|  |  |  |  |
| --- | --- | --- | --- |
| **Process** | **Gene** | **KO** | **Taxon** |
| Aerobic C fixation | RuBisCO | K01601  K01602 | *Viridiplantae* |
| phosphoribulose kinase (*prk*B) | K00855 | *Gammaproteobacteria* |
| Respiration | cytochrome C oxidase (*cox*I, *cox*III, *cox*A, *cox*C) | K02256  K02262  K02274  K02276 | *Viridiplantae*  *Proteobacteria*  *Bacteroidetes*  *Actinobacteria* |
| Anaerobic C fixation | ATP-citrate lyase (*acl*A, *acl*B)  2-oxogluterate:ferredoxin oxidoreductase  fumerate reductase (*frd*A) | K15230  K15231  K00174  K00175  K00244 | *Epsilonproteobacteria*  *Clostridia*  *Clostridia*  *Firmicutes/Protebacteria* |
| CO dehydrogenase/acetyl-CoA synthase (CODH-ACSA) | K14138  K00190 | *Deltaproteobacteria* |
| Fermentation | L-lactate dehydrogenase  Pyruvate:ferredoxin oxidoreductase | K00016  K00169  K00170 | *Mollicutes*  *Epsilonproteobacteria*  *Fusobacteria* |
| CO oxidation | carbon-monoxide dehydrogenase (*cox*S, *cox*M, *cox*L) | K03518  K03519  K03520 | *Alphaproteobacteria* |
| N fixation | nitrogenase (*nif*D, *nif*H, *nif*K) | K02586  K02588  K02591 | *Epsilonproteobacteria* |
| Denitrification | nitric oxide reductase (*nor*B, *nor*C) | K02305  K04561 | *Gammaproteobacteria* |
| nitrous oxide reductase (*nos*Z) | K00376 |
| DNRA | nitrite reductase (*nrf*A) | K03385 | *Cytophagia* |
| Anammox | hydroxylamine oxidase | K10535 | *Deltaproteobacteria* |
| N mineralization | glutamate dehydrogenase (*gdh*A) | K00260  K00261  K00262 | *Alphaproteobacteria*  *Gammaproteobacteria* |
| N assimilation | assimilatory nitrate reductase | K00360 | *Alphaproteobacteria* |
| glutamine synthetase (*gln*A, *glt*B, *glt*S) | K01915  K00265  K00284 | *Gammaproteobacteria*  *Alphaproteobacteria*  *Betaproteobacteria* |
| ASR | Adenyl sulfate kinase (*cys*C)  Sulfate adenylyltransferase (*cys*N, *cys*D) | K00860  K00956  K00957 |  |
| DSR | APS reductase (*apr*A) | K00394 |  |
| S mineralization | Cysteine diogenase  3-Mercaptopyruvate sulfurtransferase | K00456  K01011 |  |
| DMS oxidation | DMS monooxygenase | - |  |
| DMSO reduction |  | - |  |
| DMSP cleavage | DMSP lyase (*ddd*D, *ddd*L, *ddd*P) | - |  |

Table 2. Genes involved in key carbon, nitrogen and sulfur processes detected in Organic Lake and the most frequently associated taxonomic class. See Figure SX\* for frequencies of all taxonomic groups. KO, KEGG ortholog.