An overview of the sulfur cycle

The sulfur cycle is the collection of processes by which sulfur moves to and from minerals (including the waterwastes) and living system

Did you know?

Sulfur is the 10^{th} most abundant element in the environment,with atomic number 16. It is a bright yellow crystalline solid in its normal state,with most of it stored underground in rocks and minerals and in ocean floor deposits.

Steps of the **sulfur cycle** are:

Mineralization of organic sulfur into inorganic forms, such as hydrogen sulfide (H_2S), elemental sulfur, as well as sulfide minerals.

Oxidation of hydrogen sulfide, sulfide, and elemental sulfur (S) to sulfate (SO_4^{2-}).
Reduction of sulfate to sulfide.

Incorporation of sulfide into organic compounds (including metal-containing derivatives)

Sulfide can serve as an electron source for both photosynthetic microorganisms and chemolithoautotrophs such as *Thiobacillus; it is converted* to elemental sulfur and sulfate.

Sulfate diffuses into reduced habitats, it provides an opportunity for different groups of microorganisms to carry out **sulfate reduction. For example,** when a usable organic electron donor is present, *Desulfovibrio* uses sulfate as its terminal electron acceptor during anaerobic respiration.

Dissimilatory sulfate reduction (i.e., the use of sulfate as an external electron acceptor) results in sulfide accumulation in the environment

Sulfate for use in amino acid and protein biosynthesis is described as assimilatory sulfate reduction

A Simplified Sulfur Cycle.

Photosyntheticand chemosynthetic microorganisms contribute to the environmental sulfur cycle. Sulfate and sulfite reductions carried out by *Desulfovibrio and related microorganisms,* are dissimilatory processes. Sulfate reduction also can occur in assimilatory reactions, resulting in organic sulfur forms. Elemental sulfur reduction to sulfide is carried out by *Desulfuromonas*, *thermophilic* archaea, or cyanobacteria in hypersaline sediments. Sulfur oxidation can be carried out by a wide range of aerobic chemotrophs and by aerobic and anaerobic phototrophs.

Sulphur Cycle