In situ Bioremediation of Acid Mining Lakes by Addition of Organic Substrate and Lime

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Abstract

As a result of pyrite oxidation in surrounding dumps acid mining lakes have formed by sulfuric acid leaching into the lake. Lake sediments have an intrinsic capacity to produce alkalinity by microbial sulfate and iron reduction. Iron and sulfate are being reduced to form iron sulfides accompanied by the consumption of H+ ions.

The remediation strategy presented here aims at the specific stimulation of these microbial processes by controlled supply of carbon and nutrients. In an up scaling approach, Carbokalk® (a by-product from the sugar industries) and straw amendments are being investigated in 24 m^3 to 5,000 m^3 enclosure systems within an experimental mining lake in Lusatia/SE-Germany. Microbiological and geochemical findings are presented. Applicability and drawbacks of this bioremediation technique are being discussed.