|  |  |  |
| --- | --- | --- |
| **Process** | **Marker enzyme** | **Taxon** |
| Aerobic C fixation | RuBisCO  phosphoribulokinase | *Chlorophyta*  *Gammaproteobacteria* (*Marinobacter*) |
| Respiration | cytochrome C oxidase | *Proteobacteria* |
| Anaerobic C fixation | ATP-citrate lyase  2-oxogluterate:ferredoxin oxidoreductase  fumerate reductase | *Epsilonproteobacteria*  *Clostridia* |
| CO dehydrogenase/acetyl-CoA synthase | *Deltaproteobacteria* |
| Fermentation | L-lactate dehydrogenase  pyruvate:ferredoxin oxidoreductase | *Mollicutes* (RF3) |
| CO oxidation | carbon-monoxide dehydrogenase | *Alphaproteobacteria* |
| Photoheterotrophy  (potential anaplerotic autotrophy) | photosynthetic reaction center (PufLM) | *Alphaproteobacteria* |
| rhodopsin | *Alphaproteobacteria* |
| N fixation | nitrogenase | *Epsilonproteobacteria* |
| Denitrification | nitric oxide reductase  nitrous oxide reductase | *Gammaproteobacteria* |
| DNRA | nitrite reductase (NrfA) | *Cytophagia* |
| Anammox | hydroxylamine oxidase | *Deltaproteobacteria* |
| N mineralization | glutamate dehydrogenase | *Alphaproteobacteria*  *Gammaproteobacteria* |
| N assimilation | assimilatory nitrate reductase  glutamine synthetase | *Proteobacteria* |
| Dissimilatory sulfate reduction | APS reductase  sulfite reductase | *Deltaproteobacteria* |
| Sulfur oxidation | sulfite oxidase | *Alphaproteobacteria* |
| S assimilation | adenylyl sulfate kinase  sulfate adenylyltransferase | *Gammaproteobacteria* |
| S mineralization | cysteine dioxygenase  3-mercaptopyruvate sulfurtransferase | *Proteobacteria* |
| DMSO reduction | anaerobic dimethyl sulfoxide reductase | *Clostridia* |
| DMSP cleavage | DMSP lyase | *Gammaproteobacteria*  *Alphaproteobacteria* |
| DMSP demethylation | DMSP demethylase | *Alphaproteobacteria* |