**Table S2. The metabolites identified in hypha in *Metarhizium* species using LC-MS.**

|  |  |  |  |
| --- | --- | --- | --- |
| **m/z** | **RT****(min)** | **Metabolites\*** | **The mean peak area in each *Metarhizium* species** |
| **MAM** | **MAC** | **MAJ** | **MGU** | **MBR** | **MAA** | **MAN** |
| 566.33  | 27.75  | Proto Dtx B | ND | ND | ND | 2.13E+02 | 7.75E+01 | 1.55E+02 | 2.28E+02 |
| 610.34  | 21.49  | hydroxy-Dtx B | ND | ND | ND | 5.75E+04 | 6.60E+03 | 1.94E+04 | 7.31E+03 |
| 608.36  | 25.55  | Homo-Dtx B | ND | ND | ND | ND | 4.50E+02 | 7.29E+02 | 3.81E+02 |
| 596.36  | 21.35  | Dtx F | ND | ND | ND | 1.72E+04 | 3.02E+03 | 7.16E+03 | 3.19E+03 |
| 580.37  | 29.13  | Dtx E2 | ND | ND | ND | 7.29E+03 | ND | ND | 1.43E+03 |
| 616.37  | 29.37  | Dtx E1 Diol | ND | ND | ND | 1.79E+05 | 9.23E+04 | 1.10E+05 | 9.79E+04 |
| 608.40  | 31.07  | Dtx E1 | ND | ND | ND | 4.51E+03 | 3.07E+03 | 2.95E+03 | 2.76E+03 |
| 630.33  | 23.43  | Dtx E Chlorohydrin | ND | ND | ND | 2.38E+05 | 8.00E+04 | 1.59E+05 | 5.65E+04 |
| 594.39  | 29.36  | Dtx E | ND | ND | ND | 2.67E+05 | 1.19E+05 | 1.75E+05 | 1.31E+05 |
| 624.36  | 22.83  | Dtx D2 | ND | ND | ND | 2.23E+05 | 7.05E+04 | 1.30E+05 | 7.05E+04 |
| 638.29  | 22.06  | Dtx D1 | ND | ND | ND | 3.84E+04 | 8.67E+03 | 1.41E+04 | 6.14E+03 |
| 624.36  | 22.34  | Dtx D | ND | ND | ND | 2.30E+04 | 6.15E+03 | 1.78E+04 | 6.91E+03 |
| 582.37  | 27.30  | Dtx C2 | ND | ND | ND | 4.77E+03 | 1.41E+03 | 2.25E+03 | 7.65E+02 |
| 610.38  | 22.73  | Dtx C | ND | ND | ND | 3.14E+04 | 1.12E+04 | 2.30E+04 | 1.00E+04 |
| 580.37  | 27.30  | Dtx B2 | ND | ND | ND | 9.44E+04 | 3.01E+04 | 4.53E+04 | 1.72E+04 |
| 608.36  | 24.47  | Dtx B1 | ND | ND | ND | 3.01E+04 | 6.61E+03 | 1.83E+04 | 4.11E+03 |
| 606.32  | 26.22  | Dtx A5 | ND | ND | ND | 4.01E+02 | 1.72E+02 | 3.53E+02 | ND |
| 644.35  | 25.70  | Dtx A4 Chrorohydrin | ND | ND | ND | ND | 5.80E+02 | 7.54E+02 | 7.47E+02 |
| 592.37  | 27.94  | Dtx A4 | ND | ND | ND | 2.18E+03 | 6.34E+02 | 1.43E+03 | 7.86E+02 |
| 566.35  | 25.90  | Dtx A3 | ND | ND | ND | 1.11E+04 | 1.83E+03 | 1.57E+03 | 9.68E+02 |
| 564.34  | 24.26  | Dtx A2 | ND | ND | ND | 9.43E+03 | 1.48E+03 | 5.00E+03 | 2.02E+03 |
| 592.37  | 29.00  | Dtx A1 | ND | ND | ND | 2.46E+02 | 2.90E+03 | 1.86E+03 | 2.41E+03 |
| 578.35  | 26.27  | Dtx A | ND | ND | ND | 3.65E+05 | 1.61E+05 | 2.17E+05 | 1.26E+05 |
| 580.36  | 26.26  | Dihydroxy-Dtx A | ND | ND | ND | 4.02E+04 | 1.22E+04 | 2.01E+04 | 8.91E+03 |
| 566.35  | 24.78  | Desmethyl-Dtx B2 | ND | ND | ND | 1.08E+04 | 1.44E+03 | 3.02E+03 | 1.11E+03 |
| 580.37  | 27.93  | Desmethyl-Dtx B | ND | ND | ND | 1.62E+05 | 3.47E+04 | 8.42E+04 | 4.05E+04 |
| 564.34  | 24.78  | Desmethyl-Dtx A | ND | ND | ND | 1.73E+05 | 2.83E+04 | 5.54E+04 | 2.20E+04 |
| 439.29  | 12.83  | Debromomethoxymarinone | 1.40E+03 | ND | ND | 1.44E+02 | 5.23E+02 | ND | 9.64E+01 |
| 477.14  | 17.36  | 1,3,6,8-Tetrahydroxy-2-methylanthraquinone | ND | ND | ND | 1.43E+03 | ND | ND | ND |
| 332.13  | 9.26  | 1,4-Dihydroxy-2-(2-pyridylmethyl)anthraquinone | ND | ND | 2.60E+02 | 2.33E+03 | 1.30E+03 | 1.19E+03 | 7.93E+02 |
| 330.09  | 4.11  | 1-Bromoanthraquinone-2-carboxylic acid | ND | ND | 4.88E+02 | 7.46E+01 | ND | 2.50E+02 | 2.34E+02 |
| 457.11  | 18.83  | 1-Hydroxysulfurmycin A | ND | ND | ND | 2.73E+03 | ND | ND | ND |
| 223.07  | 6.94  | 1-Methylanthraquinone | ND | ND | ND | 4.70E+02 | ND | ND | ND |
| 289.14  | 11.87  | 2-(4-Methyl-1,3-pentadienyl)anthraquinone | ND | ND | ND | 3.75E+03 | 9.81E+02 | 2.41E+03 | 2.09E+03 |
| 375.14  | 12.90  | 2,8-Dihydroxy-6-hydroxymethyl-1,3,5-trimethoxyanthraquinone | ND | ND | 1.38E+02 | 1.37E+03 | 1.04E+03 | 1.25E+03 | 8.83E+02 |
| 301.07  | 16.15  | 2-Methoxy-1-nitroanthraquinone | ND | ND | ND | 1.81E+03 | ND | ND | ND |
| 223.08  | 7.39  | 2-Methylanthraquinone | ND | ND | 5.54E+01 | 9.24E+02 | ND | 2.41E+02 | 6.82E+01 |
| 355.05  | 3.05  | 3',4'-Dehydro-4'-deoxydothistromin | 3.96E+02 | 1.02E+02 | ND | 1.39E+03 | 1.79E+02 | 1.03E+03 | 3.84E+02 |
| 289.14  | 11.08  | 4-Hydroxy-9-methoxy--lapachone | ND | ND | ND | 5.58E+02 | ND | 2.24E+02 | 1.42E+02 |
| 209.10  | 3.19  | 9,10-Anthraquinon | 5.39E+01 | 9.80E+01 | 1.15E+02 | 3.19E+02 | 1.00E+02 | 1.90E+02 | 1.78E+02 |
| 413.13  | 2.73  | Aklavinone | ND | ND | ND | ND | ND | 1.73E+02 | ND |
| 387.17  | 2.72  | Annulin B | 1.00E+02 | ND | ND | 8.72E+01 | ND | 1.93E+02 | ND |
| 436.11  | 2.76  | Anthracyclinone blue A | 3.04E+01 | ND | ND | 3.28E+02 | ND | 4.81E+01 | ND |
| 309.16  | 2.54  | Anthrakunthone | 1.38E+03 | 8.69E+01 | 9.76E+01 | 8.16E+02 | 2.82E+02 | 3.08E+02 | 7.23E+02 |
| 259.06  | 17.36  | Anthraquinone-1,8-dicarboxylic acid | ND | ND | ND | 4.82E+02 | ND | ND | ND |
| 691.06  | 17.44  | Antibiotic IB 00208 | 1.26E+02 | ND | ND | ND | ND | ND | ND |
| 349.13  | 10.09  | Antibiotic M 13-1 | 8.07E+02 | ND | 1.20E+02 | ND | ND | ND | 5.66E+01 |
| 437.15  | 12.39  | Antibiotic UCE 6 | 1.59E+02 | ND | ND | ND | ND | ND | ND |
| 327.05  | 2.81  | Araliolactone A | 1.35E+03 | 1.61E+03 | 7.93E+02 | 3.39E+03 | 1.79E+03 | 1.70E+03 | 1.00E+02 |
| 307.15  | 11.30  | Bungone A | ND | ND | ND | 2.74E+03 | 8.52E+02 | 1.72E+03 | 2.00E+03 |
| 337.18  | 3.24  | Bungone B | 5.74E+02 | ND | ND | ND | 7.08E+01 | ND | 1.47E+02 |
| 380.12  | 3.46  | C.I. Disperse Blue 60 | 1.66E+02 | ND | ND | ND | ND | ND | ND |
| 355.19  | 5.79  | Citromycinone | 1.96E+02 | 1.21E+02 | ND | 3.34E+02 | 9.95E+01 | 5.36E+01 | 1.52E+02 |
| 283.06  | 4.01  | Damnacanthal | ND | 3.16E+01 | 2.18E+02 | ND | ND | 2.02E+02 | 1.17E+02 |
| 425.19  | 9.16  | Debromohydroxymarinone | ND | 5.72E+01 | 1.34E+02 | ND | ND | 2.03E+02 | 2.00E+02 |
| 367.12  | 3.56  | HMP-M2 | 1.82E+02 | 1.79E+02 | ND | ND | ND | 2.41E+02 | ND |
| 259.10  | 7.09  | Hydroxy Lapachone | 1.89E+02 | 2.90E+02 | 4.95E+02 | 9.66E+02 | 2.29E+02 | 3.56E+02 | 2.86E+01 |
| 273.15  | 10.49  | methoxy Lapachone | 2.60E+02 | ND | ND | ND | ND | ND | ND |
| 355.18  | 4.12  | Naphterpin | 6.78E+02 | 2.93E+02 | ND | 1.38E+03 | 5.07E+02 | ND | ND |
| 513.23  | 12.18  | Naphthablin | 9.44E+02 | 1.70E+02 | 6.02E+01 | 6.68E+02 | 6.89E+02 | 8.73E+02 | 7.59E+01 |
| 357.19  | 4.11  | Naphthgeranine B | 2.80E+02 | ND | ND | 2.64E+02 | 2.80E+02 | ND | ND |
| 373.19  | 4.12  | Naphthgeranine C | 1.00E+02 | ND | ND | 4.22E+02 | 1.75E+02 | 1.69E+02 | 2.57E+02 |
| 389.18  | 3.70  | Naphthgeranine D | 8.59E+02 | ND | ND | ND | 2.56E+02 | 4.50E+02 | 7.59E+02 |
| 353.13  | 2.66  | Vismiaquinone | 3.73E+02 | ND | ND | 2.63E+02 | 1.32E+02 | 1.59E+02 | 2.72E+02 |
| 216.14  | 11.95  | 1-Methoxy-3,5-dinitro-2(3H)-pyridinone | 8.90E+01 | ND | ND | ND | ND | ND | ND |
| 296.12  | 8.45  | Akanthomycin | ND | ND | ND | ND | ND | 4.10E+02 | 2.09E+03 |
| 422.23  | 4.07  | Antibiotic TMC 72 | 4.30E+02 | 3.69E+02 | 4.52E+02 | 1.52E+03 | 2.89E+02 | 1.04E+03 | ND |
| 446.22  | 7.95  | Apiosporamide | ND | 1.75E+02 | ND | 7.86E+02 | 2.27E+02 | 2.47E+02 | ND |
| 208.07  | 7.29  | Ciclopirox | ND | ND | ND | ND | ND | ND | 1.79E+02 |
| 292.11  | 8.66  | Cordypyridones D | 9.27E+02 | ND | 1.98E+02 | 2.98E+02 | 1.31E+02 | ND | 6.22E+01 |
| 508.24  | 14.27  | Cytochalasin Q | ND | 6.15E+02 | 1.36E+02 | 4.80E+02 | ND | ND | ND |
| 432.13  | 14.93  | Fischerin | ND | ND | 4.87E+02 | ND | ND | ND | ND |
| 292.10  | 3.54  | Fusaricide | 1.61E+03 | ND | 3.35E+02 | 8.60E+02 | 4.11E+02 | ND | ND |
| 462.24  | 11.56  | GKK1032A2 | 1.30E+03 | ND | ND | ND | ND | ND | ND |
| 206.11  | 13.78  | Haplotusine | ND | ND | ND | ND | 8.30E+03 | 1.26E+03 | 3.59E+03 |
| 446.23  | 8.39  | Hirsutellone A | 4.02E+01 | 2.28E+02 | 6.19E+01 | 5.30E+02 | 4.71E+02 | 5.35E+02 | 4.77E+01 |
| 448.22  | 8.99  | Hirsutellone B | 7.80E+02 | 1.24E+03 | 9.90E+02 | 2.95E+03 | 1.52E+03 | 2.50E+03 | 1.20E+03 |
| 462.20  | 4.18  | Hirsutellone C | 4.55E+02 | 3.19E+02 | 5.87E+01 | 7.17E+02 | 4.13E+02 | 5.61E+02 | 2.01E+02 |
| 140.07  | 3.51  | Metipirox | 2.98E+02 | 7.39E+02 | 2.87E+02 | 6.08E+01 | 9.45E+02 | 1.57E+03 | 2.38E+03 |
| 460.20  | 5.98  | Militarinone A | ND | ND | ND | 5.56E+01 | ND | 1.87E+02 | ND |
| 582.30  | 7.77  | Pyridomacrolidin | 5.70E+03 | 2.17E+02 | 2.03E+02 | 7.37E+02 | 3.08E+02 | 2.22E+02 | 2.17E+02 |
| 386.24  | 10.49  | Pyridoverich | 2.89E+03 | ND | ND | ND | 8.50E+01 | ND | ND |
| 264.12  | 8.63  | Pyridoxatin | 8.61E+02 | 1.60E+02 | 2.91E+02 | 2.40E+02 | 8.90E+01 | 6.80E+01 | 9.65E+01 |
| 358.15  | 19.74  | Rilopirox | ND | ND | 4.74E+02 | ND | 1.03E+02 | ND | 1.12E+02 |
| 444.24  | 8.30  | Torrubiellutin A | 2.74E+03 | ND | ND | 2.56E+03 | 1.80E+03 | 2.34E+02 | ND |
| 486.25  | 4.06  | Torrubiellutin B | 1.33E+02 | 1.84E+02 | ND | 3.46E+02 | 4.57E+01 | ND | ND |
| 528.26  | 5.84  | Torrubiellutin C | 7.71E+02 | 2.91E+02 | 1.96E+02 | 1.22E+03 | 5.83E+02 | 6.74E+02 | 5.13E+02 |
| 337.16  | 19.66  | 5-Chloro, 5'-oxo-Colletorin B | ND | ND | ND | ND | 2.93E+02 | ND | 5.51E+02 |
| 355.19  | 5.79  | 6'-Ketone-Colletochlorin A | 1.96E+02 | 1.21E+02 | ND | 3.34E+02 | 9.95E+01 | 5.36E+01 | 1.52E+02 |
| 403.18  | 6.27  | 8',9'-Didehydro-Ascochlorin | ND | 4.93E+02 | ND | ND | ND | ND | ND |
| 325.23  | 39.87  | Acetoxyscirpenediol | 5.31E+01 | 9.51E+01 | ND | ND | 3.72E+01 | ND | 1.01E+02 |
| 405.18  | 4.10  | Ascochlorin | ND | 4.18E+01 | ND | 4.19E+02 | 2.39E+02 | 9.74E+01 | ND |
| 423.19  | 6.09  | Ascofuranol | ND | ND | 2.87E+02 | 1.02E+03 | 8.90E+02 | 1.62E+03 | 1.21E+03 |
| 245.13  | 12.68  | Colletochlorin D | ND | ND | ND | 7.80E+01 | 2.71E+02 | 4.94E+02 | ND |
| 323.13  | 34.50  | Colletorin B | 1.08E+02 | 6.80E+01 | 7.74E+01 | 2.24E+02 | 8.06E+01 | 6.55E+01 | 1.45E+02 |
| 407.16  | 9.14  | Grifolic acid | ND | 1.42E+02 | 3.57E+01 | 2.59E+02 | ND | 1.82E+02 | 7.90E+01 |
| 569.30  | 9.71  | Helvolic acid | 2.17E+02 | 1.92E+03 | 1.06E+03 | 2.31E+03 | 1.27E+03 | 2.90E+03 | 5.29E+02 |
| 283.06  | 4.01  | Paecilomycine B | ND | 3.16E+01 | 2.18E+02 | ND | ND | 2.02E+02 | 1.17E+02 |
| 265.11  | 13.66  | Paecilomycine C | ND | 4.99E+02 | 1.66E+02 | 6.13E+02 | 1.82E+02 | 3.19E+02 | ND |
| 267.11  | 3.40  | Spirotenuipesine A | 6.22E+02 | 9.55E+02 | 6.23E+02 | 2.37E+03 | 8.46E+02 | 1.34E+03 | 4.09E+02 |
| 283.15  | 7.03  | Spirotenuipesine B | ND | ND | ND | ND | ND | 4.03E+02 | ND |
| 325.23  | 11.88  | Tenuipesine A | ND | ND | ND | 8.58E+03 | 2.23E+03 | 4.94E+03 | 4.88E+03 |

\*Note: Dtx, destruxin; ND, not detected.