

In situ stimulation of microbial sulfate reduction in an acidic mining lake by addition of organic substrate

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Zusammenfassung

In acidic mining lakes microbial sulfate reduction is inhibited by a low pH (below pH 3) and a lack of organic substrates. Stimulation of sulfate reduction by addition of organic substrates is a common strategy to remove acidity from acidic mine drainage. For the first time this principle was applied in enclosures in a lake under in situ conditions.

Addition of a complex organic substrate (Carbokalk - a byproduct of sugar production) together with straw as a growth matrix altered the chemistry and microbiology of the lake sediment completely. Iron was reduced and microbial sulfate reduction in the surface sediment was stimulated to a rate of $163 \text{ nmol SO}_4^{2-} \text{ cm}^{-3} \text{ d}^{-1}$. Cell numbers of sulfate reducers increased by up to 5 orders of magnitude. As a result the pH of the sediment was raised from 2.5 above 6. However lake water chemistry was hardly affected by these changes. Possible problems of the applied technique for lake restoration are discussed.

**Geochemische und mikrobiologische Vorgänge in
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