**Table S5 Statistical tables of metabolic pathways based on MetaCyc database**

**(a) The metabolic pathways of soil bacteria in three sites**

| Level1 | Level2 | Abundance |
|---|---|---|
| Biosynthesis 12 | Amine and Polyamine Biosynthesis | 1131.4 |
| | Amino Acid Biosynthesis | 35287.95 |
| | Aminoacyl-tRNA Charging | 985.01 |
| | Aromatic Compound Biosynthesis | 2338.04 |
| | Carbohydrate Biosynthesis | 12309.05 |
| | Cell Structure Biosynthesis | 6908.41 |
| | Cofactor, Prosthetic Group, Electron Carrier, and Vitamin Biosynthesis | 33059.85 |
| | Fatty Acid and Lipid Biosynthesis | 22532.79 |
| | Metabolic Regulator Biosynthesis | 534.24 |
| | Nucleoside and Nucleotide Biosynthesis | 28217.32 |
| | Other Biosynthesis | 755.91 |
| | Secondary Metabolite Biosynthesis | 4899.2 |
| Degradation/Utilization/Assimilation 16 | Alcohol Degradation | 301.95 |
| | Aldehyde Degradation | 53.34 |
| | Amine and Polyamine Degradation | 2165.35 |
| | Amino Acid Degradation | 3617.67 |
| | Aromatic Compound Degradation | 6899.45 |
| | C1 Compound Utilization and Assimilation | 3142.99 |
| | Carbohydrate Degradation | 4899.44 |
| | Carboxylate Degradation | 4390 |
| | Chlorinated Compound Degradation | 211.47 |
| | Cofactor, Prosthetic Group, Electron Carrier Degradation | 1.05 |
| | Degradation/Utilization/Assimilation - Other | 407.33 |
| | Fatty Acid and Lipid Degradation | 1693.49 |
| | Inorganic Nutrient Metabolism | 3960.96 |
| | Nucleoside and Nucleotide Degradation | 5965.32 |
| | Polymeric Compound Degradation | 1942.72 |
| | Secondary Metabolite Degradation | 4169.72 |
| Detoxification2 | Antibiotic Resistance | 110.13 |
| | methanol oxidation to carbon dioxide | 193.68 |
| Generation of Precursor Metabolite and Energy17 | 1,5-anhydrofructose degradation | 45.11 |
| | Electron Transfer | 3478.55 |
| | Entner-Duodoroff Pathways | 18.69 |

| | | |
|---|---|---|
| | ethylmalonyl-CoA pathway | 164.95 |
| | Fermentation | 9323.24 |
| | formaldehyde oxidation I | 37.3 |
| | Glycolysis | 3060.28 |
| | glyoxylate cycle | 913.46 |
| | isopropanol biosynthesis | 256.18 |
| | methyl ketone biosynthesis | 195.58 |
| | methylaspartate cycle | 100.59 |
| | Pentose Phosphate Pathways | 2738.17 |
| | Photosynthesis | 1890.84 |
| | Respiration | 3563.85 |
| | superpathway of glycolysis and Entner-Doudoroff | 931.8 |
| | superpathway of glycolysis, pyruvate dehydrogenase, TCA, and glyoxylate bypass | 975.15 |
| | TCA cycle | 8156.17 |
| Glycan Pathways2 | Glycan Biosynthesis | 776.92 |
| | Glycan Degradation | 1080.88 |
| Macromolecule Modification2 | Nucleic Acid Processing | 1476.53 |
| | Protein Modification | 0.01 |
| Metabolic Clusters10 | L-glutamate and L-glutamine biosynthesis | 481.04 |
| | O-antigen building blocks biosynthesis (E. coli) | 1065.07 |
| | phospholipases | 16.89 |
| | pyrimidine deoxyribonucleotide phosphorylation | 991.8 |
| | pyrimidine deoxyribonucleotides biosynthesis from CTP | 6.39 |
| | pyrimidine deoxyribonucleotides de novo biosynthesis I | 1008.79 |
| | pyrimidine deoxyribonucleotides de novo biosynthesis III | 518.52 |
| | pyrimidine deoxyribonucleotides de novo biosynthesis IV | 4.48 |
| | superpathway of L-aspartate and L-asparagine biosynthesis | 423.49 |
| | tRNA charging | 985.01 |

(b) The metabolic pathways of soil fungi in three sites

| Level1 | Level2 | Abundance |
|---|---|---|
| Biosynthesis7 | Amino Acid Biosynthesis | 3105.23 |
| | Aminoacyl-tRNA Charging | 914.9 |
| | Carbohydrate Biosynthesis | 2374.26 |
| | Cofactor, Prosthetic Group, Electron Carrier, and Vitamin Biosynthesis | 4611.78 |
| | Fatty Acid and Lipid Biosynthesis | 2433.44 |
| | Nucleoside and Nucleotide Biosynthesis | 8015.38 |
| | Secondary Metabolite Biosynthesis | 1629.24 |
| Degradation/Utilization/Assimilation7 | Amino Acid Degradation | 461.18 |
| | C1 Compound Utilization and Assimilation | 684.31 |
| | Carbohydrate Degradation | 1126.14 |
| | Degradation/Utilization/Assimilation - Other | 736.47 |
| | Fatty Acid and Lipid Degradation | 2529.4 |
| | Inorganic Nutrient Metabolism | 1218.49 |
| | Nucleoside and Nucleotide Degradation | 859.27 |
| Generation of Precursor Metabolite and Energy9 | chitin degradation to ethanol | 400.58 |
| | Electron Transfer | 5845.37 |
| | Fermentation | 1399.32 |
| | Glycolysis | 680.77 |
| | glyoxylate cycle | 1314.64 |
| | methyl ketone biosynthesis | 808.45 |
| | Pentose Phosphate Pathways | 1758.79 |
| | Respiration | 5845.37 |
| | TCA cycle | 1051.59 |
| Glycan Pathways1 | Glycan Biosynthesis | 785.24 |
| Metabolic Clusters5 | phospholipases | 51.14 |
| | pyrimidine deoxyribonucleotide phosphorylation | 693.88 |
| | pyrimidine deoxyribonucleotides biosynthesis from CTP | 423.63 |
| | pyrimidine deoxyribonucleotides de novo biosynthesis I | 852.93 |
| | tRNA charging | 914.9 |