Circumneutral-pH Biological Mn(II) Oxidation

Fairview, PA
150 mg/L Mn(II)! influent
10 gal/min
Limestone treatment system
MS1 - Figure 1

Graphs showing the concentration of manganese (Mn(II)) and dissolved oxygen over distance for Site 1 in Elk County, PA and Site 2 in Somerset County, PA. The graphs also show temperature and pH changes over distance at both sites.
Ditch in limestone bed provides passive aeration. Manganese oxide (MnO_x) precipitates coat ditch bottom.
MnO$_x$-coated limestone

Facing “up” into ditch

Facing “down” into bed

12/07/2005
MS2 - Figure 3

The figure shows the distribution of bacterial communities across different regions (Front, Middle, Rear, Background) at various sample sizes (n=80, n=78, n=64, n=61). The pie charts depict the percentage composition of different bacterial groups, while the bar graphs illustrate the cell count per gram of dry mass. The bacterial groups are color-coded as follows:

- **Alpha-proteobacteria**
- **Beta-proteobacteria**
- **Gamma-proteobacteria**
- **Cyanobacteria**
- **Firmicutes**
- **Acidobacteria**
- **Deinococcus-Thermus**
- **Bacteroidetes**
- **Planctomycetes**
- **Actinobacteria**
- **Gemmataceae**
- **Chloroflexi**
- **Delta-proteobacteria**
- **Eukaryota**
- **Unidentified**

The cell count values are represented on a logarithmic scale (10^5 to 10^8 cells per g dry mass).
Principle Component Analysis

PC1 (36.0%) vs. PC2 (29.1%)

- Background
- Front
- Middle
- Rear

MS2 - Figure 7
MS2 - Figure 5
Black squares – live under air
White squares – live under N2
Black circles – killed under air
White circles – killed under N2
White circles – live under 21% pO2
Black squares – live under 10% pO2
Black triangles – live under 1% pO2
Black squares – no org-C addition
White circles – + glucose
Black triangles – + carboxymethylcellulose

MS3 - Figure 3
Black squares – live no fungicides
White squares – killed no fungicides
Black circles – live + fungicides
White circles – killed + fungicides
The graph shows the CFU (colony-forming units) of dry mass for different conditions:

- **Original sediment**: The CFU is around $10^5$.
- **Irradiated sediments**: The CFU is significantly lower, around $10^3$.
- **Live**: The CFU is around $10^6$.
- **Live with fungicides**: The CFU is the highest, around $10^7$.

The graph indicates that the presence of fungicides significantly increases the CFU compared to the other conditions.