Biological reduction of sulfate under cold temperatures and low cost substrates

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Comprehensive Sulfate Management in Cold Mining Waters Seminar, March 21th 2018, University of Oulu
Aims

1. Use of low cost carbon sources for biological reduction of preconcentrated sulfate
2. Screening of potential microbes and carbon sources for sulfate reduction
3. Reduced substrate costs via co-hydrolysis of biopolymers
4. Identification of the most important factors affecting the performance of sulfate reducing bacteria in cold conditions
Enrichment
- Growth observed as formation of a black iron sulfide precipitate in the liquid medium = growth indication.
- Lactate as substrate (Postgate and Modified Baar’s medium).
- Sulfate measurements = reduction rate.
- Storage of potential consortia as glycerol stocks.

Classification
High-throughput sequencing, phylogenetic analysis.

Cold acclimation
Adaptation of enriched consortia for cold temperatures (mL scale).

Substrate tests
Evaluation of various carbon and nitrogen sources, and industrial waste for SRB consortia (mL scale).

Assessment
Use of enriched consortia for reduction of pre-concentrated sulfate in bioreactors (1-10 L scale).

Sampling
Sediment sample from the proximity of a metal mine under Arctic climate.
Work ahead

- **Identification of microbes**
  - 16S rDNA sequencing of the strains in progress

- **Widening of the substrate scope**
  - Test on various substrates planned
  - If necessary, acclimation of cultures to other substrates
  - Use of low-cost substrates from food industry

- **Scale-up investigations**
  - Reduction of pre-concentrated sulfate
  - Cooperation with Prof. Johnson planned in 2018-2019 for reactor studies
Thank you for your attention!

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