  |  | CYP105AC2 | Other |
|  |  |  |  | CYP180A5 | Other |
|  |  |  |  | CYP1056A1 | Ladderane-Nrps |
|  |  |  |  | CYP107CL1 | Ladderane-Nrps |
|  |  |  |  | CYP162A4 | Ladderane-Nrps |
|  |  |  |  | CYP163B5 | Ladderane-Nrps |
| *Streptomyces davawensis* | 32 | 31 | 17 | CYP105BA1 | T1pks-Nrps |
|  |  |  |  | CYP1005B2 | Other |
|  |  |  |  | CYP179B1 | Bacteriocin-Lantipeptide |
|  |  |  |  | CYP183K1 | Terpene |
|  |  |  |  | CYP179A3 | Lantipeptide-T1pks-Nrps |
|  |  |  |  | CYP180A6 | Butyrolactone-Terpene |
|  |  |  |  | CYP107CN1 | Bacteriocin-Oligosaccharide |
|  |  |  |  | CYP107CP1 | Bacteriocin-Oligosaccharide |
|  |  |  |  | CYP170A9 | Terpene-Nrps |
|  |  |  |  | CYP113J1 | T1pks-Nrps |
|  |  |  |  | CYP113J2 | T1pks-Nrps |
|  |  |  |  | CYP162A5 | T1pks-Nrps |
|  |  |  |  | CYP125A22 | Otherks-Nrps |
|  |  |  |  | CYP163C2 | Otherks-Nrps |
|  |  |  |  | CYP158A7 | T3pks |
|  |  |  |  | CYP1041A2 | Terpene-T3pks-Cyanobactin-Nrps |
|  |  |  |  | CYP1058A1 | Terpene-T3pks-Cyanobactin-Nrps |
| *Streptomyces albus* J1074 | 18 | 22 | 7 | CYP107BX2 | T1pks-Nrps |
|  |  |  |  | CYP1420A1 | Otherks |
|  |  |  |  | CYP146A3 | Nrps |
|  |  |  |  | CYP170B5 | Terpene |
|  |  |  |  | CYP154A1 | Lantipeptide |
|  |  |  |  | CYP107F4 | T3pks |
|  |  |  |  | CYP105H3 | Lantipeptide-T1pks-Nrps |
| *Streptomyces albus* DSM 41398 | 25 | 35 | 10 | CYP105BK3 | Nrps |
|  |  |  |  | CYP107EJ1 | T1pks-Butyrolactone-Nrps |
|  |  |  |  | CYP113Y1 | T1pks-Otherks |
|  |  |  |  | CYP105DB1 | T1pks-Otherks |
|  |  |  |  | CYP107DU1 | T1pks |
|  |  |  |  | CYP170B5 | Terpene |
|  |  |  |  | CYP107T3 | Arylpolyene-Nrps |
|  |  |  |  | CYP107KW1 | Arylpolyene |
|  |  |  |  | CYP1193A1 | T2pks-Otherks |
|  |  |  |  | CYP1194A1 | T1pks-Nrps |
| *Streptomyces* sp. PAMC 26508 | 29 | 28 | 12 | CYP156B9 | Nrps |
|  |  |  |  | CYP1035A4 | Nrps |
|  |  |  |  | CYP124G4 | Melanin |
|  |  |  |  | CYP157K1 | Terpene |
|  |  |  |  | CYP285A2 | T1pks-Nrps |
|  |  |  |  | CYP1423A2 | T1pks-Nrps |
|  |  |  |  | CYP1029A2 | T1pks-Nrps |
|  |  |  |  | CYP105AZ1 | T1pks |
|  |  |  |  | CYP105AZ2 | T1pks |
|  |  |  |  | CYP1057A1 | Bacteriocin-Otherks |
|  |  |  |  | CYP107BX5 | Blactam-T1pks-Nrps |
|  |  |  |  | CYP247A3 | Blactam-T1pks-Nrps |
| *Streptomyces fulvissimus* | 19 | 34 | 3 | CYP107F4 | T3pks |
|  |  |  |  | CYP107BX3 | T1pks-Nrps |
|  |  |  |  | CYP124G2 | Melanin |
| *Streptomyces collinus* | 34 | 32 | 13 | CYP107CQ1 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP105AJ2 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP1059A1 | Bacteriocin |
|  |  |  |  | CYP105B21 | Bacteriocin |
|  |  |  |  | CYP158A2 | T3pks |
|  |  |  |  | CYP170A10 | Terpene |
|  |  |  |  | CYP105BC1 | T1pks |
|  |  |  |  | CYP105AH2 | T1pks |
|  |  |  |  | CYP180A6 | Terpene |
|  |  |  |  | CYP183A4 | Terpene |
|  |  |  |  | CYP113K3 | Bacteriocin-Nrps |
|  |  |  |  | CYP105AJ2 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP107CQ1 | Transatpks-T1pks-Nrps |
| *Streptomyces rapamycinicus* | 63 | 47 | 30 | CYP105AX1 | T1pks |
|  |  |  |  | CYP124B3 | T1pks |
|  |  |  |  | CYP161D1 | T1pks-Nrps |
|  |  |  |  | CYP105AT1 | T1pks-Nrps |
|  |  |  |  | CYP107L12 | T1pks-Nrps |
|  |  |  |  | CYP1013A2 | Terpene |
|  |  |  |  | CYP105AU1 | T1pks-Nrps |
|  |  |  |  | CYP147F5 | Terpene |
|  |  |  |  | CYP107CE1 | Nrps-Arylpolyene-Ladderane |
|  |  |  |  | CYP107CF1 | Nrps-Arylpolyene-Ladderane |
|  |  |  |  | CYP163B4 | Nrps-Arylpolyene-Ladderane |
|  |  |  |  | CYP156B6 | Indole |
|  |  |  |  | CYP107U9 | Indole |
|  |  |  |  | CYP125A20 | Terpene |
|  |  |  |  | CYP156C8 | Terpene |
|  |  |  |  | CYP194B3 | T1pks |
|  |  |  |  | CYP194B4 | T1pks |
|  |  |  |  | CYP107BS2 | T1pks |
|  |  |  |  | CYP105AW1 | T1pks-Nrps |
|  |  |  |  | CYP122A4 | T1pks-Nrps |
|  |  |  |  | CYP107G2 | T1pks-Nrps |
|  |  |  |  | CYP183F1 | Otherks |
|  |  |  |  | CYP107B3 | T1pks-Arylpolyene-Ladderane |
|  |  |  |  | CYP105AY1 | T1pks-Nrps |
|  |  |  |  | CYP107AD1 | T1pks |
|  |  |  |  | CYP105AN3 | Bacteriocin-Nrps-Lantipeptide-T1pks-Otherks |
|  |  |  |  | CYP107E9 | Bacteriocin-Nrps-Lantipeptide-T1pks-Otherks |
|  |  |  |  | CYP155A5 | Bacteriocin-Nrps-Lantipeptide-T1pks-Otherks |
|  |  |  |  | CYP105AV1 | Terpene |
|  |  |  |  | CYP107CD1 | T1pks |
| *Streptomyces albulus NK660* | 64 | 33 | 20 | CYP107L43 | Butyrolactone |
|  |  |  |  | CYP1190A1 | Other |
|  |  |  |  | CYP1192A1 | Other |
|  |  |  |  | CYP1191A1 | T1pks-Nrps |
|  |  |  |  | CYP107EB1 | Nrps |
|  |  |  |  | CYP163B9 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP105AA13 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP105H9 | T1pks |
|  |  |  |  | CYP161A7 | T1pks |
|  |  |  |  | CYP107B6 | Transatpks-Nrps |
|  |  |  |  | CYP1189A1 | Transatpks-Nrps |
|  |  |  |  | CYP1189A2 | Transatpks-Nrps |
|  |  |  |  | CYP107F9 | T3pks-Otherks-Butyrolactone-Nrps |
|  |  |  |  | CYP163C3 | T3pks-Otherks-Butyrolactone-Nrps |
|  |  |  |  | CYP113D6 | T2pks-Oligosaccharide-Nucleoside-Nrps |
|  |  |  |  | CYP157C28 | T2pks-Oligosaccharide-Nucleoside-Nrps |
|  |  |  |  | CYP107AE9 | Butyrolactone |
|  |  |  |  | CYP251G1 | Lantipeptide |
|  |  |  |  | CYP161A6 | Terpene-T1pks |
|  |  |  |  | CYP105H1 | Terpene-T1pks |
| *Streptomyces albulus ZPM* | 68 | 35 | 25 | CYP107EL1 | Nrps |
|  |  |  |  | CYP163B8 | Nrps |
|  |  |  |  | CYP107EA2 | Nrps |
|  |  |  |  | CYP107L43 | Butyrolactone |
|  |  |  |  | CYP1190A1 | Other |
|  |  |  |  | CYP147F21 | Other |
|  |  |  |  | CYP1060A2 | Other |
|  |  |  |  | CYP1192A1 | Other |
|  |  |  |  | CYP1191A1 | T1pks |
|  |  |  |  | CYP163B9 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP105AA13 | Transatpks-T1pks-Nrps |
|  |  |  |  | CYP105H9 | T1pks |
|  |  |  |  | CYP1189A1 | Transatpks-Nrps |
|  |  |  |  | CYP1189A2 | Transatpks-Nrps |
|  |  |  |  | CYP107F9 | T3pks |
|  |  |  |  | CYP163C3 | Otherks-Butyrolactone-Nrps |
|  |  |  |  | CYP113D6 | T2pks-Oligosaccharide-Nucleoside-Nrps |
|  |  |  |  | CYP157C28 | T2pks-Oligosaccharide-Nucleoside-Nrps |
|  |  |  |  | CYP107AE9 | Butyrolactone |
|  |  |  |  | CYP251G1 | Lantipeptide |
|  |  |  |  | CYP161A6 | T1pks |
|  |  |  |  | CYP105H1 | T1pks |
|  |  |  |  | CYP107EA2 | Nrps |
|  |  |  |  | CYP163B8 | Nrps |
|  |  |  |  | CYP107EL1 | Nrps |
| *Streptomyces lividans* | 20 | 27 | 3 | CYP105N1 | T3pks-Terpene-Nrps |
|  |  |  |  | CYP170A1 | Terpene |
|  |  |  |  | CYP158A2 | T3pks |
| *Streptomyces glaucescens* | 18 | 25 | 7 | CYP178B1 | Other |
|  |  |  |  | CYP163B10 | Nrps |
|  |  |  |  | CYP170A22 | Terpene |
|  |  |  |  | CYP180A9 | Terpene |
|  |  |  |  | CYP107AH4 | T2pks |
|  |  |  |  | CYP157K3 | Terpene |
|  |  |  |  | CYP113K5 | Nrps |
| *Streptomyces vietnamensis* | 30 | 27 | 7 | CYP121A2 | Other |
|  |  |  |  | CYP1029A3 | T2pks-Nrps |
|  |  |  |  | CYP1423A1 | T2pks-Nrps |
|  |  |  |  | CYP285A5 | T2pks-Nrps |
|  |  |  |  | CYP107LD1 | Lantipeptide |
|  |  |  |  | CYP154C11 | T2pks-Lantipeptide-Terpene |
|  |  |  |  | CYP157A19 | T2pks-Lantipeptide-Terpene |
| *Streptomyces* sp. 769 | 59 | 36 | 21 | CYP105BA3 | Butyrolactone-T1pks-Nrps |
|  |  |  |  | CYP107EM1 | T1pks-Arylpolyene |
|  |  |  |  | CYP1198A1 | T1pks-Arylpolyene |
|  |  |  |  | CYP105BV1 | T1pks-Arylpolyene |
|  |  |  |  | CYP157C31 | Terpene |
|  |  |  |  | CYP105H1 | T1pks |
|  |  |  |  | CYP161A6 | T1pks |
|  |  |  |  | CYP107AE10 | Butyrolactone |
|  |  |  |  | CYP107F9 | T3pks |
|  |  |  |  | CYP105DE1 | T1pks |
|  |  |  |  | CYP105BS1 | T1pks |
|  |  |  |  | CYP1197A1 | T1pks |
|  |  |  |  | CYP184A8 | Thiopeptide-T1pks |
|  |  |  |  | CYP1196A1 | Nrps |
|  |  |  |  | CYP107CA2 | Transatpks-Nrps |
|  |  |  |  | CYP154D14 | Transatpks-Nrps |
|  |  |  |  | CYP107L42 | Lantipeptide |
|  |  |  |  | CYP163B | Lantipeptide-Nrps |
|  |  |  |  | CYP1278B1 | Lantipeptide-Nrps |
|  |  |  |  | CYP105H8 | Terpene-T1pks |
|  |  |  |  | CYP105BA3 | T1pks-Butyrolactone-Nrps |
| *Streptomyces cyaneogriseus* | 30 | 29 | 9 | CYP107L35 | T1pks |
|  |  |  |  | CYP105BT1 | T1pks |
|  |  |  |  | CYP170A17 | Terpene |
|  |  |  |  | CYP107W3 | T1pks |
|  |  |  |  | CYP105AC8 | Siderophore |
|  |  |  |  | CYP161C4 | Terpene |
|  |  |  |  | CYP183A4 | Terpene |
|  |  |  |  | CYP157K4 | Terpene |
|  |  |  |  | CYP105AC17 | T3pks-Fused-Nrps |
| *Streptomyces xiamenensis* 318 | 19 | 20 | 7 | CYP157C32 | Terpene |
|  |  |  |  | CYP1029A4 | T1pks-Nrps |
|  |  |  |  | CYP285A6 | T1pks-Nrps |
|  |  |  |  | CYP1223B1 | Lantipeptide-Linaridin |
|  |  |  |  | CYP107LF1 | Linaridin-T1pks-Lassopeptide-Nrps |
|  |  |  |  | CYP183W1 | Terpene |
|  |  |  |  | CYP107F11 | T3pks-Terpene-Nrps |
| *Streptomyces* sp. Mg1 | 37 | 23 | 11 | CYP154Q2 | Terpene-Nrps |
|  |  |  |  | CYP157C26 | Lantipeptide-Terpene |
|  |  |  |  | CYP134A3 | Lantipeptide-Terpene |
|  |  |  |  | CYP105DF1 | Other |
|  |  |  |  | CYP2238A1 | Thiopeptide |
|  |  |  |  | CYP1048A3 | Thiopeptide |
|  |  |  |  | CYP154D15 | Terpene-Otherks |
|  |  |  |  | CYP157C27 | Terpene-Otherks |
|  |  |  |  | CYP105L3 | T1pks |
|  |  |  |  | CYP1995C1 | T1pks |
|  |  |  |  | CYP251F1 | Terpene |
| *Streptomyces* sp. CNQ-509 | 16 | 28 | 12 | CYP105AC15 | T1pks-Transatpks-Terpene |
|  |  |  |  | CYP107LC1 | Nrps |
|  |  |  |  | CYP105BK2 | Nrps |
|  |  |  |  | CYP1064A5 | T2pks |
|  |  |  |  | CYP1341E2 | Fused |
|  |  |  |  | CYP157A20 | T3pks |
|  |  |  |  | CYP154C13 | T3pks |
|  |  |  |  | CYP123D1 | T3pks-Terpene-Otherks |
|  |  |  |  | CYP105BA2 | T1pks-Nrps |
|  |  |  |  | CYP165E2; | T3pks-Nrps |
|  |  |  |  | CYP165B8 | T3pks-Nrps |
|  |  |  |  | CYP157C32 | Terpene |
| *Streptomyces ambofaciens* | 19 | 26 | 9 | CYP154K2 | T2pks-Butyrolactone |
|  |  |  |  | CYP156B15 | Indole |
|  |  |  |  | CYP170A1 | Terpene |
|  |  |  |  | CYP107EP1 | Oligosaccharide-T1pks-Nrps |
|  |  |  |  | CYP113B4 | Oligosaccharide-T1pks-Nrps |
|  |  |  |  | CYP157K5 | Terpene |
|  |  |  |  | CYP107EF1 | T1pks |
|  |  |  |  | CYP107EP1 | T1pks |
|  |  |  |  | CYP154K2 | T2pks-Butyrolactone |
| *Streptomyces pristinaespiralis* HCCB 10218 | 23 | 21 | 8 | CYP154A22 | Oligosaccharide-Ectoine-T2pks-Nrps-T1pks-Otherks |
|  |  |  |  | CYP107EH1 | Oligosaccharide-Ectoine-T2pks-Nrps-T1pks-Otherks |
|  |  |  |  | CYP113C2 | Oligosaccharide-Ectoine-T2pks-Nrps-T1pks-Otherks |
|  |  |  |  | CYP124G6 | Melanin |
|  |  |  |  | CYP154B6 | T2pks-Oligosaccharide-Nrps-Otherks |
|  |  |  |  | CYP113C2 | T2pks-Oligosaccharide-Nrps-Otherks |
|  |  |  |  | CYP107EH1 | T2pks-Oligosaccharide-Nrps-Otherks |
|  |  |  |  | CYP154A22 | T1pks-Ectoine-Otherks |
| *Streptomyces* sp. CFMR 7 | 24 | 38 | 5 | CYP124G2 | Melanin |
|  |  |  |  | CYP107BX7 | Bacteriocin-T1pks-Nrps |
|  |  |  |  | CYP154A18 | Nrps |
|  |  |  |  | CYP107F4 | T3pks |
|  |  |  |  | CYP105D20 | Arylpolyene |
| *Streptomyces* sp. CdTB01 | 26 | 32 | 5 | CYP145C3 | Indole |
|  |  |  |  | CYP180A29 | Terpene |
|  |  |  |  | CYP170A19 | Terpene |
|  |  |  |  | CYP157C39 | Terpene |
|  |  |  |  | CYP183B5 | Terpene |
| *Streptomyces reticuli* | 47 | 26 | 12 | CYP166A3 | T1pks |
|  |  |  |  | CYP113K6 | Bacteriocin-Nrps |
|  |  |  |  | CYP162B2 | Other |
|  |  |  |  | CYP121A5 | Other |
|  |  |  |  | CYP154U7 | Other |
|  |  |  |  | CYP158A14 | T2pks-T3pks-Otherks |
|  |  |  |  | CYP107LB1 | Nrps |
|  |  |  |  | CYP105BK2 | Nrps |
|  |  |  |  | CYP1037A2 | Butyrolactone-Amglyccycl-T1pks-Nrps |
|  |  |  |  | CYP170A23 | Terpene |
|  |  |  |  | CYP2045A1 | Nrps |
|  |  |  |  | CYP180A28 | Terpene |
| *Streptomyces* sp. 4F | 16 | 19 | 3 | CYP105DD1 | Nrps-T2pks-Otherks-T1pks-Phenazine |
|  |  |  |  | CYP170A16 | Terpene |
|  |  |  |  | CYP105DD1 | T2pks-Otherks |
| *Streptomyces leeuwenhoekii* C34(2013) | 36 | 31 | 23 | CYP107L35 | T3pks-T1pks-Nrps |
|  |  |  |  | CYP105BT1 | T3pks-T1pks-Nrps |
|  |  |  |  | CYP154B4 | T3pks-T1pks-Nrps |
|  |  |  |  | CYP157K4 | Terpene |
|  |  |  |  | CYP102B20 | Lassopeptide |
|  |  |  |  | CYP113K3 | Nrps |
|  |  |  |  | CYP107EG1 | Nrps-Transatpks-Terpene-Otherks |
|  |  |  |  | CYP105BR1 | Nrps-Transatpks-Terpene-Otherks |
|  |  |  |  | CYP107Q3 | Terpene-T1pks |
|  |  |  |  | CYP105D28 | Terpene-T1pks |
|  |  |  |  | CYP166A2 | Terpene-T1pks |
|  |  |  |  | CYP154Z1 | T1pks |
|  |  |  |  | CYP1416A1 | T1pks |
|  |  |  |  | CYP2266A2 | T1pks |
|  |  |  |  | CYP183A4 | Terpene |
|  |  |  |  | CYP161C4 | Terpene |
|  |  |  |  | CYP107L33 | T1pks-Siderophore |
|  |  |  |  | CYP105AC8 | T1pks-Siderophore |
|  |  |  |  | CYP107F10 | T3pks |
|  |  |  |  | CYP170A17 | Terpene |
|  |  |  |  | CYP1418A1 | T1pks |
|  |  |  |  | CYP1031A3 | T1pks |
|  |  |  |  | CYP107AM11 | Other |
| *Streptomyces rubrolavendulae* | 20 | 24 | 14 | CYP251A3 | Terpene |
|  |  |  |  | CYP157C21 | Terpene |
|  |  |  |  | CYP158A20 | Terpene |
|  |  |  |  | CYP245A6 | Indole |
|  |  |  |  | CYP244A3 | Indole |
|  |  |  |  | CYP159A23 | Nrps |
|  |  |  |  | CYP157B32 | Nrps |
|  |  |  |  | CYP183H3 | Thiopeptide |
|  |  |  |  | CYP183G3 | Thiopeptide |
|  |  |  |  | CYP251F2 | Terpene |
|  |  |  |  | CYP1207A10 | Lantipeptide-Nrps |
|  |  |  |  | CYP158A19 | T3pks-Butyrolactone |
|  |  |  |  | CYP107E12 | Nrps |
|  |  |  |  | CYP285D1 | Nrps |
| *Streptomyces parvulus* | 25 | 21 | 5 | CYP156B15 | Indole |
|  |  |  |  | CYP183J3 | Indole |
|  |  |  |  | CYP170A1 | Terpene |
|  |  |  |  | CYP157K6 | Terpene |
|  |  |  |  | CYP105D33 | Terpene |
| *Streptomyces* sp. SAT1 | 25 | 27 | 11 | CYP1618A1 | Phosphonate-Nrps |
|  |  |  |  | CYP180B6 | Thiopeptide-Terpene |
|  |  |  |  | CYP105B73 | Butyrolactone |
|  |  |  |  | CYP183X4 | Terpene |
|  |  |  |  | CYP158A25 | T3pks |
|  |  |  |  | CYP107P31 | Other |
|  |  |  |  | CYP170A18 | Terpene |
|  |  |  |  | CYP158A24 | Bacteriocin-T1pks |
|  |  |  |  | CYP107E32 | Phosphoglycolipid |
|  |  |  |  | CYP1722A3 | Bacteriocin-Terpene-Nrps |
|  |  |  |  | CYP1618A2 | Bacteriocin-Terpene-Nrps |
| *Streptomyces clavuligerus* | 64 | 26 | 11 | CYP105BG1 | Terpene-T1pks-Nrps |
|  |  |  |  | CYP163B7 | Terpene-T1pks-Nrps |
|  |  |  |  | CYP251E1 | Terpene-T1pks-Nrps |
|  |  |  |  | CYP107F7 | T3pks |
|  |  |  |  | CYP107NSF1 | Indole-Terpene-Nrps |
|  |  |  |  | CYP107BY2 | Indole-Terpene-Nrps |
|  |  |  |  | CYP136E1 | T1pks-Nrps |
|  |  |  |  | CYP105M1 | Blactam-Nrps |
|  |  |  |  | CYP124G5 | Melanin |
|  |  |  |  | CYP107AL2 | T1pks-Butyrolactone-Otherks |
|  |  |  |  | CYP154A14 | T1pks |
| *Streptomyces griseochromogenes* | 46 | 49 | 12 | CYP113V2 | Thiopeptide-Bacteriocin |
|  |  |  |  | CYP170A10 | Terpene |
|  |  |  |  | CYP247A3 | T1pks-Nrps |
|  |  |  |  | CYP105BC2 | T1pks |
|  |  |  |  | CYP180A26 | Terpene |
|  |  |  |  | CYP208A9 | Lantipeptide-T1pks-Nrps |
|  |  |  |  | CYP107BK3 | Lantipeptide-T1pks-Nrps |
|  |  |  |  | CYP107KX1 | Nrps |
|  |  |  |  | CYP121A4 | Other |
|  |  |  |  | CYP154U6 | Other |
|  |  |  |  | CYP183X2 | Terpene |
|  |  |  |  | CYP158A21 | Phosphonate-T3pks-Nrps-Ladderane |
| *Streptomyces* sp. S10(2016) | 20 | 27 | 4 | CYP154K3 | Butyrolactone |
|  |  |  |  | CYP170A15 | Terpene |
|  |  |  |  | CYP163B15 | Nrps |
|  |  |  |  | CYP113Z1 | Nrps |
| *Streptomyces lincolnensis* | 24 | 34 | 9 | CYP105B41 | Ladderane |
|  |  |  |  | CYP163A5 | Nrps |
|  |  |  |  | CYP1424A1 | Nrps |
|  |  |  |  | CYP158A15 | T3pks |
|  |  |  |  | CYP183Y1 | Terpene |
|  |  |  |  | CYP157C22 | Terpene |
|  |  |  |  | CYP170A20 | Terpene |
|  |  |  |  | CYP107L32 | Nrps-Siderophore |
|  |  |  |  | CYP105B41 | T2pks |
| *Streptomyces noursei* | 64 | 37 | 24 | CYP105BV1 | T1pks |
|  |  |  |  | CYP1198A1 | T1pks |
|  |  |  |  | CYP107EM1 | T1pks |
|  |  |  |  | CYP1060A2 | T1pks |
|  |  |  |  | CYP147F29 | T1pks |
|  |  |  |  | CYP157C31 | Terpene |
|  |  |  |  | CYP105H1 | T1pks |
|  |  |  |  | CYP161A1 | T1pks |
|  |  |  |  | CYP107AE10 | Butyrolactone |
|  |  |  |  | CYP1248A3 | Other |
|  |  |  |  | CYP107EQ1 | T1pks |
|  |  |  |  | CYP107KZ1 | T1pks |
|  |  |  |  | CYP1420A1 | T1pks |
|  |  |  |  | CYP107A3 | T1pks |
|  |  |  |  | CYP107F9 | T3pks |
|  |  |  |  | CYP113D4 | Thiopeptide-Bacteriocin |
|  |  |  |  | CYP105AB15 | T1pks |
|  |  |  |  | CYP107CA2 | Transatpks-Nrps |
|  |  |  |  | CYP154D14 | Transatpks-Nrps |
|  |  |  |  | CYP105AC16 | Transatpks-Nrps |
|  |  |  |  | CYP105A7 | Terpene |
|  |  |  |  | CYP163B; | Lantipeptide-Nrps |
|  |  |  |  | CYP1278B1 | Lantipeptide-Nrps |
|  |  |  |  | CYP105H8 | Terpene-T1pks |
| *Streptomyces lydicus* A02 | 38 | 35 | 17 | CYP105BW1 | T2pks |
|  |  |  |  | CYP147K2 | Transatpks |
|  |  |  |  | CYP1038A7 | Transatpks |
|  |  |  |  | CYP147F28P | Terpene |
|  |  |  |  | CYP107AE8 | Butyrolactone |
|  |  |  |  | CYP1469A2 | Other |
|  |  |  |  | CYP157C29 | Terpene |
|  |  |  |  | CYP107F8; | T3pks-Nrps |
|  |  |  |  | CYP105D25 | T3pks-Nrps |
|  |  |  |  | CYP157C42 | Terpene |
|  |  |  |  | CYP113D5 | T2pks-Oligosaccharide |
|  |  |  |  | CYP1278B2; | Lassopeptide-Nrps |
|  |  |  |  | CYP163B11 | Lassopeptide-Nrps |
|  |  |  |  | CYP121A3 | Other |
|  |  |  |  | CYP161A5 | T1pks |
|  |  |  |  | CYP105H3 | T1pks |
|  |  |  |  | CYP186D1 | T1pks |
| *Streptomyces lydicus* 103 | 32 | 26 | 10 | CYP147F26 | T1pks |
|  |  |  |  | CYP107FH2 | Terpene-T1pks-Nrps |
|  |  |  |  | CYP107B26 | Terpene-T1pks-Nrps |
|  |  |  |  | CYP163G1 | T1pks-Nrps |
|  |  |  |  | CYP147F27 | Thiopeptide |
|  |  |  |  | CYP107AE12 | Butyrolactone |
|  |  |  |  | CYP107FV4 | Melanin-Nrps |
|  |  |  |  | CYP1005B7 | Other |
|  |  |  |  | CYP157C36 | Nucleoside-Lassopeptide-Nrps |
|  |  |  |  | CYP107F15 | T3pks-Nrps |
| *Streptomyces* sp. Tu6071 | 22 | 18 | 11 | CYP105B | Terpene |
|  |  |  |  | CYP105N | NRPS |
|  |  |  |  | CYP107BC1 | PKS-like,terpene |
|  |  |  |  | CYP161B1 | PKS-like,terpene |
|  |  |  |  | CYP113F1 | PKS-like,terpene |
|  |  |  |  | CYP107BB1 | PKS-like,terpene |
|  |  |  |  | CYP170B | Terpene |
|  |  |  |  | CYP107BX | NRPS,T1PKS |
|  |  |  |  | CYP1200A1 | Butyrolactone |
|  |  |  |  | CYP208A | T1PKS,NRPS |
|  |  |  |  | CYP154AJ1 | T1PKS,NRPS |
| *Streptomyces* sp. LaPpAH-201 | 19 | 26 | 5 | CYP105DT1 | T1PKS |
|  |  |  |  | CYP170B | Terpene |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP105H | T1PKS,NRPS-like,NRPS,lanthipeptide |
|  |  |  |  | CYP146A | NRPS |
| *Streptomyces* sp. W007 | 28 | 44 | 3 | CYP107L | NRPS-like,arylpolyene,ladderane,NRPS |
|  |  |  |  | CYP163B | NRPS-like,arylpolyene,ladderane,NRPS |
|  |  |  |  | CYP107BZ | NRPS-like,arylpolyene,ladderane,NRPS |
| *Streptomyces* sp. TAA486-18 | 18 | 23 | 3 | CYP157C | Terpene |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP105AB | NRPS-like |
| *Streptomyces* sp. PVA 94-07 | 20 | 24 | 10 | CYP105AK | NRPS |
|  |  |  |  | CYP107R1 | T2PKS |
|  |  |  |  | CYP107F | T3PKS,T1PKS,NRPS-like,NRPS,lanthipeptide |
|  |  |  |  | CYP105H | T3PKS,T1PKS,NRPS-like,NRPS,lanthipeptide |
|  |  |  |  | CYP105BT | butyrolactone,T1PKS,other,NRPS |
|  |  |  |  | CYP105BT | butyrolactone,T1PKS,other,NRPS |
|  |  |  |  | CYP105AC | NRPS,T3PKS,T1PKS |
|  |  |  |  | CYP105AC | NRPS,T3PKS,T1PKS |
|  |  |  |  | CYP107BX | NRPS,T1PKS |
|  |  |  |  | CYP170B | Terpene |
| *Streptomyces canus* 299MFChir4.1 | 28 | 33 | 7 | CYP157C | Terpene |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP182B | T1PKS |
|  |  |  |  | CYP183B6 | Terpene |
|  |  |  |  | CYP251T1 | Terpene |
|  |  |  |  | CYP163H | T1PKS,NRPS,NRPS-like |
|  |  |  |  | CYP113AF1 | NRPS,lassopeptide |
| *Streptomyces sulphureus* DSM 40104 | 26 | 26 | 12 | CYP105DH3 | T2PKS |
|  |  |  |  | CYP113AC1 | NRPS,T1PKS |
|  |  |  |  | CYP107MD1 | T1PKS |
|  |  |  |  | CYP107CS | transAT-PKS,T1PKS,transAT-PKS-like,NRPS |
|  |  |  |  | CYP105DM1 | transAT-PKS,T1PKS,transAT-PKS-like,NRPS |
|  |  |  |  | CYP1265A1 | T1PKS |
|  |  |  |  | CYP135E8 | NRPS |
|  |  |  |  | CYP107FF2 | NRPS |
|  |  |  |  | CYP107AM | Nucleoside |
|  |  |  |  | CYP105B | Nucleoside |
|  |  |  |  | CYP107AM | Nucleoside |
|  |  |  |  | CYP283A | bacteriocin,bottromycin |
| *Streptomyces* sp. MspMP-M5 | 44 | 48 | 15 | CYP107F | T3PKS |
|  |  |  |  | CYP1237C2 | oligosaccharide,T2PKS,PKS-like,NRPS |
|  |  |  |  | CYP1237B3 | oligosaccharide,T2PKS,PKS-like,NRPS |
|  |  |  |  | CYP105DN1 | oligosaccharide,T2PKS,PKS-like,NRPS |
|  |  |  |  | CYP163B | transAT-PKS-like,NRPS,T1PKS |
|  |  |  |  | CYP121A | NRPS-like,CDPS |
|  |  |  |  | CYP156B | NRPS-like,CDPS |
|  |  |  |  | CYP1035A | NRPS-like,CDPS |
|  |  |  |  | CYP107EB | other,NRPS |
|  |  |  |  | CYP107AE | Butyrolactone |
|  |  |  |  | CYP105AC | T3PKS,NRPS-like |
|  |  |  |  | CYP1004B2 | NRPS,arylpolyene |
|  |  |  |  | CYP125G3 | NRPS,arylpolyene |
|  |  |  |  | CYP105BA | T1PKS,NRPS |
|  |  |  |  | CYP157C | Terpene |
| *Streptomyces* sp. LaPpAH-95 | 24 | 27 | 6 | CYP107BT5 | NRPS |
|  |  |  |  | CYP107CD | T2PKS,terpene |
|  |  |  |  | CYP105DW1 | T1PKS |
|  |  |  |  | CYP1046A | T1PKS,NRPS |
|  |  |  |  | CYP154M12 | NRPS,T1PKS |
|  |  |  |  | CYP208A | NRPS,T1PKS |
| *Streptomyces mirabilis* YR139 | 42 | 38 | 6 | CYP1859A2 | NRPS-like |
|  |  |  |  | CYP163H | NRPS-like |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP180A | Terpene |
|  |  |  |  | CYP247A | NRPS,other,T1PKS |
|  |  |  |  | CYP166A | NRPS-like |
| *Streptomyces* sp. AA1529 | 26 | 28 | 12 | CYP158B2 | T3PKS |
|  |  |  |  | CYP107MK1 | T1PKS,transAT-PKS-like |
|  |  |  |  | CYP1031A | transAT-PKS,NRPS,T1PKS |
|  |  |  |  | CYP1192A | NRPS-like,T1PKS |
|  |  |  |  | CYP107MH2 | NRPS-like,T1PKS |
|  |  |  |  | CYP157C | NRPS-like,T1PKS |
|  |  |  |  | CYP183A | Terpene |
|  |  |  |  | CYP161C | Terpene |
|  |  |  |  | CYP1237A4 | T2PKS,T1PKS |
|  |  |  |  | CYP107A | T2PKS,T1PKS |
|  |  |  |  | CYP107R2 | T2PKS |
|  |  |  |  | CYP163B | T1PKS,NRPS-like,NRPS |
| *Streptomyces atratus* OK008 | 15 | 15 | 1 | CYP107F | T3PKS |
| *Streptomyces* sp. PsTaAH-130 | 36 | 37 | 12 | CYP146A3 | NRPS |
|  |  |  |  | CYP105BC | other,T1PKS,PKS-like |
|  |  |  |  | CYP105AH | other,T1PKS,PKS-like |
|  |  |  |  | CYP180A | Terpene |
|  |  |  |  | CYP105D | T1PKS |
|  |  |  |  | CYP105P | NRPS,T1PKS |
|  |  |  |  | CYP105D | NRPS,T1PKS |
|  |  |  |  | CYP1469D1 | CDPS |
|  |  |  |  | CYP1253B3 | NRPS |
|  |  |  |  | CYP163B | transAT-PKS-like,NRPS,T1PKS |
|  |  |  |  | CYP105B | Terpene |
|  |  |  |  | CYP1207A | NRPS,lanthipeptide |
| *Streptomyces* sp. CNT318 | 27 | 32 | 13 | CYP107MK1 | transAT-PKS,NRPS,transAT-PKS-like,T1PKS |
|  |  |  |  | CYP158B2 | T3PKS |
|  |  |  |  | CYP183A | Terpene |
|  |  |  |  | CYP161C | Terpene |
|  |  |  |  | CYP107AL | T2PKS,T1PKS |
|  |  |  |  | CYP105N | NRPS |
|  |  |  |  | CYP107E | T2PKS |
|  |  |  |  | CYP157K | T2PKS |
|  |  |  |  | CYP1192A | NRPS-like,T1PKS |
|  |  |  |  | CYP1192A | NRPS-like,T1PKS |
|  |  |  |  | CYP107MH2 | NRPS-like,T1PKS |
|  |  |  |  | CYP157C | NRPS-like,T1PKS |
|  |  |  |  | CYP1031A | transAT-PKS,NRPS,T1PKS |
| *Streptomyces* sp. CNH099 | 16 | 39 | 10 | CYP157C | Terpene |
|  |  |  |  | CYP105AC | T1PKS |
|  |  |  |  | CYP285A | PKS-like,NRPS |
|  |  |  |  | CYP146C1 | PKS-like,NRPS |
|  |  |  |  | CYP126B5 | T1PKS |
|  |  |  |  | CYP107AT5 | T1PKS |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP105BA | NRPS,T1PKS |
|  |  |  |  | CYP1064A | other,terpene |
|  |  |  |  | CYP1265B1 | T1PKS |
| *Streptomyces* sp. CNH287 | 16 | 27 | 8 | CYP105AR2 | Terpene |
|  |  |  |  | CYP251D2 | Terpene |
|  |  |  |  | CYP251B2 | Terpene |
|  |  |  |  | CYP1044A3 | Terpene |
|  |  |  |  | CYP107BY | NRPS |
|  |  |  |  | CYP102B | hglE-KS,LAP,terpene |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP163C | NRPS,PKS-like |
| *Streptomyces* sp. GXT6 | 13 | 24 | 3 | CYP170A | Terpene |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP154A | Bacteriocin |
| *Streptomyces* sp. LaPpAH-108 | 24 | 21 | 3 | CYP170A | Terpene |
|  |  |  |  | CYP154U | NRPS |
|  |  |  |  | CYP158A | NRPS,T3PKS |
| *Streptomyces aurantiacus* JA 4570 | 30 | 49 | 12 | CYP105BT | other,NRPS,T1PKS |
|  |  |  |  | CYP247A | other,NRPS,T1PKS |
|  |  |  |  | CYP157K | Terpene |
|  |  |  |  | CYP183J | Terpene |
|  |  |  |  | CYP105DH2 | T2PKS |
|  |  |  |  | CYP113K | NRPS |
|  |  |  |  | CYP1658A1 | LAP |
|  |  |  |  | CYP163B | NRPS |
|  |  |  |  | CYP1031A | T3PKS,PKS-like,NRPS |
|  |  |  |  | CYP107ND1 | T1PKS |
|  |  |  |  | CYP170B | Terpene |
|  |  |  |  | CYP294A3 | T1PKS |
| *Streptomyces* sp. KhCrAH-337 | 26 | 26 | 3 | CYP105D | T1PKS |
|  |  |  |  | CYP105D | T1PKS |
|  |  |  |  | CYP163B | NRPS |
| *Streptomyces* sp. LaPpAH-202 | 19 | 32 | 6 | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP170B | Terpene |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP105DT1 | T1PKS |
|  |  |  |  | CYP146A | NRPS |
|  |  |  |  | CYP105H | T1PKS,NRPS-like,lanthipeptide,NRPS |
| *Streptomyces* sp. UNC401CLCol | 15 | 14 | 3 | CYP170A | Terpene |
|  |  |  |  | CYP1240A5 | Terpene |
|  |  |  |  | CYP1216A1 | Terpene |
| *Streptomyces* sp. KhCrAH-40 | 26 | 26 | 6 | CYP105D | T1PKS |
|  |  |  |  | CYP105D | T1PKS |
|  |  |  |  | CYP163B | NRPS |
|  |  |  |  | CYP1004F2 | NRPS |
|  |  |  |  | CYP1004E2 | NRPS |
|  |  |  |  | CYP1618A | NRPS |
| *Kitasatospora* sp. SolWspMP-SS2h | 25 | 33 | 9 | CYP105DX1 | Terpene |
|  |  |  |  | CYP251M2 | Terpene |
|  |  |  |  | CYP2027A | T1PKS |
|  |  |  |  | CYP105B | NRPS |
|  |  |  |  | CYP154A | ectoine,PKS-like,T1PKS |
|  |  |  |  | CYP107MG1 | T1PKS |
|  |  |  |  | CYP124G15 | PKS-like,butyrolactone |
|  |  |  |  | CYP1448A3 | LAP,NRPS,T1PKS,butyrolactone |
|  |  |  |  | CYP1265C1 | T2PKS |
| *Streptomyces* sp. NTK 937 | 17 | 24 | 1 | CYP105BA | T1PKS,NRPS |
| *Streptomyces* sp. HmicA12 | 25 | 18 | 7 | CYP285A | NRPS,T1PKS |
|  |  |  |  | CYP123H2 | NRPS,T1PKS |
|  |  |  |  | CYP154D | T3PKS |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP170B | Terpene |
|  |  |  |  | CYP180A | Terpene |
|  |  |  |  | CYP1341F1 | fused |
| *Streptomyces griseoaurantiacus* M045 | 16 | 25 | 4 | CYP105N | NRPS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP2080A1 | T1PKS |
|  |  |  |  | CYP105AC | fused,T3PKS |
| *Streptomyces afghaniensis* 772 | 28 | 47 | 7 | CYP107AH | T2PKS |
|  |  |  |  | CYP1424A | NRPS |
|  |  |  |  | CYP105EB1 | T2PKS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP107CT | NRPS,T1PKS |
|  |  |  |  | CYP154A | Terpene |
|  |  |  |  | CYP154K | Butyrolactone |
| *Streptomyces sulphureus* L180 | 19 | 30 | 3 | CYP151D1 | Ectoine |
|  |  |  |  | CYP105DM1 | T1PKS |
|  |  |  |  | CYP1037B | NRPS,T1PKS,butyrolactone |
| *Streptomyces* sp. KhCrAH-340 | 26 | 26 | 3 | CYP105D | T1PKS |
|  |  |  |  | CYP105D | T1PKS |
|  |  |  |  | CYP163B | NRPS |
| *Streptomyces violaceusniger* SPC6 | 13 | 17 | 7 | CYP163B | NRPS,T1PKS,ladderane,NRPS-like |
|  |  |  |  | CYP158A | Terpene |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP251F | T3PKS,terpene |
|  |  |  |  | CYP1207A | lanthipeptide,NRPS,T3PKS |
|  |  |  |  | CYP158A | lanthipeptide,NRPS,T3PKS |
| *Streptomyces* sp. CNS615 | 27 | 37 | 9 | CYP163J1 | NRPS |
|  |  |  |  | CYP107BM | Terpene |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP105H | T1PKS |
|  |  |  |  | CYP208A | butyrolactone,T1PKS,NRPS,other |
|  |  |  |  | CYP154M | butyrolactone,T1PKS,NRPS,other |
|  |  |  |  | CYP211A | butyrolactone,T1PKS,NRPS,other |
|  |  |  |  | CYP1562A2 | butyrolactone,T1PKS,NRPS,other |
| *Streptomyces vitaminophilus* DSM 41686 | 18 | 25 | 2 | CYP105BA | T3PKS,other,NRPS-like,NRPS,T1PKS |
|  |  |  |  | CYP107KW | NRPS-like,other |
| *Streptomyces bottropensis* ATCC 25435 | 31 | 28 | 8 | CYP107AM | T1PKS,NRPS,T2PKS |
|  |  |  |  | CYP154A | Terpene |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP156B | Indole |
|  |  |  |  | CYP113AD1 | T1PKS |
|  |  |  |  | CYP105DS2 | T1PKS |
|  |  |  |  | CYP107AL | PKS-like,LAP,butyrolactone,T1PKS |
|  |  |  |  | CYP283A | bacteriocin,bottromycin |
| *Streptomyces* sp. CNQ865 | 16 | 46 | 13 | CYP126B6 | T1PKS |
|  |  |  |  | CYP107AT4 | T1PKS |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP1459B5 | NRPS |
|  |  |  |  | CYP1279A1 | NRPS |
|  |  |  |  | CYP105AC | T1PKS |
|  |  |  |  | CYP165E | other,T3PKS,NRPS |
|  |  |  |  | CYP165B | other,T3PKS,NRPS |
|  |  |  |  | CYP154C | T3PKS |
|  |  |  |  | CYP157A | T3PKS |
|  |  |  |  | CYP1959B1 | T1PKS |
|  |  |  |  | CYP1064A | Terpene |
| *Streptomyces* sp. CNT360 | 19 | 19 | 6 | CYP2045B1 | transAT-PKS,NRPS |
|  |  |  |  | CYP155A | NRPS,T1PKS |
|  |  |  |  | CYP1039C1 | NRPS,T1PKS |
|  |  |  |  | CYP113AE1 | T1PKS |
|  |  |  |  | CYP186B8 | NRPS,lanthipeptide,T1PKS |
|  |  |  |  | CYP107E | NRPS |
| *Streptomyces* sp. 142MFCol3.1 | 27 | 30 | 7 | CYP157K | Terpene |
|  |  |  |  | CYP1417A | Terpene |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP180A | Terpene |
|  |  |  |  | CYP154A | Terpene |
|  |  |  |  | CYP156C | Terpene |
|  |  |  |  | CYP170A | Terpene |
| *Streptomyces* sp. ScaeMP-e122 | 25 | 24 | 8 | CYP105N | NRPS |
|  |  |  |  | CYP124G | Melanin |
|  |  |  |  | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP105A | NRPS,butyrolactone |
|  |  |  |  | CYP105AZ | NRPS,T1PKS |
|  |  |  |  | CYP105AZ | NRPS,T1PKS |
|  |  |  |  | CYP181A | T2PKS,PKS-like,T1PKS |
|  |  |  |  | CYP107Y | T2PKS,PKS-like,T1PKS |
| *Streptomyces* sp. TAA204 | 18 | 34 | 5 | CYP154A | NRPS-like |
|  |  |  |  | CYP1832A1 | NRPS-like |
|  |  |  |  | CYP113C | terpene,NRPS,PKS-like,transAT-PKS,furan |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP157C | Terpene |
| *Streptomyces* sp. CNQ329 | 13 | 36 | 9 | CYP157C | T1PKS |
|  |  |  |  | CYP1043A | T3PKS |
|  |  |  |  | CYP108B | thiopeptide,other,furan,LAP |
|  |  |  |  | CYP165E | NRPS |
|  |  |  |  | CYP165B | NRPS |
|  |  |  |  | CYP154C | T3PKS |
|  |  |  |  | CYP157A | T3PKS |
|  |  |  |  | CYP107AT6 | T1PKS |
|  |  |  |  | CYP126B5 | T1PKS |
| *Streptomyces* sp. KhCrAH-244 | 26 | 28 | 2 | CYP105D | T1PKS |
|  |  |  |  | CYP105D | T1PKS |
| *Streptomyces chartreusis* NRRL 12338 | 23 | 33 | 6 | CYP154K | Butyrolactone |
|  |  |  |  | CYP154A | Terpene |
|  |  |  |  | CYP105D | Terpene |
|  |  |  |  | CYP157K | Terpene |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP107AH | T2PKS |
| *Streptomyces* sp. CcalMP-8W | 23 | 38 | 9 | CYP107BX | NRPS,T1PKS,bacteriocin |
|  |  |  |  | CYP1984A1 | NRPS,T2PKS,PKS-like,other,oligosaccharide |
|  |  |  |  | CYP124G | Melanin |
|  |  |  |  | CYP154C | lanthipeptide |
|  |  |  |  | CYP157A | lanthipeptide |
|  |  |  |  | CYP105D | NRPS-like,arylpolyene |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP154D | NRPS |
|  |  |  |  | CYP157F | NRPS |
| *Streptomyces* sp. SS | 15 | 23 | 3 | CYP102G | NRPS |
|  |  |  |  | CYP105D | Terpene |
|  |  |  |  | CYP105AC | NRPS |
| *Streptomyces* sp. CNQ766 | 16 | 50 | 12 | CYP157C | Terpene |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP1459B5 | NRPS |
|  |  |  |  | CYP1279A1 | NRPS |
|  |  |  |  | CYP105AC | T1PKS,transAT-PKS |
|  |  |  |  | CYP126B6 | T1PKS |
|  |  |  |  | CYP1064A | Terpene |
|  |  |  |  | CYP154C | T3PKS |
|  |  |  |  | CYP157A | T3PKS |
|  |  |  |  | CYP1959B1 | T1PKS |
|  |  |  |  | CYP165E | NRPS |
|  |  |  |  | CYP165B | NRPS |
| *Streptomyces* sp. URHA0041 | 16 | 39 | 7 | CYP123D | PKS-like |
|  |  |  |  | CYP183AR2 | terpene,phenazine |
|  |  |  |  | CYP1044A4 | terpene,phenazine |
|  |  |  |  | CYP154A | PKS-like,T1PKS |
|  |  |  |  | CYP107JK3 | T2PKS |
|  |  |  |  | CYP156B | Indole |
|  |  |  |  | CYP107MG2 | T1PKS |
| *Streptomyces* sp. CNB091 | 27 | 41 | 5 | CYP107BY | NRPS |
|  |  |  |  | CYP107BX | NRPS,T1PKS |
|  |  |  |  | CYP124G | Melanin |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP2134B1 | NRPS,T1PKS |
| *Streptomyces flavidovirens* DSM 40150 | 24 | 24 | 9 | CYP105B | T2PKS,LAP |
|  |  |  |  | CYP121A | lanthipeptide,CDPS |
|  |  |  |  | CYP157K | bacteriocin,terpene |
|  |  |  |  | CYP124G | Melanin |
|  |  |  |  | CYP245B1 | Indole |
|  |  |  |  | CYP1634A2 | NRPS,T1PKS |
|  |  |  |  | CYP1228A1 | NRPS,T1PKS |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP157C | T1PKS,NRPS,terpene |
| *Streptomyces viridosporus* T7A, ATCC 39115 | 32 | 32 | 9 | CYP105D | T3PKS |
|  |  |  |  | CYP163B | NRPS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP1207A | NRPS,lanthipeptide,T2PKS |
|  |  |  |  | CYP105AC | fused,T3PKS |
|  |  |  |  | CYP154B | NRPS,T1PKS,other |
|  |  |  |  | CYP208A | butyrolactone,T1PKS,NRPS,other |
|  |  |  |  | CYP154M | butyrolactone,T1PKS,NRPS,other |
|  |  |  |  | CYP211F | butyrolactone,T1PKS,NRPS,other |
| *Streptomyces* sp. FXJ7.023 | 27 | 14 | 3 | CYP170A | terpene,betalactone |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP105CD | NRPS |
| *Streptomyces* sp. ATexAB-D23 | 28 | 42 | 11 | CYP107BT3 | T2PKS,terpene,NRPS |
|  |  |  |  | CYP1394B1 | NRPS,betalactone |
|  |  |  |  | CYP107LX1 | NRPS,betalactone,T3PKS |
|  |  |  |  | CYP2027A | T1PKS |
|  |  |  |  | CYP105DW1 | T1PKS |
|  |  |  |  | CYP157F | T1PKS |
|  |  |  |  | CYP154D | T1PKS |
|  |  |  |  | CYP156B | Indole |
|  |  |  |  | CYP107JK2 | T2PKS,butyrolactone |
|  |  |  |  | CYP105CF3 | oligosaccharide,T1PKS |
|  |  |  |  | CYP161E7 | PKS-like |
| *Streptomyces* sp. BoleA5 | 17 | 23 | 7 | CYP107X | T2PKS,bacteriocin |
|  |  |  |  | CYP107BM | T3PKS |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP154C | Terpene |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP183B | Terpene |
| *Streptomyces* sp. CNS654 | 27 | 48 | 3 | CYP107B | bacteriocin,transAT-PKS,PKS-like,T1PKS,NRPS |
|  |  |  |  | CYP107BX | bacteriocin,transAT-PKS,PKS-like,T1PKS,NRPS |
|  |  |  |  | CYP163B | NRPS |
| *Streptomyces* sp. DpondAA-B6 | 19 | 28 | 4 | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP163B | PKS-like,NRPS |
|  |  |  |  | CYP124G | Melanin |
|  |  |  |  | CYP157K | Terpene |
| *Streptomyces* sp. PCS3-D2 | 25 | 27 | 7 | CYP163J3 | NRPS |
|  |  |  |  | CYP105EA1 | NRPS-like,NRPS |
|  |  |  |  | CYP157C | terpene,thiopeptide,LAP,NRPS |
|  |  |  |  | CYP107L | Siderophore |
|  |  |  |  | CYP121A | CDPS,NRPS-like |
|  |  |  |  | CYP162B | NRPS |
|  |  |  |  | CYP147F | T2PKS,NRPS |
| *Streptomyces* sp. CNR698 | 29 | 39 | 11 | CYP1424A | NRPS |
|  |  |  |  | CYP180A | NRPS |
|  |  |  |  | CYP107BM | Terpene |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP163J2 | NRPS |
|  |  |  |  | CYP146A | NRPS |
|  |  |  |  | CYP211A | Other |
|  |  |  |  | CYP1562A2 | Other |
|  |  |  |  | CYP208A | T1PKS,butyrolactone |
|  |  |  |  | CYP154M | NRPS |
| *Streptomyces cattleya* ATCC 35852 | 41 | 46 | 14 | CYP107AE | lanthipeptide |
|  |  |  |  | CYP107CT | butyrolactone,NRPS,T1PKS |
|  |  |  |  | CYP105B | butyrolactone,NRPS,T1PKS |
|  |  |  |  | CYP163D | NRPS,thiopeptide |
|  |  |  |  | CYP183L | Terpene |
|  |  |  |  | CYP105BF | T1PKS |
|  |  |  |  | CYP285A | terpene,NRPS |
|  |  |  |  | CYP1061A | terpene,NRPS |
|  |  |  |  | CYP158A | T3PKS,terpene |
|  |  |  |  | CYP107CR | T1PKS |
|  |  |  |  | CYP1274A | T1PKS |
|  |  |  |  | CYP107W | T1PKS |
|  |  |  |  | CYP107CS | T1PKS |
|  |  |  |  | CYP184A | NRPS |
| *Streptomyces* sp. WMMB 714 | 21 | 25 | 2 | CYP105BA | NRPS,T1PKS |
|  |  |  |  | CYP105BA | NRPS,T1PKS |
| *Streptomyces scabrisporus* DSM 41855 | 37 | 47 | 11 | CYP1199A | NRPS,indole |
|  |  |  |  | CYP1385A3 | thiopeptide,LAP |
|  |  |  |  | CYP151B2 | T1PKS |
|  |  |  |  | CYP1045B1 | Terpene, T1PKS |
|  |  |  |  | CYP105DZ1 | other,T1PKS |
|  |  |  |  | CYP107MZ1 | other,T1PKS |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP1568A1 | NRPS,T1PKS,terpene |
|  |  |  |  | CYP285G1 | NRPS |
|  |  |  |  | CYP107NA1 | NRPS |
|  |  |  |  | CYP285H1 | NRPS |
| *Streptomyces* sp. KhCrAH-43 | 26 | 26 | 2 | CYP105D | T1PKS |
|  |  |  |  | CYP105D | T1PKS |
| *Streptomyces* sp. PsTaAH-124 | 32 | 42 | 12 | CYP107P | NRPS-like |
|  |  |  |  | CYP1722A | NRPS,bacteriocin |
|  |  |  |  | CYP107E | Phosphoglycolipid |
|  |  |  |  | CYP183X | terpene,other |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP105N | NRPS |
|  |  |  |  | CYP1618A | NRPS,phosphonate |
|  |  |  |  | CYP180B | LAP,thiopeptide,terpene |
|  |  |  |  | CYP105B | Butyrolactone |
|  |  |  |  | CYP1042A | NRPS |
|  |  |  |  | CYP105DU1 | NRPS,T1PKS,thiopeptide |
| *Streptomyces* sp. Amel2xC10 | 15 | 28 | 4 | CYP107Z | NRPS,other |
|  |  |  |  | CYP156B | Indole |
|  |  |  |  | CYP105EH1 | NRPS,T1PKS |
|  |  |  |  | CYP170A | Terpene |
| *Streptomyces* sp. CNT372 | 10 | 29 | 1 | CYP124G | Melanin |
| *Streptomyces* sp. CNS606 | 16 | 31 | 5 | CYP156Q1 | Terpene |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP105AC46 | T1PKS,NRPS,butyrolactone |
|  |  |  |  | CYP1917A2 | T1PKS,NRPS,butyrolactone |
| *Streptomyces* sp. 303MFCol5.2 | 23 | 28 | 6 | CYP154C | T3PKS |
|  |  |  |  | CYP157A | T3PKS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP105CD4 | T2PKS |
|  |  |  |  | CYP181A | T2PKS,PKS-like,T1PKS |
|  |  |  |  | CYP107Y | T2PKS,PKS-like,T1PKS |
| *Streptomyces* *acidiscabies* 84-104 | 47 | 45 | 12 | CYP246A | NRPS |
|  |  |  |  | CYP105D | T1PKS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP107MR1 | betalactone,NRPS |
|  |  |  |  | CYP107MB1 | NRPS,T2PKS,T1PKS,NRPS-like |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP124B | T1PKS |
|  |  |  |  | CYP1524A2 | NRPS |
|  |  |  |  | CYP107BT6 | NRPS |
|  |  |  |  | CYP156B | Indole |
|  |  |  |  | CYP105K3 | nucleoside,betalactone,NRPS-like |
|  |  |  |  | CYP162A | nucleoside,betalactone,NRPS-like |
| *Streptomyces* sp. S4 | 19 | 33 | 4 | CYP105H | lanthipeptide,NRPS,T1PKS,NRPS-like |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP107BX | NRPS,T1PKS |
|  |  |  |  | CYP170B | Terpene |
| *Streptomyces* sp. DvalAA-21 | 24 | 27 | 7 | CYP124G | Melanin |
|  |  |  |  | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP105A | NRPS,butyrolactone |
|  |  |  |  | CYP107Y | T2PKS,PKS-like,T1PKS |
|  |  |  |  | CYP181A | T2PKS,PKS-like,T1PKS |
|  |  |  |  | CYP105AZ | T1PKS |
|  |  |  |  | CYP105AZ | T1PKS |
| *Streptomyces* sp. CNT371 | 17 | 43 | 12 | CYP126B6 | T1PKS |
|  |  |  |  | CYP107AT4 | T1PKS |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP1459B5 | NRPS |
|  |  |  |  | CYP157A | T3PKS |
|  |  |  |  | CYP154C | T3PKS |
|  |  |  |  | CYP1279A1 | NRPS |
|  |  |  |  | CYP105AC | T1PKS |
|  |  |  |  | CYP1064A | Terpene |
|  |  |  |  | CYP165B | NRPS |
|  |  |  |  | CYP165E | NRPS |
| *Streptomyces* *somaliensis* DSM 40738 | 10 | 26 | 3 | CYP158A | terpene,T3PKS |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP251A | Terpene |
| *Streptomyces* sp. 351MFTsu5.1 | 22 | 26 | 4 | CYP170A | Terpene |
|  |  |  |  | CYP182B | T1PKS |
|  |  |  |  | CYP107MC1 | T1PKS |
|  |  |  |  | CYP268H2 | T1PKS |
| *Streptomyces* sp. DvalAA-83 | 24 | 25 | 7 | CYP124G | Melanin |
|  |  |  |  | CYP105AZ | T1PKS |
|  |  |  |  | CYP105AZ | T1PKS |
|  |  |  |  | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP105A | NRPS,butyrolactone |
|  |  |  |  | CYP181A | T2PKS,PKS-like |
|  |  |  |  | CYP107Y | T2PKS,PKS-like |
| *Streptomyces* sp. CNT302 | 26 | 28 | 7 | CYP105AH | other,T1PKS,butyrolactone |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP107BM | Terpene |
|  |  |  |  | CYP163J2 | NRPS |
|  |  |  |  | CYP208A | T1PKS,butyrolactone |
|  |  |  |  | CYP154M | NRPS |
| *Streptomyces* sp. CNY243 | 17 | 41 | 13 | CYP1959B1 | T1PKS |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP107AT4 | T1PKS |
|  |  |  |  | CYP126B6 | T1PKS |
|  |  |  |  | CYP1459B5 | NRPS |
|  |  |  |  | CYP105AC | T1PKS |
|  |  |  |  | CYP1279A1 | NRPS |
|  |  |  |  | CYP165B | NRPS,T3PKS,other |
|  |  |  |  | CYP165E | NRPS,T3PKS,other |
|  |  |  |  | CYP154C | T3PKS |
|  |  |  |  | CYP157A | T3PKS |
|  |  |  |  | CYP1064A | Terpene |
| *Streptomyces* sp. AA0539 | 19 | 21 | 10 | CYP186Q1 | oligosaccharide,T2PKS,NRPS |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP105N | NRPS |
|  |  |  |  | CYP183W | Terpene |
|  |  |  |  | CYP107AM | NRPS |
|  |  |  |  | CYP105CD | NRPS |
|  |  |  |  | CYP105EE1 | NRPS,T1PKS |
|  |  |  |  | CYP107LF | NRPS,T1PKS |
|  |  |  |  | CYP107EA | NRPS,T1PKS |
| *Streptomyces* *atratus* OK807 | 31 | 36 | 8 | CYP107R1 | T2PKS |
|  |  |  |  | CYP1240A4 | terpene,T1PKS,NRPS-like |
|  |  |  |  | CYP1216A11 | terpene,T1PKS,NRPS-like |
|  |  |  |  | CYP107LZ1 | terpene,T1PKS,NRPS-like |
|  |  |  |  | CYP107L | NRPS |
|  |  |  |  | CYP107L | NRPS |
|  |  |  |  | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP107F | T3PKS |
| *Streptomyces* sp. CNS335 | 16 | 46 | 13 | CYP107AT4 | T1PKS |
|  |  |  |  | CYP126B6 | T1PKS |
|  |  |  |  | CYP1459B5 | NRPS |
|  |  |  |  | CYP251A | Terpene |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP105AC | T1PKS |
|  |  |  |  | CYP157A | T3PKS |
|  |  |  |  | CYP154C | T3PKS |
|  |  |  |  | CYP1279A1 | NRPS |
|  |  |  |  | CYP1064A | Terpene |
|  |  |  |  | CYP1959B1 | T1PKS |
|  |  |  |  | CYP165E | NRPS |
|  |  |  |  | CYP165B | NRPS |
| *Streptomyces* sp. FxanaC1 | 27 | 27 | 4 | CYP113AB1 | LAP,thiopeptide,lassopeptide,NRPS |
|  |  |  |  | CYP105DP1 | T1PKS,NRPS,melanin,T2PKS |
|  |  |  |  | CYP105AA | Terpene |
|  |  |  |  | CYP251G | terpene,amglyccycl |
| *Streptomyces* sp. TOR3209 | 20 | 55 | 7 | CYP152D | Terpene |
|  |  |  |  | CYP156B | Indole |
|  |  |  |  | CYP1417A | hglE-KS,T1PKS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP157K | Terpene |
|  |  |  |  | CYP105H | T1PKS,NRPS-like |
| *Streptomyces* sp. DpondAA-E10 | 25 | 25 | 7 | CYP105AZ | T1PKS |
|  |  |  |  | CYP105AZ | T1PKS |
|  |  |  |  | CYP124G | Melanin |
|  |  |  |  | CYP105A | NRPS,butyrolactone |
|  |  |  |  | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP107Y | T2PKS,PKS-like,T1PKS |
|  |  |  |  | CYP181A | T2PKS,PKS-like,T1PKS |
| *Streptomyces* sp. DpondAA-A50 | 25 | 27 | 7 | CYP124G | Melanin |
|  |  |  |  | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP105A | NRPS,butyrolactone |
|  |  |  |  | CYP107Y | T2PKS,PKS-like,T1PKS |
|  |  |  |  | CYP181A | T2PKS,PKS-like,T1PKS |
|  |  |  |  | CYP105AZ | T1PKS |
|  |  |  |  | CYP105AZ | T1PKS |
| *Streptomyces* sp. TAA040 | 15 | 22 | 6 | CYP1207A | terpene,lanthipeptide,NRPS |
|  |  |  |  | CYP184A | NRPS,T3PKS,terpene |
|  |  |  |  | CYP105AH | other,T1PKS,LAP,thiopeptide |
|  |  |  |  | CYP161C | Terpene |
|  |  |  |  | CYP183A | Terpene |
|  |  |  |  | CYP156B | Terpene |
| *Streptomyces* sp. PgraA7 | 23 | 36 | 6 | CYP124G | Melanin |
|  |  |  |  | CYP107BX | bacteriocin,NRPS,T1PKS |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP107MH1 | T1PKS,terpene |
|  |  |  |  | CYP183BC1 | T1PKS,terpene |
|  |  |  |  | CYP159F4 | T1PKS,terpene |
| *Streptomyces* sp. FxanaD5 | 15 | 14 | 3 | CYP170A | Terpene |
|  |  |  |  | CYP1240A5 | Terpene |
|  |  |  |  | CYP1216A1 | Terpene |
| *Streptomyces* *viridochromogenes* Tue57 | 31 | 38 | 8 | CYP107AH | T2PKS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP121A | CDPS |
|  |  |  |  | CYP1059A | Bacteriocin |
|  |  |  |  | CYP105B | Bacteriocin |
|  |  |  |  | CYP154U | NRPS |
|  |  |  |  | CYP156H | NRPS |
|  |  |  |  | CYP183L | Terpene |
| *Streptomyces* sp. GBA 94-10 | 20 | 26 | 10 | CYP105AK | NRPS |
|  |  |  |  | CYP107R1 | T2PKS |
|  |  |  |  | CYP107F | T2PKS |
|  |  |  |  | CYP105H | T3PKS,T1PKS,NRPS-like,NRPS,lanthipeptide |
|  |  |  |  | CYP105BT | butyrolactone,T1PKS,other,NRPS |
|  |  |  |  | CYP105BT | NRPS,other,T1PKS,butyrolactone |
|  |  |  |  | CYP105AC | NRPS,T3PKS,T1PKS |
|  |  |  |  | CYP105AC | NRPS,T3PKS,T1PKS |
|  |  |  |  | CYP107BX | T1PKS,NRPS |
|  |  |  |  | CYP170B | Terpene |
| *Streptomyces* sp. CNQ-525 | 18 | 43 | 15 | CYP251A | Terpene |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP105AC | transAT-PKS,T1PKS |
|  |  |  |  | CYP1959B1 | T1PKS |
|  |  |  |  | CYP1064A | Terpene |
|  |  |  |  | CYP157A | T3PKS |
|  |  |  |  | CYP154C | T3PKS |
|  |  |  |  | CYP1529A1 | Terpene |
|  |  |  |  | CYP1279A1 | NRPS |
|  |  |  |  | CYP165B | NRPS,T3PKS,other |
|  |  |  |  | CYP165E | NRPS,T3PKS,other |
|  |  |  |  | CYP126B6 | T1PKS |
|  |  |  |  | CYP107AT4 | T1PKS |
|  |  |  |  | CYP108B | LAP |
|  |  |  |  | CYP107MN1 | T1PKS |
| *Streptomyces* *mirabilis* OK461 | 37 | 31 | 2 | CYP158A | T3PKS |
|  |  |  |  | CYP170A | Terpene |
| *Streptomyces* *exfoliatus* DSMZ 41693 | 26 | 33 | 6 | CYP1037B | NRPS-like,T1PKS,NRPS |
|  |  |  |  | CYP105AC | NRPS |
|  |  |  |  | CYP183AS1 | T2PKS,terpene,ectoine |
|  |  |  |  | CYP183AR1 | T2PKS,terpene,ectoine |
|  |  |  |  | CYP158C1 | T3PKS |
|  |  |  |  | CYP158A | T3PKS |
| *Streptomyces* sp. PsTaAH-137 | 29 | 39 | 6 | CYP1238A2 | terpene,bacteriocin |
|  |  |  |  | CYP180A | terpene,bacteriocin |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP159A | Bacteriocin |
|  |  |  |  | CYP105D | Bacteriocin |
|  |  |  |  | CYP170B | Terpene |
| *Streptomyces* sp. Amel2xE9 | 27 | 35 | 10 | CYP105N | NRPS |
|  |  |  |  | CYP1043A | NRPS |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP1460B1 | NRPS |
|  |  |  |  | CYP105AE1 | T1PKS |
|  |  |  |  | CYP105AD2 | T1PKS |
|  |  |  |  | CYP107LF4 | NRPS,T1PKS |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP107G8 | T1PKS |
|  |  |  |  | CYP2045A | NRPS,NRPS-like |
| *Streptomyces* *prunicolor* NBRC 13075 | 44 | 32 | 8 | CYP157K | Terpene |
|  |  |  |  | CYP170A | Terpene |
|  |  |  |  | CYP105AB22 | transAT-PKS,T1PKS,T3PKS,PKS-like |
|  |  |  |  | CYP107LW1 | transAT-PKS,T1PKS,T3PKS,PKS-like |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP107AF2 | T2PKS |
|  |  |  |  | CYP157C | Terpene |
|  |  |  |  | CYP211D1 | T1PKS |
| *Streptomyces* sp. JS01 | 24 | 25 | 6 | CYP107BX | NRPS,T1PKS |
|  |  |  |  | CYP124G | Melanin |
|  |  |  |  | CYP1037B | NRPS,T1PKS |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP105BN | T2PKS,PKS-like,T1PKS |
|  |  |  |  | CYP105D | T1PKS,NRPS |
| *Streptomyces* sp. CNY228 | 19 | 30 | 6 | CYP1420A | PKS-like |
|  |  |  |  | CYP107BX | NRPS,T1PKS |
|  |  |  |  | CYP170B | Terpene |
|  |  |  |  | CYP107F | T3PKS |
|  |  |  |  | CYP105H | NRPS-like,lanthipeptide,NRPS,T1PKS |
|  |  |  |  | CYP146A | NRPS |
| *Streptomyces* sp. LaPpAH-165 | 24 | 27 | 6 | CYP107BT5 | NRPS |
|  |  |  |  | CYP107CD | T2PKS,terpene |
|  |  |  |  | CYP105DW1 | T1PKS |
|  |  |  |  | CYP1046A | T1PKS,NRPS |
|  |  |  |  | CYP154M12 | NRPS,T1PKS |
|  |  |  |  | CYP208A | NRPS,T1PKS |
| *Streptomyces* *purpureus* KA281, ATCC 21405 | 22 | 27 | 11 | CYP157C | Terpene |
|  |  |  |  | CYP283A | bacteriocin,bottromycin |
|  |  |  |  | CYP121A | other,CDPS |
|  |  |  |  | CYP158A | T3PKS |
|  |  |  |  | CYP217A3 | NRPS-like,T2PKS |
|  |  |  |  | CYP159A7P | Other |
|  |  |  |  | CYP180A | NRPS |
|  |  |  |  | CYP245A | Indole |
|  |  |  |  | CYP244A | Indole |
|  |  |  |  | CYP1038A | LAP,thiopeptide,NRPS-like,arylpolyene,T2PKS |
|  |  |  |  | CYP107F | T3PKS |
| 144 | 3873 | 4457 | 1231 |  |  |

Table S5. Comparative analysis of P450s that are part of secondary metabolite biosynthetic gene clusters (BGCs) and the BGCs having P450s in *Streptomyces* species. For comparative analysis, secondary metabolites BGCs that does not contain P450s also listed in the table.

|  |  |  |  |
| --- | --- | --- | --- |
| P450 family | Total number of P450s | BGC type | Total number of BGCs |
| CYP107 | 254 | Terpene | 199 |
| CYP105 | 219 | T1pks | 166 |
| CYP157 | 70 | Nrps | 129 |
| CYP154 | 56 | T3pks | 82 |
| CYP170 | 53 | T1pks-Nrps | 40 |
| CYP158 | 44 | NRPS,T1PKS | 32 |
| CYP163 | 42 | Other | 28 |
| CYP183 | 33 | Melanin | 21 |
| CYP113 | 27 | T2pks | 21 |
| CYP124 | 26 | Indole | 20 |
| CYP251 | 24 | T1PKS,NRPS | 16 |
| CYP156 | 21 | Butyrolactone | 15 |
| CYP180 | 19 | Transatpks-T1pks-Nrps | 15 |
| CYP165 | 16 | T2PKS,PKS-like,T1PKS | 11 |
| CYP161 | 15 | butyrolactone,T1PKS,NRPS,other | 10 |
| CYP285 | 11 | Transatpks-Nrps | 10 |
| CYP121 | 10 | Lantipeptide | 9 |
| CYP147 | 10 | Lantipeptide-Nrps | 9 |
| CYP208 | 9 | Bacteriocin | 7 |
| CYP1064 | 8 | NRPS-like | 7 |
| CYP126 | 8 | NRPS-like,T1PKS | 7 |
| CYP181 | 8 | Terpene-T1pks | 7 |
| CYP146 | 7 | T1pks-Butyrolactone-Nrps | 6 |
| CYP162 | 7 | Ladderane-Arylpolyene-Nrps | 5 |
| CYP1279 | 6 | Lantipeptide-T1pks-Nrps | 5 |
| CYP1037 | 5 | NRPS,butyrolactone | 5 |
| CYP1192 | 5 | Otherks | 5 |
| CYP1207 | 5 | T2pks-T1pks-Otherks | 5 |
| CYP1459 | 5 | T3pks-Nrps | 5 |
| CYP184 | 5 | Terpene-T1pks-Nrps | 5 |
| CYP1959 | 5 | Thiopeptide | 5 |
| CYP247 | 5 | Bacteriocin-Lantipeptide-T1pks-Otherks-Nrps | 4 |
| CYP1029 | 4 | Bacteriocin-Nrps | 4 |
| CYP1031 | 4 | Bacteriocin-T1pks-Nrps | 4 |
| CYP1189 | 4 | Blactam-T1pks-Nrps | 4 |
| CYP125 | 4 | Ladderane-Nrps | 4 |
| CYP159 | 4 | NRPS,T3PKS,other | 4 |
| CYP1618 | 4 | NRPS,T3PKS,T1PKS | 4 |
| CYP211 | 4 | PKS-like,terpene | 4 |
| CYP245 | 4 | T2pks-Oligosaccharide-Nucleoside-Nrps | 4 |
| CYP283 | 4 | bacteriocin,bottromycin | 3 |
| CYP1004 | 3 | Bacteriocin-Nrps-Lantipeptide-T1pks-Otherks | 3 |
| CYP102 | 3 | lanthipeptide | 3 |
| CYP1035 | 3 | Lantipeptide-Terpene | 3 |
| CYP1216 | 3 | Nrps-Arylpolyene-Ladderane | 3 |
| CYP123 | 3 | NRPS-like,arylpolyene,ladderane,NRPS | 3 |
| CYP1237 | 3 | NRPS-like,CDPS | 3 |
| CYP1240 | 3 | Nucleoside | 3 |
| CYP1265 | 3 | oligosaccharide,T2PKS,PKS-like,NRPS | 3 |
| CYP1278 | 3 | Oligosaccharide-Ectoine-T2pks-Nrps-T1pks-Otherks | 3 |
| CYP1420 | 3 | Otherks-Nrps | 3 |
| CYP1423 | 3 | PKS-like | 3 |
| CYP1424 | 3 | PKS-like,NRPS | 3 |
| CYP155 | 3 | T1PKS,terpene | 3 |
| CYP166 | 3 | T1pks-Arylpolyene | 3 |
| CYP178 | 3 | T2PKS,T1PKS | 3 |
| CYP186 | 3 | T2pks-Nrps | 3 |
| CYP2045 | 3 | T2pks-Oligosaccharide-Nrps-Otherks | 3 |
| CYP1005 | 2 | T3PKS,T1PKS,NRPS-like,NRPS,lanthipeptide | 3 |
| CYP1013 | 2 | T3pks-T1pks-Nrps | 3 |
| CYP1038 | 2 | T3pks-Terpene-Nrps | 3 |
| CYP1039 | 2 | terpene,T1PKS,NRPS-like | 3 |
| CYP1043 | 2 | Arylpolyene | 2 |
| CYP1044 | 2 | bacteriocin,transAT-PKS,PKS-like,T1PKS,NRPS | 2 |
| CYP1046 | 2 | Bacteriocin-Oligosaccharide | 2 |
| CYP1048 | 2 | Bacteriocin-Terpene-Nrps | 2 |
| CYP1059 | 2 | butyrolactone,NRPS,T1PKS | 2 |
| CYP1060 | 2 | Butyrolactone-Otherks | 2 |
| CYP108 | 2 | CDPS | 2 |
| CYP1190 | 2 | Fused | 2 |
| CYP1191 | 2 | fused,T3PKS | 2 |
| CYP1198 | 2 | Indole-Terpene-Nrps | 2 |
| CYP1274 | 2 | lanthipeptide,NRPS,T3PKS | 2 |
| CYP1341 | 2 | LAP | 2 |
| CYP1417 | 2 | Lassopeptide-Nrps | 2 |
| CYP1469 | 2 | NRPS,arylpolyene | 2 |
| CYP151 | 2 | Nrps-T1pks-Otherks | 2 |
| CYP1562 | 2 | Nrps-Transatpks-Terpene-Otherks | 2 |
| CYP171 | 2 | nucleoside,betalactone,NRPS-like | 2 |
| CYP1722 | 2 | Oligosaccharide-T1pks-Nrps | 2 |
| CYP179 | 2 | other,NRPS,T1PKS | 2 |
| CYP182 | 2 | other,T1PKS | 2 |
| CYP194 | 2 | other,T1PKS,PKS-like | 2 |
| CYP2027 | 2 | other,T3PKS,NRPS | 2 |
| CYP244 | 2 | Phosphoglycolipid | 2 |
| CYP246 | 2 | T1PKS,butyrolactone | 2 |
| CYP268 | 2 | T1PKS,NRPS,butyrolactone | 2 |
| CYP1041 | 1 | T1pks-Otherks | 2 |
| CYP1042 | 1 | T1pks-Siderophore | 2 |
| CYP1045 | 1 | T2PKS,PKS-like | 2 |
| CYP1056 | 1 | T2PKS,terpene | 2 |
| CYP1057 | 1 | T2PKS,terpene,ectoine | 2 |
| CYP1058 | 1 | T2pks-Butyrolactone | 2 |
| CYP1061 | 1 | T2pks-Lantipeptide-Terpene | 2 |
| CYP1193 | 1 | T2pks-Otherks | 2 |
| CYP1194 | 1 | T3PKS,terpene | 2 |
| CYP1196 | 1 | T3pks-Otherks-Butyrolactone-Nrps | 2 |
| CYP1197 | 1 | T3pks-Terpene | 2 |
| CYP1199 | 1 | terpene,bacteriocin | 2 |
| CYP1200 | 1 | terpene,NRPS | 2 |
| CYP122 | 1 | terpene,phenazine | 2 |
| CYP1223 | 1 | Terpene-Nrps | 2 |
| CYP1228 | 1 | Terpene-Otherks | 2 |
| CYP1238 | 1 | Terpene-T3pks-Cyanobactin-Nrps | 2 |
| CYP1248 | 1 | Thiopeptide-Bacteriocin | 2 |
| CYP1253 | 1 | Transatpks | 2 |
| CYP134 | 1 | transAT-PKS,NRPS,T1PKS | 2 |
| CYP135 | 1 | transAT-PKS,T1PKS,T3PKS,PKS-like | 2 |
| CYP136 | 1 | transAT-PKS,T1PKS,transAT-PKS-like,NRPS | 2 |
| CYP1373 | 1 | transAT-PKS-like,NRPS,T1PKS | 2 |
| CYP1385 | 1 | Transatpks-Terpene-Nrps | 2 |
| CYP1394 | 1 | Arylpolyene-Ladderane | 1 |
| CYP1416 | 1 | Arylpolyene-Nrps | 1 |
| CYP1418 | 1 | bacteriocin,NRPS,T1PKS | 1 |
| CYP1448 | 1 | bacteriocin,terpene | 1 |
| CYP145 | 1 | Bacteriocin-Bottromycin | 1 |
| CYP1460 | 1 | Bacteriocin-Lantipeptide | 1 |
| CYP152 | 1 | Bacteriocin-Lantipeptide-T1pks | 1 |
| CYP1524 | 1 | Bacteriocin-Otherks | 1 |
| CYP1529 | 1 | Bacteriocin-T1pks | 1 |
| CYP1568 | 1 | betalactone,NRPS | 1 |
| CYP1634 | 1 | Blactam-Nrps | 1 |
| CYP1658 | 1 | Butyrolactone-Amglyccycl-T1pks-Nrps | 1 |
| CYP1832 | 1 | Butyrolactone-T1pks-Nrps | 1 |
| CYP1859 | 1 | Butyrolactone-T1pks-Otherks | 1 |
| CYP1917 | 1 | Butyrolactone-Terpene | 1 |
| CYP1984 | 1 | CDPS,NRPS-like | 1 |
| CYP1995 | 1 | Ectoine | 1 |
| CYP2080 | 1 | ectoine,PKS-like,T1PKS | 1 |
| CYP2134 | 1 | hglE-KS,LAP,terpene | 1 |
| CYP217 | 1 | hglE-KS,T1PKS | 1 |
| CYP2238 | 1 | Indole-T1pks | 1 |
| CYP2266 | 1 | Ladderane | 1 |
| CYP285 | 1 | lanthipeptide,CDPS | 1 |
| CYP294 | 1 | lanthipeptide,NRPS,T1PKS,NRPS-like | 1 |
| 135 | 1231 | Lantipeptide-Linaridin | 1 |
|  |  | LAP,NRPS,T1PKS,butyrolactone | 1 |
|  |  | LAP,thiopeptide,lassopeptide,NRPS | 1 |
|  |  | LAP,thiopeptide,NRPS-like,arylpolyene,T2PKS | 1 |
|  |  | LAP,thiopeptide,terpene | 1 |
|  |  | Lassopeptide | 1 |
|  |  | Linaridin-T1pks-Lassopeptide-Nrps | 1 |
|  |  | Melanin-Nrps | 1 |
|  |  | NRPS,bacteriocin | 1 |
|  |  | NRPS,betalactone | 1 |
|  |  | NRPS,betalactone,T3PKS | 1 |
|  |  | NRPS,indole | 1 |
|  |  | NRPS,lanthipeptide | 1 |
|  |  | NRPS,lanthipeptide,T1PKS | 1 |
|  |  | NRPS,lanthipeptide,T2PKS | 1 |
|  |  | NRPS,lassopeptide | 1 |
|  |  | NRPS,NRPS-like | 1 |
|  |  | NRPS,other | 1 |
|  |  | NRPS,other,T1PKS | 1 |
|  |  | NRPS,other,T1PKS,butyrolactone | 1 |
|  |  | NRPS,phosphonate | 1 |
|  |  | NRPS,PKS-like | 1 |
|  |  | NRPS,T1PKS,bacteriocin | 1 |
|  |  | NRPS,T1PKS,butyrolactone | 1 |
|  |  | NRPS,T1PKS,ladderane,NRPS-like | 1 |
|  |  | NRPS,T1PKS,other | 1 |
|  |  | NRPS,T1PKS,terpene | 1 |
|  |  | NRPS,T1PKS,thiopeptide | 1 |
|  |  | NRPS,T2PKS,PKS-like,other,oligosaccharide | 1 |
|  |  | NRPS,T2PKS,T1PKS,NRPS-like | 1 |
|  |  | NRPS,T3PKS | 1 |
|  |  | NRPS,T3PKS,terpene | 1 |
|  |  | NRPS,thiopeptide | 1 |
|  |  | NRPS-like,arylpolyene | 1 |
|  |  | NRPS-like,lanthipeptide,NRPS,T1PKS | 1 |
|  |  | NRPS-like,NRPS | 1 |
|  |  | NRPS-like,other | 1 |
|  |  | NRPS-like,T1PKS,NRPS | 1 |
|  |  | NRPS-like,T2PKS | 1 |
|  |  | Nrps-Siderophore | 1 |
|  |  | Nrps-T2pks-Otherks-T1pks-Phenazine | 1 |
|  |  | Nucleoside-Lassopeptide-Nrps | 1 |
|  |  | oligosaccharide,T1PKS | 1 |
|  |  | oligosaccharide,T2PKS,NRPS | 1 |
|  |  | other,CDPS | 1 |
|  |  | other,NRPS | 1 |
|  |  | other,T1PKS,butyrolactone | 1 |
|  |  | other,T1PKS,LAP,thiopeptide | 1 |
|  |  | other,terpene | 1 |
|  |  | Otherks-Butyrolactone-Nrps | 1 |
|  |  | Phosphonate-Nrps | 1 |
|  |  | Phosphonate-T3pks-Nrps-Ladderane | 1 |
|  |  | PKS-like,butyrolactone | 1 |
|  |  | PKS-like,LAP,butyrolactone,T1PKS | 1 |
|  |  | PKS-like,T1PKS | 1 |
|  |  | Siderophore | 1 |
|  |  | Siderophore | 1 |
|  |  | T1PKS,NRPS,melanin,T2PKS | 1 |
|  |  | T1PKS,NRPS,NRPS-like | 1 |
|  |  | T1PKS,NRPS,T2PKS | 1 |
|  |  | T1PKS,NRPS,terpene | 1 |
|  |  | T1PKS,NRPS-like | 1 |
|  |  | T1PKS,NRPS-like,lanthipeptide,NRPS | 1 |
|  |  | T1PKS,NRPS-like,NRPS | 1 |
|  |  | T1PKS,NRPS-like,NRPS,lanthipeptide | 1 |
|  |  | T1PKS,transAT-PKS | 1 |
|  |  | T1PKS,transAT-PKS-like | 1 |
|  |  | T1pks-Arylpolyene-Ladderane | 1 |
|  |  | T1pks-Butyrolactone-Otherks | 1 |
|  |  | T1pks-Ectoine-Otherks | 1 |
|  |  | T1pks-Transatpks-Terpene | 1 |
|  |  | T2PKS,bacteriocin | 1 |
|  |  | T2PKS,butyrolactone | 1 |
|  |  | T2PKS,LAP | 1 |
|  |  | T2PKS,NRPS | 1 |
|  |  | T2PKS,terpene,NRPS | 1 |
|  |  | T2pks-Butyrolactone-Nrps | 1 |
|  |  | T2pks-Oligosaccharide | 1 |
|  |  | T3PKS,NRPS-like | 1 |
|  |  | T3PKS,other,NRPS-like,NRPS,T1PKS | 1 |
|  |  | T3PKS,PKS-like,NRPS | 1 |
|  |  | T3pks-Butyrolactone | 1 |
|  |  | T3pks-Fused-Nrps | 1 |
|  |  | T3pks-Terpene-Otherks | 1 |
|  |  | Terpene, T1PKS | 1 |
|  |  | terpene,amglyccycl | 1 |
|  |  | terpene,betalactone | 1 |
|  |  | terpene,lanthipeptide,NRPS | 1 |
|  |  | terpene,NRPS,PKS-like,transAT-PKS,furan | 1 |
|  |  | terpene,other | 1 |
|  |  | terpene,T3PKS | 1 |
|  |  | terpene,thiopeptide,LAP,NRPS | 1 |
|  |  | thiopeptide,LAP | 1 |
|  |  | thiopeptide,other,furan,LAP | 1 |
|  |  | Thiopeptide-T1pks | 1 |
|  |  | Thiopeptide-Terpene | 1 |
|  |  | transAT-PKS,NRPS | 1 |
|  |  | transAT-PKS,NRPS,transAT-PKS-like,T1PKS | 1 |
|  |  | transAT-PKS,T1PKS | 1 |
|  |  | Transatpks-T1pks-Otherks-Nrps | 1 |
|  |  | 235 | 1231 |

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