**Suppl Table 1:** Partial list of differentially regulated metabolites by Undernourishment in both +ve and -ve ion modes.

|  |  |  |
| --- | --- | --- |
| **Source ID** | **Name** | **FC** |
| HMDB0006709 | Ubiquinone-2 | 1.4 |
| HMDB0030064 | Cohulupone | 1.4 |
| HMDB0031373 | (1(10)E,4E,6a,9b)-9-(2-Methylpropanoyloxy)-1(10),4,11(13)-germacratrien-12,6-olide | 1.4 |
| HMDB0035500 | Panaquinquecol 6 | 1.4 |
| HMDB0013272 | N-Lauroylglycine | 3.8449 |
| HMDB0006512 | 3-Mercaptolactate-cysteine disulfide | 1.7034 |
| HMDB0001342 | Thymidine 5'-triphosphate | 0.52293 |
| HMDB0056273 | DG(24:1n9/0:0/22:2n6) | 0.51089 |
| HMDB0128563 | ({3,4,5-trihydroxy-6-[5-hydroxy-7-methoxy-4-oxo-2-(2,4,5-trihydroxyphenyl)-4H-chromen-6-yl]oxan-2-yl}methoxy)sulfonic acid | 0.25673 |
| HMDB0128564 | {4,5-dihydroxy-2-[5-hydroxy-7-methoxy-4-oxo-2-(2,4,5-trihydroxyphenyl)-4H-chromen-6-yl]-6-(hydroxymethyl)oxan-3-yl}oxidanesulfonic acid | 0.25673 |
| HMDB0128565 | {3,5-dihydroxy-2-[5-hydroxy-7-methoxy-4-oxo-2-(2,4,5-trihydroxyphenyl)-4H-chromen-6-yl]-6-(hydroxymethyl)oxan-4-yl}oxidanesulfonic acid | 0.25673 |
| HMDB0128566 | {4,5-dihydroxy-6-[5-hydroxy-7-methoxy-4-oxo-2-(2,4,5-trihydroxyphenyl)-4H-chromen-6-yl]-2-(hydroxymethyl)oxan-3-yl}oxidanesulfonic acid | 0.25673 |
| HMDB0005457 | TG(18:1(9Z)/20:1(11Z)/20:1(11Z)) | 3.465 |
| HMDB0031168 | Cohibin A | 0.11795 |
| HMDB0031169 | Cohibin B | 0.11795 |
| HMDB0128690 | 2-amino-4-({1-[(carboxymethyl)-C-hydroxycarbonimidoyl]-2-{[1-(6,7-dimethoxy-2H-1,3-benzodioxol-5-yl)-2-hydroxy-3-oxopropyl]sulfanyl}ethyl}-C-hydroxycarbonimidoyl)butanoic acid | 0.24419 |
| HMDB0128693 | 2-amino-4-({1-[(carboxymethyl)-C-hydroxycarbonimidoyl]-2-{[1-(6,7-dimethoxy-2H-1,3-benzodioxol-5-yl)-1-hydroxy-3-oxopropan-2-yl]sulfanyl}ethyl}-C-hydroxycarbonimidoyl)butanoic acid | 0.24419 |
| HMDB0056102 | DG(22:0/0:0/22:2n6) | 2.1106 |
| HMDB0056122 | DG(24:0/0:0/20:2n6) | 2.1106 |
| HMDB0056219 | DG(20:1n9/0:0/24:1n9) | 2.1106 |
| HMDB0055369 | TG(18:4(6Z,9Z,12Z,15Z)/16:0/18:4(6Z,9Z,12Z,15Z)) | 1.3065 |
| HMDB0001206 | Acetyl-CoA | 6.7935 |
| HMDB0035910 | Cedryl acetate | 0.52166 |
| HMDB0036153 | Shyobunyl acetate | 0.52166 |
| HMDB0037218 | Guaiol acetate | 0.52166 |
| HMDB0037224 | alpha-Caryophyllene alcohol acetate | 0.52166 |
| HMDB0037273 | beta-Caryophyllene alcohol acetate | 0.52166 |
| HMDB0039630 | Nerolidyl acetate | 0.52166 |
| HMDB0038537 | Glycinoprenol 10 | 2.0485 |
| HMDB0126623 | 2-amino-4-({1-[(carboxymethyl)-C-hydroxycarbonimidoyl]-2-({2-hydroxy-5-[(2E)-3-(4-hydroxyphenyl)prop-2-enoyl]-3,6-dioxo-4-{[3,4,5-trihydroxy-6-(hydroxymethyl)oxan-2-yl]oxy}cyclohexa-1,4-dien-1-yl}sulfanyl)ethyl}-C-hydroxycarbonimidoyl)butanoic acid | 0.39732 |
| HMDB0060158 | Tetracosatetraenoyl carnitine | 2.0794 |
| HMDB0124741 | (2,6-dihydroxy-4-{7-methyl-11-oxo-4-[(3,4,5-trihydroxy-6-{[(3,4,5-trihydroxy-6-methyloxan-2-yl)oxy]methyl}oxan-2-yl)oxy]-2,8-dioxatricyclo[7.3.1.0âµ,Â¹Â³]trideca-1(12),3,5(13),6,9-pentaen-3-yl}phenoxy)dihydroxyoxo-Î»â¶-sulfanylium | 0.65186 |
| HMDB0000942 | Tetrahydroneopterin | 3.3951 |
| HMDB0002281 | 4a-Hydroxytetrahydrobiopterin | 3.3951 |
| HMDB0013024 | Neurotensin 11-13 | 0.36548 |
| HMDB0013462 | SM(d18:0/14:1(9Z)(OH)) | 0.18504 |
| HMDB0060787 | 6-Methoxy-2-naphthylacetic acid | 3.044 |
| HMDB0006336 | ADP-ribose 2'-phosphate | 3.1231 |
| HMDB0125964 | 6-({2-[4,6-dihydroxy-2-methoxy-3-(3-methylbut-2-en-1-yl)phenyl]-3-oxo-2,3-dihydro-1-benzofuran-6-yl}oxy)-3,4,5-trihydroxyoxane-2-carboxylic acid | 0.39442 |
| HMDB0125965 | 3,4,5-trihydroxy-6-[5-hydroxy-2-(6-hydroxy-3-oxo-2,3-dihydro-1-benzofuran-2-yl)-3-methoxy-4-(3-methylbut-2-en-1-yl)phenoxy]oxane-2-carboxylic acid | 0.39442 |
| HMDB0126425 | 6-{2-[6-carboxy-5-(2,4-dihydroxyphenyl)-3-methylcyclohex-2-en-1-yl]-3-hydroxyphenoxy}-3,4,5-trihydroxyoxane-2-carboxylic acid | 0.39442 |
| HMDB0034840 | Faradiol laurate | 0.17124 |
| HMDB0062690 | 1,2-dioleoyl-sn-glycero-3-phosphocholine | 0.35557 |
| HMDB0032643 | Maclurin 3-C-(2'',3'',6''-trigalloylglucoside) | 0.5061 |
| HMDB0001328 | dTDP-D-glucose | 2.5515 |
| HMDB0006876 | dTDP-D-galactose | 2.5515 |
| HMDB0035188 | Fasciculol F | 0.25853 |
| HMDB0035189 | Fasciculol E | 0.25853 |
| HMDB0031910 | Chatenaytrienin 1 | 2.6478 |
| HMDB0032647 | Chatenaytrienin 2 | 2.6478 |
| HMDB0060298 | (+)-7-Isojasmonic acid CoA | 0.35403 |
| HMDB0013022 | Neuromedin N | 2.7977 |
| HMDB0030914 | Alliospiroside C | 0.24978 |
| HMDB0125294 | [2,6-dihydroxy-4-(3,5,6,7-tetrahydroxy-4-oxo-3,4-dihydro-2H-1-benzopyran-2-yl)phenyl]oxidanesulfonic acid | 3.051 |
| HMDB0125295 | [5,6,7-trihydroxy-4-oxo-2-(3,4,5-trihydroxyphenyl)-3,4-dihydro-2H-1-benzopyran-3-yl]oxidanesulfonic acid | 3.051 |
| HMDB0125307 | {4-[2,3-dioxo-3-(2,3,4,6-tetrahydroxyphenyl)propyl]-2,6-dihydroxyphenyl}oxidanesulfonic acid | 3.051 |
| HMDB0125339 | [5,7-dihydroxy-4-oxo-2-(2,3,4,5-tetrahydroxyphenyl)-3,4-dihydro-2H-1-benzopyran-3-yl]oxidanesulfonic acid | 3.051 |
| HMDB0129483 | [2,6-dihydroxy-3-(3,5,6,7-tetrahydroxy-4-oxo-3,4-dihydro-2H-1-benzopyran-2-yl)phenyl]oxidanesulfonic acid | 3.051 |
| HMDB0129484 | [5,6,7-trihydroxy-4-oxo-2-(2,3,4-trihydroxyphenyl)-3,4-dihydro-2H-1-benzopyran-3-yl]oxidanesulfonic acid | 3.051 |
| HMDB0129492 | {3-[2,3-dioxo-3-(2,3,4,6-tetrahydroxyphenyl)propyl]-2,6-dihydroxyphenyl}oxidanesulfonic acid | 3.051 |
| HMDB0129499 | [5,6,7-trihydroxy-4-oxo-2-(2,4,5-trihydroxyphenyl)-3,4-dihydro-2H-1-benzopyran-3-yl]oxidanesulfonic acid | 3.051 |
| HMDB0006595 | Alpha-Trisaccharide | 1.6845 |
| HMDB0029962 | Annoglaucin | 2.1633 |
| HMDB0029963 | Muricatin C | 2.1633 |
| HMDB0030440 | Rollidecin A | 2.1633 |
| HMDB0030445 | Bullatetrocin | 2.1633 |
| HMDB0031136 | Rollitacin | 2.1633 |
| HMDB0031391 | Mucocin | 2.1633 |
| HMDB0032113 | Glabracin A | 2.1633 |
| HMDB0032588 | Purpurenin | 2.1633 |
| HMDB0033423 | 12,15-cis-Squamostatin A | 2.1633 |
| HMDB0034622 | Rollimusin | 2.1633 |
| HMDB0034628 | 20,23-cis-Bullatalicinone | 2.1633 |
| HMDB0034739 | Bullatanocin | 2.1633 |
| HMDB0034740 | Annonin XIV | 2.1633 |
| HMDB0034819 | 27-Hydroxybullatacin | 2.1633 |
| HMDB0036547 | 9-Hydroxyasimicinone | 2.1633 |
| HMDB0040839 | Purpureacin 2 | 2.1633 |
| HMDB0059788 | Hemorphin-4 | 0.3351 |
| HMDB0040827 | Scutellarein 7-glucuronosyl-(1-&gt;2)-glucuronide | 1.636 |
| HMDB0060297 | Luteolin 7-O-[beta-D-glucuronosyl-(1-&gt;2)-beta-D-glucuronide] | 1.636 |
| HMDB0000532 | Acetylglycine | 2.2551 |
| HMDB0006454 | L-2-Amino-3-oxobutanoic acid | 2.2551 |
| HMDB0012249 | L-Aspartate-semialdehyde | 2.2551 |
| HMDB0006836 | Tetrahymanol | 1.4679 |
| HMDB0006839 | 24,25-Dihydrolanosterol | 1.4679 |
| HMDB0032851 | Isohelianol | 1.4679 |
| HMDB0033829 | 24-Ethyllophenol | 1.4679 |
| HMDB0035969 | Cycloartanol | 1.4679 |
| HMDB0036429 | (3beta,4alpha,5alpha,14alpha,24xi)-4,14,24-Trimethylcholest-9(11)-en-3-ol | 1.4679 |
| HMDB0040710 | Cycloartan-29-ol | 1.4679 |
| HMDB0040770 | 3beta-3-Lupanol | 1.4679 |
| HMDB0032678 | 2-Methylheneicosane | 2.6127 |
| HMDB0010334 | Ketoprofen glucuronide | 2.6986 |
| HMDB0000369 | 3b,17b-Dihydroxyetiocholane | 1.7223 |
| HMDB0000383 | 3a,17a-Dihydroxy-5b-androstane | 1.7223 |
| HMDB0000412 | 3b,17a-Dihydroxy-5a-androstane | 1.7223 |
| HMDB0000458 | 5a-Androstane-3a,17a-diol | 1.7223 |
| HMDB0000493 | 5a-Androstane-3b,17b-diol | 1.7223 |
| HMDB0000495 | Androstanediol | 1.7223 |
| HMDB0000551 | Etiocholanediol | 1.7223 |
| HMDB0000554 | Dihydroandrosterone | 1.7223 |
| HMDB0060437 | Androstan-3alpha,17beta-diol | 1.7223 |
| HMDB0032836 | Lucyoside R | 2.1664 |
| HMDB0034504 | Sericoside | 2.1664 |
| HMDB0035691 | Quercilicoside A | 2.1664 |
| HMDB0005457 | TG(18:1(9Z)/20:1(11Z)/20:1(11Z)) | 3.465 |
| HMDB0005468 | TG(18:2(9Z,12Z)/20:0/20:1(11Z)) | 3.465 |
| HMDB0010466 | TG(18:1(9Z)/18:1(9Z)/22:1(13Z)) | 3.465 |
| HMDB0042253 | TG(14:0/24:0/20:3(5Z,8Z,11Z)) | 3.465 |
| HMDB0042259 | TG(14:0/24:0/20:3n6) | 3.465 |
| HMDB0042427 | TG(14:0/20:3(5Z,8Z,11Z)/24:0) | 3.465 |
| HMDB0042471 | TG(14:0/22:1(13Z)/22:2(13Z,16Z)) | 3.465 |
| HMDB0042498 | TG(14:0/24:1(15Z)/20:2n6) | 3.465 |
| HMDB0042585 | TG(14:0/20:2n6/24:1(15Z)) | 3.465 |
| HMDB0042607 | TG(14:0/20:3n6/24:0) | 3.465 |
| HMDB0042674 | TG(14:0/22:2(13Z,16Z)/22:1(13Z)) | 3.465 |
| HMDB0043979 | TG(16:0/22:0/20:3(5Z,8Z,11Z)) | 3.465 |
| HMDB0043985 | TG(16:0/22:0/20:3n6) | 3.465 |
| HMDB0044011 | TG(16:0/24:0/18:3(6Z,9Z,12Z)) | 3.465 |
| HMDB0044018 | TG(16:0/24:0/18:3(9Z,12Z,15Z)) | 3.465 |
| HMDB0044155 | TG(16:0/20:1(11Z)/22:2(13Z,16Z)) | 3.465 |
| HMDB0044168 | TG(16:0/20:3(5Z,8Z,11Z)/22:0) | 3.465 |
| HMDB0044208 | TG(16:0/22:1(13Z)/20:2n6) | 3.465 |
| HMDB0044234 | TG(16:0/24:1(15Z)/18:2(9Z,12Z)) | 3.465 |
| HMDB0044261 | TG(16:0/18:2(9Z,12Z)/24:1(15Z)) | 3.465 |
| HMDB0044281 | TG(16:0/18:3(6Z,9Z,12Z)/24:0) | 3.465 |
| HMDB0044316 | TG(16:0/20:2n6/22:1(13Z)) | 3.465 |
| HMDB0044336 | TG(16:0/20:3n6/22:0) | 3.465 |
| HMDB0044398 | TG(16:0/22:2(13Z,16Z)/20:1(11Z)) | 3.465 |
| HMDB0044477 | TG(16:0/18:3(9Z,12Z,15Z)/24:0) | 3.465 |
| HMDB0044785 | TG(18:0/20:0/20:3(5Z,8Z,11Z)) | 3.465 |
| HMDB0044791 | TG(18:0/20:0/20:3n6) | 3.465 |
| HMDB0044816 | TG(18:0/22:0/18:3(6Z,9Z,12Z)) | 3.465 |
| HMDB0044823 | TG(18:0/22:0/18:3(9Z,12Z,15Z)) | 3.465 |
| HMDB0044928 | TG(18:0/18:1(11Z)/22:2(13Z,16Z)) | 3.465 |
| HMDB0044955 | TG(18:0/18:1(9Z)/22:2(13Z,16Z)) | 3.465 |
| HMDB0044979 | TG(18:0/20:1(11Z)/20:2n6) | 3.465 |
| HMDB0044993 | TG(18:0/20:3(5Z,8Z,11Z)/20:0) | 3.465 |
| HMDB0045031 | TG(18:0/22:1(13Z)/18:2(9Z,12Z)) | 3.465 |
| HMDB0045083 | TG(18:0/18:2(9Z,12Z)/22:1(13Z)) | 3.465 |
| HMDB0045102 | TG(18:0/18:3(6Z,9Z,12Z)/22:0) | 3.465 |
| HMDB0045135 | TG(18:0/20:2n6/20:1(11Z)) | 3.465 |
| HMDB0045155 | TG(18:0/20:3n6/20:0) | 3.465 |
| HMDB0045214 | TG(18:0/22:2(13Z,16Z)/18:1(11Z)) | 3.465 |
| HMDB0045215 | TG(18:0/22:2(13Z,16Z)/18:1(9Z)) | 3.465 |
| HMDB0045291 | TG(18:0/18:3(9Z,12Z,15Z)/22:0) | 3.465 |
| HMDB0045563 | TG(20:0/18:0/20:3(5Z,8Z,11Z)) | 3.465 |
| HMDB0045569 | TG(20:0/18:0/20:3n6) | 3.465 |
| HMDB0045593 | TG(20:0/20:0/18:3(6Z,9Z,12Z)) | 3.465 |
| HMDB0045600 | TG(20:0/20:0/18:3(9Z,12Z,15Z)) | 3.465 |
| HMDB0045701 | TG(20:0/16:1(9Z)/22:2(13Z,16Z)) | 3.465 |
| HMDB0045724 | TG(20:0/18:1(11Z)/20:2n6) | 3.465 |
| HMDB0045750 | TG(20:0/18:1(9Z)/20:2n6) | 3.465 |
| HMDB0045774 | TG(20:0/20:1(11Z)/18:2(9Z,12Z)) | 3.465 |
| HMDB0045874 | TG(20:0/18:2(9Z,12Z)/20:1(11Z)) | 3.465 |
| HMDB0045924 | TG(20:0/20:2n6/18:1(11Z)) | 3.465 |
| HMDB0045925 | TG(20:0/20:2n6/18:1(9Z)) | 3.465 |
| HMDB0046001 | TG(20:0/22:2(13Z,16Z)/16:1(9Z)) | 3.465 |
| HMDB0046313 | TG(22:0/16:0/20:3(5Z,8Z,11Z)) | 3.465 |

**Suppl Table 2:** Partial list of differentially regulated metabolites by AsX and DHA supplementation upon undernourishment in both +ve and -ve ion modes.

|  |  |  |
| --- | --- | --- |
| **Source ID** | **Name** | **FC** |
| HMDB0013239 | Heptanoylcholine | 0.48142 |
| HMDB0125585 | 3-(2,3,4-trihydroxy-5-methoxyphenyl)prop-2-enoic acid | 3.6928 |
| HMDB0125586 | 3-(2,4,5-trihydroxy-3-methoxyphenyl)prop-2-enoic acid | 3.6928 |
| HMDB0125587 | 3-(3,4-dihydroxy-5-methoxyphenyl)oxirane-2-carboxylic acid | 3.6928 |
| HMDB0126510 | 3-(3,4-dihydroxy-5-methoxyphenyl)-2-oxopropanoic acid | 3.6928 |
| HMDB0030353 | Arecoline | 0.2803 |
| HMDB0029381 | 6-O-Methylcodeine | 2.3851 |
| HMDB0030259 | (+)-Erysotrine | 2.3851 |
| HMDB0032389 | Methyl acrylate-divinylbenzene, completely hydrolyzed, copolymer | 2.036 |
| HMDB0013668 | Ruthenium | 1.9466 |
| HMDB0034392 | Perulactone | 2.3556 |
| HMDB0035304 | Ganoderic acid C2 | 2.3556 |
| HMDB0035699 | Corosin | 2.3556 |
| HMDB0039691 | Ganolucidic acid C | 2.3556 |
| HMDB0031153 | Diisobutylcarbinol | 3.2736 |
| HMDB0062608 | 5beta-Dihydroepitestosterone | 1.5185 |
| HMDB0031282 | erythro-7,9-Dotriacontanediol | 2.0034 |
| HMDB0041078 | erythro-6,8-Dotriacontanediol | 2.0034 |
| HMDB0031444 | N-Dodecane | 1.9564 |
| HMDB0060352 | 2-Polyprenyl-3-methyl-5-hydroxy-6-methoxy-1,4-benzoquinone | 2.1368 |
| HMDB0060379 | 3-Polyprenyl-4-hydroxy-5-methoxybenzoate | 2.1368 |
| HMDB0032661 | 2-Methylhexacosane | 2.4219 |
| HMDB0062632 | 1-O-all-trans-retinoyl-beta-glucuronic Acid | 4.7396 |
| HMDB0062808 | N-methylphenylethanolaminium | 3.5416 |
| HMDB0029669 | Eremopetasinorone A | 2.8109 |
| HMDB0032176 | Benzyl hexanoate | 2.8109 |
| HMDB0034469 | 2-Phenylpropyl butyrate | 2.8109 |
| HMDB0035016 | 2-Phenylethyl pentanoate | 2.8109 |
| HMDB0035017 | 2-Phenylethyl 3-methylbutanoate | 2.8109 |
| HMDB0036240 | Methyl 4-tert-butylphenylacetate | 2.8109 |
| HMDB0036391 | alpha-Methylphenethyl butyrate | 2.8109 |
| HMDB0037194 | Ethyl (Â±)-2-ethyl-3-phenylpropanoate | 2.8109 |
| HMDB0037604 | 10beta-12,13-Dinor-8-oxo-6-eremophilen-11-al | 2.8109 |
| HMDB0037720 | 2-Phenylethyl 2-methylbutanoate | 2.8109 |
| HMDB0132932 | 1-(4-methoxyphenyl)-4-methylpentan-3-one | 2.8109 |
| HMDB0132940 | 1-(4-methoxyphenyl)-4-methylpent-1-en-3-ol | 2.8109 |
| HMDB0036195 | N,2,3-Trimethyl-2-(1-methylethyl)butanamide | 2.7359 |
| HMDB0062219 | 13Z,16Z-docosadienoic acid | 2.2033 |
| HMDB0030006 | 2,2,7,7-Tetramethyl-1,6-dioxaspiro[4.4]non-3-ene | 2.0351 |
| HMDB0030424 | Linalyl formate | 2.0351 |
| HMDB0032050 | alpha-Terpineol formate | 2.0351 |
| HMDB0032463 | 5-Pentyl-3h-furan-2-one | 2.0351 |
| HMDB0034708 | Methyl 4,8-decadienoate | 2.0351 |
| HMDB0034730 | Methyl (2E,4Z)-decadienoate | 2.0351 |
| HMDB0035156 | Neryl formate | 2.0351 |
| HMDB0036215 | Ethyl octynecarboxylate | 2.0351 |
| HMDB0038245 | Bornyl formate | 2.0351 |
| HMDB0038279 | cis-3-Hexenyl tiglate | 2.0351 |
| HMDB0059816 | Methyl geranate | 2.0351 |
| HMDB0061017 | 1-Pyrimidinylpiperazine | 3.5354 |
| HMDB0006816 | 3-Hexaprenyl-4-hydroxybenzoic acid | 3.5137 |
| HMDB0006818 | 2-Hexaprenyl-6-methoxy-1,4-benzoquinone | 3.5137 |
| HMDB0036283 | Campesteryl p-coumarate | 3.5137 |
| HMDB0001412 | 7,8-Dihydropteroic acid | 2.2014 |
| HMDB0013272 | N-Lauroylglycine | 0.30494 |
| HMDB0005766 | Norophthalmic acid | 3.4681 |
| HMDB0011738 | N2-gamma-Glutamylglutamine | 3.4681 |
| HMDB0041205 | Panaxydol linoleate | 3.1667 |
| HMDB0029633 | Phenylmethanethiol | 3.6301 |
| HMDB0029634 | 2-Methylbenzenethiol | 3.6301 |
| HMDB0031367 | Linalool oxide D 3-[apiosyl-(1-&gt;6)-glucoside] | 1.6324 |
| HMDB0035489 | Linalool 3,6-oxide primeveroside | 1.6324 |
| HMDB0036571 | Linalool 3,7-oxide beta-primeveroside | 1.6324 |
| HMDB0012271 | O-Ureidohomoserine | 2.0792 |
| HMDB0036106 | Thiogeraniol | 1.503 |
| HMDB0061712 | Palmitoyl sphingomyelin | 0.29334 |
| HMDB0031830 | Ginsenoside Rg5 | 0.44244 |
| HMDB0031110 | Glycerol tritridecanoate | 0.51738 |
| HMDB0035488 | (25S)-Spirostane-3b,5b,6a-triol 3-[4''-rhamnosylglucoside] | 0.39372 |
| HMDB0036244 | Schidigerasaponin F2 | 0.39372 |
| HMDB0034578 | Deterrol stearate | 0.1565 |
| HMDB0030542 | Neohesperidin dihydrochalcone | 0.51129 |
| HMDB0060754 | 31-Hydroxy rifabutin | 0.42914 |
| HMDB0060616 | Tamoxifen-N-glucuronide | 1.7453 |
| HMDB0001206 | Acetyl-CoA | 0.031766 |
| HMDB0034635 | Esculentoside E | 2.2922 |
| HMDB0060818 | Digoxigenin bisdigitoxoside | 2.2922 |
| HMDB0006347 | Hexacosanoyl carnitine | 0.25461 |
| HMDB0062206 | 3alpha,7alpha,12alpha,24(S)-tetrahydroxy-5beta-cholestan-27-al | 0.5749 |
| HMDB0062207 | 3alpha,7alpha,12alpha-trihydroxy-5beta-cholestanate | 0.5749 |
| HMDB0038537 | Glycinoprenol 10 | 0.51739 |
| HMDB0031536 | Myricatomentoside I | 1.6442 |
| HMDB0029846 | Nonivamide | 1.4388 |
| HMDB0036328 | Nordihydrocapsaicin | 1.4388 |
| HMDB0012262 | Molybdopterin-AMP | 3.4494 |
| HMDB0060158 | Tetracosatetraenoyl carnitine | 0.32439 |
| HMDB0000942 | Tetrahydroneopterin | 0.25121 |
| HMDB0002281 | 4a-Hydroxytetrahydrobiopterin | 0.25121 |
| HMDB0031010 | Glycerol 1,2-dioctacosanoate | 3.1641 |
| HMDB0013024 | Neurotensin 11-13 | 2.5603 |
| HMDB0006336 | ADP-ribose 2'-phosphate | 0.098396 |
| HMDB0034994 | Chikusetsusaponin Ia | 1.7942 |
| HMDB0035264 | Avenestergenin A1 | 2.2878 |
| HMDB0004970 | Glucosylceramide (d18:1/9Z-18:1) | 1.9613 |
| HMDB0010714 | Galactosylceramide (d18:1/18:1(9Z)) | 1.9613 |
| HMDB0034840 | Faradiol laurate | 6.8618 |
| HMDB0001501 | Guanosine diphosphate adenosine | 0.2191 |
| HMDB0003369 | CDP-glucose | 5.6828 |
| HMDB0029334 | Nummularine B | 0.27633 |
| HMDB0001328 | dTDP-D-glucose | 0.15883 |
| HMDB0006876 | dTDP-D-galactose | 0.15883 |
| HMDB0036338 | 25-Acetyl-6,7-didehydrofevicordin F 3-glucoside | 0.39674 |
| HMDB0035188 | Fasciculol F | 6.216 |
| HMDB0035189 | Fasciculol E | 6.216 |
| HMDB0031274 | 1,3,4-Trigalloyl-beta-D-glucopyranose | 0.27385 |
| HMDB0031745 | 1,2,4-Trigalloyl-beta-D-glucopyranose | 0.27385 |
| HMDB0040418 | Majonoside R2 | 3.3709 |
| HMDB0040781 | Vinaginsenoside R11 | 3.3709 |
| HMDB0061723 | Carbovir Triphosphate | 0.18321 |
| HMDB0006866 | 2-Methyl-1-hydroxypropyl-ThPP | 0.21466 |
| HMDB0030671 | Pulmatin | 0.22915 |
| HMDB0031615 | Dioctyltin isooctylthioglycolate | 0.34385 |
| HMDB0030609 | Xanthochymuside | 0.1313 |
| HMDB0001396 | 5-Methyltetrahydrofolic acid | 4.1256 |
| HMDB0005457 | TG(18:1(9Z)/20:1(11Z)/20:1(11Z)) | 0.073649 |
| HMDB0005468 | TG(18:2(9Z,12Z)/20:0/20:1(11Z)) | 0.073649 |
| HMDB0010466 | TG(18:1(9Z)/18:1(9Z)/22:1(13Z)) | 0.073649 |
| HMDB0042253 | TG(14:0/24:0/20:3(5Z,8Z,11Z)) | 0.073649 |
| HMDB0042259 | TG(14:0/24:0/20:3n6) | 0.073649 |
| HMDB0042427 | TG(14:0/20:3(5Z,8Z,11Z)/24:0) | 0.073649 |
| HMDB0042471 | TG(14:0/22:1(13Z)/22:2(13Z,16Z)) | 0.073649 |
| HMDB0042498 | TG(14:0/24:1(15Z)/20:2n6) | 0.073649 |
| HMDB0042585 | TG(14:0/20:2n6/24:1(15Z)) | 0.073649 |
| HMDB0042607 | TG(14:0/20:3n6/24:0) | 0.073649 |
| HMDB0042674 | TG(14:0/22:2(13Z,16Z)/22:1(13Z)) | 0.073649 |
| HMDB0043979 | TG(16:0/22:0/20:3(5Z,8Z,11Z)) | 0.073649 |
| HMDB0043985 | TG(16:0/22:0/20:3n6) | 0.073649 |
| HMDB0044011 | TG(16:0/24:0/18:3(6Z,9Z,12Z)) | 0.073649 |
| HMDB0044018 | TG(16:0/24:0/18:3(9Z,12Z,15Z)) | 0.073649 |
| HMDB0044155 | TG(16:0/20:1(11Z)/22:2(13Z,16Z)) | 0.073649 |
| HMDB0044168 | TG(16:0/20:3(5Z,8Z,11Z)/22:0) | 0.073649 |
| HMDB0044208 | TG(16:0/22:1(13Z)/20:2n6) | 0.073649 |
| HMDB0044234 | TG(16:0/24:1(15Z)/18:2(9Z,12Z)) | 0.073649 |
| HMDB0044261 | TG(16:0/18:2(9Z,12Z)/24:1(15Z)) | 0.073649 |
| HMDB0044281 | TG(16:0/18:3(6Z,9Z,12Z)/24:0) | 0.073649 |
| HMDB0044316 | TG(16:0/20:2n6/22:1(13Z)) | 0.073649 |
| HMDB0044336 | TG(16:0/20:3n6/22:0) | 0.073649 |
| HMDB0044398 | TG(16:0/22:2(13Z,16Z)/20:1(11Z)) | 0.073649 |
| HMDB0044477 | TG(16:0/18:3(9Z,12Z,15Z)/24:0) | 0.073649 |
| HMDB0044785 | TG(18:0/20:0/20:3(5Z,8Z,11Z)) | 0.073649 |
| HMDB0044791 | TG(18:0/20:0/20:3n6) | 0.073649 |
| HMDB0044816 | TG(18:0/22:0/18:3(6Z,9Z,12Z)) | 0.073649 |
| HMDB0044823 | TG(18:0/22:0/18:3(9Z,12Z,15Z)) | 0.073649 |
| HMDB0044928 | TG(18:0/18:1(11Z)/22:2(13Z,16Z)) | 0.073649 |
| HMDB0044955 | TG(18:0/18:1(9Z)/22:2(13Z,16Z)) | 0.073649 |
| HMDB0044979 | TG(18:0/20:1(11Z)/20:2n6) | 0.073649 |
| HMDB0044993 | TG(18:0/20:3(5Z,8Z,11Z)/20:0) | 0.073649 |
| HMDB0045031 | TG(18:0/22:1(13Z)/18:2(9Z,12Z)) | 0.073649 |
| HMDB0045083 | TG(18:0/18:2(9Z,12Z)/22:1(13Z)) | 0.073649 |
| HMDB0045102 | TG(18:0/18:3(6Z,9Z,12Z)/22:0) | 0.073649 |
| HMDB0045135 | TG(18:0/20:2n6/20:1(11Z)) | 0.073649 |
| HMDB0045155 | TG(18:0/20:3n6/20:0) | 0.073649 |
| HMDB0045214 | TG(18:0/22:2(13Z,16Z)/18:1(11Z)) | 0.073649 |
| HMDB0045215 | TG(18:0/22:2(13Z,16Z)/18:1(9Z)) | 0.073649 |
| HMDB0045291 | TG(18:0/18:3(9Z,12Z,15Z)/22:0) | 0.073649 |
| HMDB0045563 | TG(20:0/18:0/20:3(5Z,8Z,11Z)) | 0.073649 |
| HMDB0045569 | TG(20:0/18:0/20:3n6) | 0.073649 |
| HMDB0045593 | TG(20:0/20:0/18:3(6Z,9Z,12Z)) | 0.073649 |
| HMDB0045600 | TG(20:0/20:0/18:3(9Z,12Z,15Z)) | 0.073649 |
| HMDB0045701 | TG(20:0/16:1(9Z)/22:2(13Z,16Z)) | 0.073649 |
| HMDB0045724 | TG(20:0/18:1(11Z)/20:2n6) | 0.073649 |
| HMDB0045750 | TG(20:0/18:1(9Z)/20:2n6) | 0.073649 |
| HMDB0045774 | TG(20:0/20:1(11Z)/18:2(9Z,12Z)) | 0.073649 |
| HMDB0045874 | TG(20:0/18:2(9Z,12Z)/20:1(11Z)) | 0.073649 |
| HMDB0045924 | TG(20:0/20:2n6/18:1(11Z)) | 0.073649 |
| HMDB0045925 | TG(20:0/20:2n6/18:1(9Z)) | 0.073649 |
| HMDB0046001 | TG(20:0/22:2(13Z,16Z)/16:1(9Z)) | 0.073649 |
| HMDB0046313 | TG(22:0/16:0/20:3(5Z,8Z,11Z)) | 0.073649 |
| HMDB0046319 | TG(22:0/16:0/20:3n6) | 0.073649 |
| HMDB0046342 | TG(22:0/18:0/18:3(6Z,9Z,12Z)) | 0.073649 |
| HMDB0046349 | TG(22:0/18:0/18:3(9Z,12Z,15Z)) | 0.073649 |
| HMDB0046446 | TG(22:0/14:1(9Z)/22:2(13Z,16Z)) | 0.073649 |
| HMDB0046468 | TG(22:0/16:1(9Z)/20:2n6) | 0.073649 |
| HMDB0046491 | TG(22:0/18:1(11Z)/18:2(9Z,12Z)) | 0.073649 |
| HMDB0046516 | TG(22:0/18:1(9Z)/18:2(9Z,12Z)) | 0.073649 |
| HMDB0046635 | TG(22:0/18:2(9Z,12Z)/18:1(11Z)) | 0.073649 |
| HMDB0046636 | TG(22:0/18:2(9Z,12Z)/18:1(9Z)) | 0.073649 |
| HMDB0046684 | TG(22:0/20:2n6/16:1(9Z)) | 0.073649 |
| HMDB0046758 | TG(22:0/22:2(13Z,16Z)/14:1(9Z)) | 0.073649 |
| HMDB0047011 | TG(24:0/14:0/20:3(5Z,8Z,11Z)) | 0.073649 |
| HMDB0047017 | TG(24:0/14:0/20:3n6) | 0.073649 |
| HMDB0047063 | TG(24:0/16:0/18:3(6Z,9Z,12Z)) | 0.073649 |
| HMDB0047070 | TG(24:0/16:0/18:3(9Z,12Z,15Z)) | 0.073649 |
| HMDB0047184 | TG(24:0/14:1(9Z)/20:2n6) | 0.073649 |
| HMDB0047206 | TG(24:0/16:1(9Z)/18:2(9Z,12Z)) | 0.073649 |
| HMDB0047367 | TG(24:0/18:2(9Z,12Z)/16:1(9Z)) | 0.073649 |
| HMDB0047414 | TG(24:0/20:2n6/14:1(9Z)) | 0.073649 |
| HMDB0047852 | TG(14:1(9Z)/22:0/22:2(13Z,16Z)) | 0.073649 |
| HMDB0047872 | TG(14:1(9Z)/24:0/20:2n6) | 0.073649 |
| HMDB0047984 | TG(14:1(9Z)/20:1(11Z)/24:1(15Z)) | 0.073649 |
| HMDB0048029 | TG(14:1(9Z)/22:1(13Z)/22:1(13Z)) | 0.073649 |
| HMDB0048050 | TG(14:1(9Z)/24:1(15Z)/20:1(11Z)) | 0.073649 |
| HMDB0048513 | TG(16:1(9Z)/20:0/22:2(13Z,16Z)) | 0.073649 |
| HMDB0048532 | TG(16:1(9Z)/22:0/20:2n6) | 0.073649 |
| HMDB0048552 | TG(16:1(9Z)/24:0/18:2(9Z,12Z)) | 0.073649 |
| HMDB0048617 | TG(16:1(9Z)/18:1(11Z)/24:1(15Z)) | 0.073649 |
| HMDB0048639 | TG(16:1(9Z)/18:1(9Z)/24:1(15Z)) | 0.073649 |
| HMDB0048660 | TG(16:1(9Z)/20:1(11Z)/22:1(13Z)) | 0.073649 |
| HMDB0048702 | TG(16:1(9Z)/22:1(13Z)/20:1(11Z)) | 0.073649 |
| HMDB0048722 | TG(16:1(9Z)/24:1(15Z)/18:1(11Z)) | 0.073649 |
| HMDB0048723 | TG(16:1(9Z)/24:1(15Z)/18:1(9Z)) | 0.073649 |
| HMDB0049146 | TG(18:1(11Z)/18:0/22:2(13Z,16Z)) | 0.073649 |
| HMDB0049164 | TG(18:1(11Z)/20:0/20:2n6) | 0.073649 |
| HMDB0049183 | TG(18:1(11Z)/22:0/18:2(9Z,12Z)) | 0.073649 |
| HMDB0049245 | TG(18:1(11Z)/16:1(9Z)/24:1(15Z)) | 0.073649 |
| HMDB0049265 | TG(18:1(11Z)/18:1(11Z)/22:1(13Z)) | 0.073649 |
| HMDB0049286 | TG(18:1(11Z)/18:1(9Z)/22:1(13Z)) | 0.073649 |
| HMDB0049305 | TG(18:1(11Z)/20:1(11Z)/20:1(11Z)) | 0.073649 |
| HMDB0049346 | TG(18:1(11Z)/22:1(13Z)/18:1(9Z)) | 0.073649 |
| HMDB0049771 | TG(18:1(9Z)/18:0/22:2(13Z,16Z)) | 0.073649 |
| HMDB0049788 | TG(18:1(9Z)/20:0/20:2n6) | 0.073649 |
| HMDB0049806 | TG(18:1(9Z)/22:0/18:2(9Z,12Z)) | 0.073649 |
| HMDB0049865 | TG(18:1(9Z)/16:1(9Z)/24:1(15Z)) | 0.073649 |
| HMDB0049884 | TG(18:1(9Z)/18:1(11Z)/22:1(13Z)) | 0.073649 |
| HMDB0050347 | TG(20:1(11Z)/16:0/22:2(13Z,16Z)) | 0.073649 |

**Suppl Table 3:** Pathway impact analysis results in Undernourished group

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Pathway** | **Total** | **Expected** | **Hits** | **Raw p** | **Holm adjust** | **FDR** | **Impact** |
| alpha-Linolenic acid metabolism | 13 | 0.066032 | 1 | 0.064294 | 1 | 0.69317 | 0 |
| Butanoate metabolism | 15 | 0.07619 | 1 | 0.073857 | 1 | 0.69317 | 0 |
| Terpenoid backbone biosynthesis | 18 | 0.091429 | 1 | 0.088042 | 1 | 0.69317 | 0 |
| Citrate cycle (TCA cycle) | 20 | 0.10159 | 1 | 0.097392 | 1 | 0.69317 | 0.03668 |
| beta-Alanine metabolism | 21 | 0.10667 | 1 | 0.10204 | 1 | 0.69317 | 0.05597 |
| Propanoate metabolism | 22 | 0.11175 | 1 | 0.10666 | 1 | 0.69317 | 0.00513 |
| Pyruvate metabolism | 23 | 0.11683 | 1 | 0.11126 | 1 | 0.69317 | 0.15633 |
| Glycolysis / Gluconeogenesis | 26 | 0.13206 | 1 | 0.12494 | 1 | 0.69317 | 0.04062 |
| Folate biosynthesis | 27 | 0.13714 | 1 | 0.12946 | 1 | 0.69317 | 0 |
| Glutathione metabolism | 28 | 0.14222 | 1 | 0.13396 | 1 | 0.69317 | 0 |
| Lipoic acid metabolism | 28 | 0.14222 | 1 | 0.13396 | 1 | 0.69317 | 0 |
| Lysine degradation | 30 | 0.15238 | 1 | 0.1429 | 1 | 0.69317 | 0 |
| Inositol phosphate metabolism | 30 | 0.15238 | 1 | 0.1429 | 1 | 0.69317 | 0 |
| Sphingolipid metabolism | 32 | 0.16254 | 1 | 0.15175 | 1 | 0.69317 | 0 |
| Glyoxylate and dicarboxylate metabolism | 32 | 0.16254 | 1 | 0.15175 | 1 | 0.69317 | 0.00794 |
| Glycine, serine and threonine metabolism | 33 | 0.16762 | 1 | 0.15615 | 1 | 0.69317 | 0 |
| Pyrimidine metabolism | 39 | 0.1981 | 1 | 0.18212 | 1 | 0.69317 | 0 |
| Fatty acid degradation | 39 | 0.1981 | 1 | 0.18212 | 1 | 0.69317 | 0.18092 |
| Fatty acid elongation | 39 | 0.1981 | 1 | 0.18212 | 1 | 0.69317 | 0.25661 |
| Valine, leucine and isoleucine degradation | 40 | 0.20317 | 1 | 0.18638 | 1 | 0.69317 | 0.02836 |
| Steroid biosynthesis | 41 | 0.20825 | 1 | 0.19062 | 1 | 0.69317 | 0 |
| Tryptophan metabolism | 41 | 0.20825 | 1 | 0.19062 | 1 | 0.69317 | 0 |
| Fatty acid biosynthesis | 47 | 0.23873 | 1 | 0.21566 | 1 | 0.75012 | 0.00213 |
| Steroid hormone biosynthesis | 87 | 0.4419 | 1 | 0.36595 | 1 | 1 | 0.00175 |

Total: total number of compounds in the pathway; Hits: the actually matched number from uploaded data; Raw p: original p value calculated from enrichment analysis; Holm p: p value adjusted by Holm-Bonferroni method.

**Suppl Table 4:** Pathway impact analysis results in AsX and DHA supplemented group

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Pathway** | **Total** | **Expected** | **Hits** | **Raw p** | **Holm adjust** | **FDR** | **Impact** |
| beta-Alanine metabolism | 21 | 0.13333 | 2 | 0.007147 | 0.57178 | 0.335 | 0.05597 |
| Folate biosynthesis | 27 | 0.17143 | 2 | 0.011705 | 0.92469 | 0.335 | 0 |
| Glutathione metabolism | 28 | 0.17778 | 2 | 0.012563 | 0.97988 | 0.335 | 0.00719 |
| Valine, leucine and isoleucine degradation | 40 | 0.25397 | 2 | 0.024886 | 1 | 0.49772 | 0.05835 |
| One carbon pool by folate | 9 | 0.057143 | 1 | 0.055851 | 1 | 0.78339 | 0 |
| alpha-Linolenic acid metabolism | 13 | 0.08254 | 1 | 0.07976 | 1 | 0.78339 | 0 |
| Butanoate metabolism | 15 | 0.095238 | 1 | 0.091509 | 1 | 0.78339 | 0 |
| Retinol metabolism | 17 | 0.10794 | 1 | 0.10312 | 1 | 0.78339 | 0 |
| Ubiquinone and other terpenoid-quinone biosynthesis | 18 | 0.11429 | 1 | 0.10888 | 1 | 0.78339 | 0 |
| Terpenoid backbone biosynthesis | 18 | 0.11429 | 1 | 0.10888 | 1 | 0.78339 | 0 |
| Citrate cycle (TCA cycle) | 20 | 0.12698 | 1 | 0.12029 | 1 | 0.78339 | 0.03668 |
| Propanoate metabolism | 22 | 0.13968 | 1 | 0.13157 | 1 | 0.78339 | 0.00513 |
| Pyruvate metabolism | 23 | 0.14603 | 1 | 0.13717 | 1 | 0.78339 | 0.15633 |
| Glycolysis / Gluconeogenesis | 26 | 0.16508 | 1 | 0.15375 | 1 | 0.78339 | 0.04062 |
| Lipoic acid metabolism | 28 | 0.17778 | 1 | 0.16464 | 1 | 0.78339 | 0 |
| Lysine degradation | 30 | 0.19048 | 1 | 0.17541 | 1 | 0.78339 | 0 |
| Inositol phosphate metabolism | 30 | 0.19048 | 1 | 0.17541 | 1 | 0.78339 | 0 |
| Glyoxylate and dicarboxylate metabolism | 32 | 0.20317 | 1 | 0.18605 | 1 | 0.78339 | 0.00794 |
| Sphingolipid metabolism | 32 | 0.20317 | 1 | 0.18605 | 1 | 0.78339 | 0.21576 |
| Arginine and proline metabolism | 36 | 0.22857 | 1 | 0.20697 | 1 | 0.80847 | 0.06628 |
| Fatty acid degradation | 39 | 0.24762 | 1 | 0.22234 | 1 | 0.80847 | 0.18092 |
| Fatty acid elongation | 39 | 0.24762 | 1 | 0.22234 | 1 | 0.80847 | 0.25661 |
| Tryptophan metabolism | 41 | 0.26032 | 1 | 0.23244 | 1 | 0.80847 | 0 |
| Fatty acid biosynthesis | 47 | 0.29841 | 1 | 0.26202 | 1 | 0.8734 | 0.00213 |

Total: total number of compounds in the pathway; Hits: the actually matched number from uploaded data; Raw p: original p value calculated from enrichment analysis; Holm p: p value adjusted by Holm-Bonferroni method.

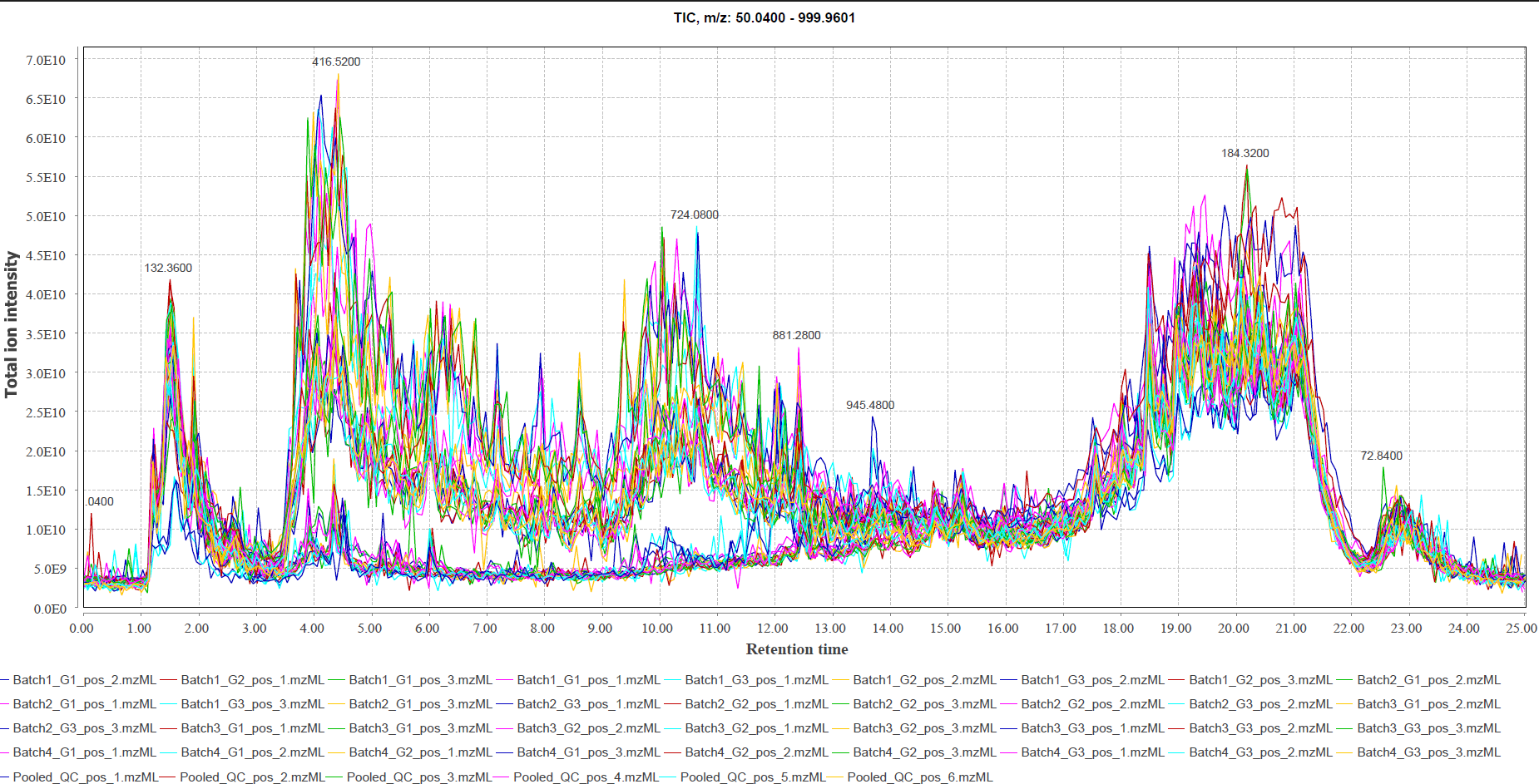


Fig 1: Mass spectra obtained in positive ion mode

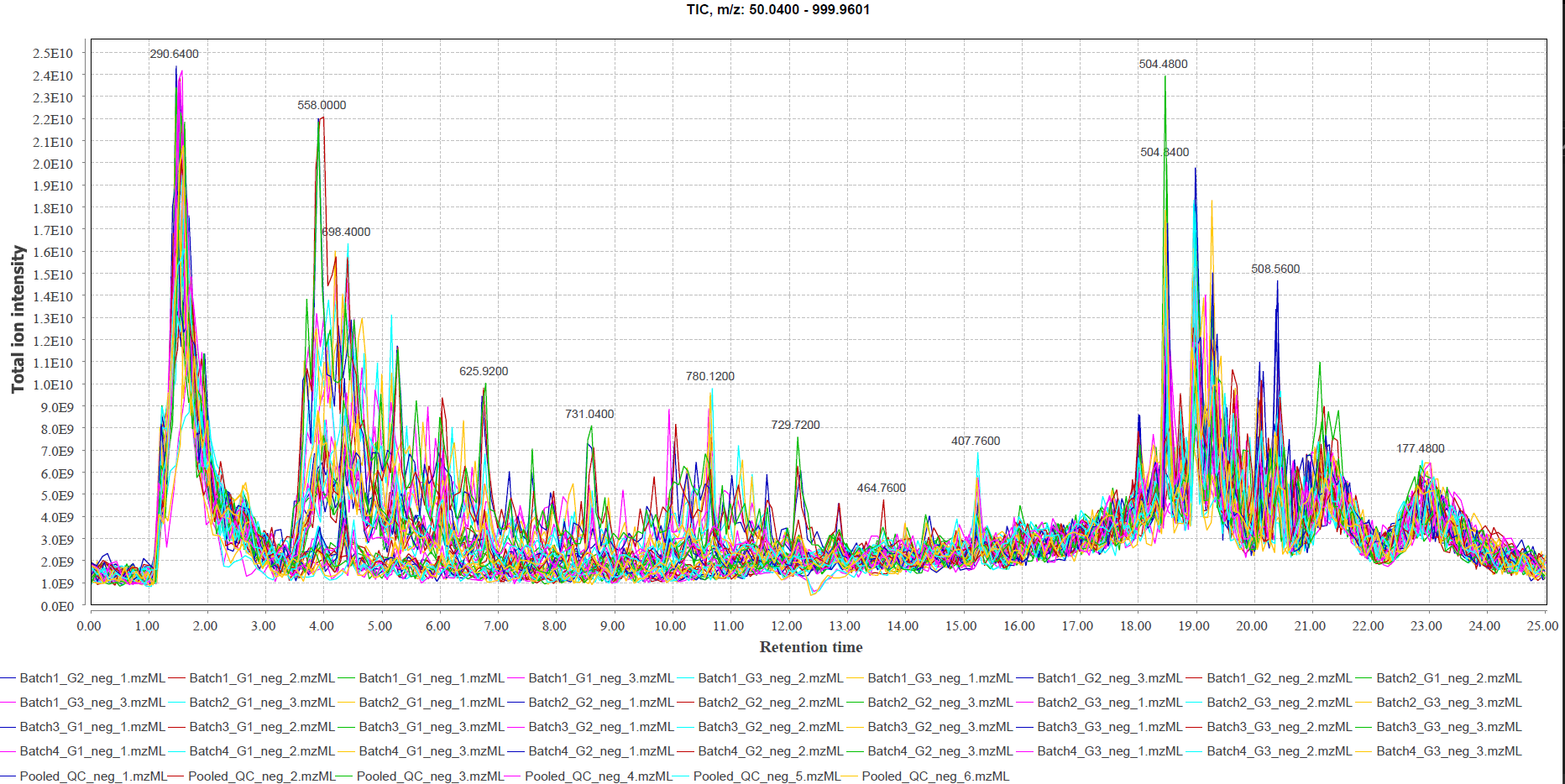


Fig 2: Mass spectra obtained in negative ion mode

Note: Fig 1 and Fig 2 display multiple spectra, because the chromatograms were obtained by running 12 samples together (including the samples used in this study) to minimize batch variation. Additionally, all samples run in triplicates.