Supplementary Material

# Supplementary Data

**Supplementary**

**Table S1** Complete comparison of corrosion rates and distribution between flow-through system sections and stationary cultures. Sulfate reducing bacteria (*D. alaskensis* and *D. ferrophilus* IS5) are compared against methanogen (*Methanobacterium* IM1).

|  |  |  |
| --- | --- | --- |
|  | **Flow system** | **Stationary cultures** |
|  | Column section | Control\* | 161091 | IS51 | IM11set 1 | IM11set 2 | Control | 161092 | IM12 | Control | 16109 | IS5 | IM1 |
| Total fast (%) | 1 | 10 | 28 | 35 | 88 | 78 | 30 | 55 | 83 | N/A |
| 2 | 15 | 23 | 22 | 57 | 38 | 25 | 13 | 62 |
| 3 | 0 | 18 | 13 | 30 | 18 | 30 | 3 | 28 |
| 4 | 5 | 3 | 18 | 28 | 15 | 35 | 25 | 5 |
| 5 | 20 | 13 | 23 | 13 | 57 | 15 | 3 | 7 |
| 6 | 15 | 8 | 20 | 27 | 45 | 15 | 23 | 0 |
| CRFast (mm/yr) | 1 | 0.12 | 0.2 | 0.15 | 0.22 | 0.21 | 0.09 | 0.17 | 0.36 |
| 2 | 0.12 | 0.2 | 0.15 | 0.18 | 0.17 | 0.10 | 0.14 | 0.20 |
| 3 | 0.00 | 0.2 | 0.15 | 0.17 | 0.16 | 0.10 | 0.12 | 0.19 |
| 4 | 0.10 | 0.1 | 0.15 | 0.17 | 0.18 | 0.10 | 0.14 | 0.12 |
| 5 | 0.12 | 0.1 | 0.15 | 0.14 | 0.18 | 0.10 | 0.14 | 0.14 |
| 6 | 0.12 | 0.2 | 0.13 | 0.17 | 0.21 | 0.10 | 0.20 | 0.00 |
| Total Slow (% ) | 1 | 90 | 72 | 65 | 12 | 22 | 70 | 45 | 17 |
| 2 | 85 | 77 | 78 | 43 | 62 | 75 | 88 | 38 |
| 3 | 100 | 82 | 87 | 70 | 82 | 68 | 98 | 72 |
| 4 | 90 | 97 | 82 | 72 | 85 | 65 | 75 | 95 |
| 5 | 80 | 87 | 77 | 87 | 43 | 85 | 98 | 93 |
| 6 | 85 | 92 | 80 | 73 | 55 | 85 | 78 | 100 |
| CRSlow (mm/yr) | 1 | 0.04 | 0.1 | 0.07 | 0.05 | 0.06 | 0.05 | 0.07 | 0.06 |
| 2 | 0.04 | 0.1 | 0.06 | 0.05 | 0.04 | 0.05 | 0.05 | 0.07 |
| 3 | 0.03 | 0.1 | 0.05 | 0.04 | 0.03 | 0.05 | 0.05 | 0.06 |
| 4 | 0.03 | 0.1 | 0.05 | 0.05 | 0.04 | 0.05 | 0.05 | 0.05 |
| 5 | 0.04 | 0.1 | 0.06 | 0.05 | 0.04 | 0.05 | 0.03 | 0.04 |
| 6 | 0.03 | 0.1 | 0.07 | 0.05 | 0.03 | 0.05 | 0.05 | 0.04 |
| CRFast/CRSlow | 1 | 2.6 | 2.0 | 2.2 | 4.1 | 3.6 | 1.8 | 2.3 | 6.4 |
| 2 | 2.7 | 2.9 | 2.4 | 3.3 | 4.1 | 1.9 | 2.7 | 3.0 |
| 3 | 0.0 | 2.8 | 2.9 | 3.9 | 4.8 | 2.1 | 2.4 | 3.1 |
| 4 | 3.6 | 2.1 | 2.8 | 3.1 | 4.6 | 2.1 | 2.9 | 2.4 |
| 5 | 3.1 | 2.2 | 2.5 | 2.9 | 4.0 | 2.3 | 4.2 | 3.1 |
| 6 | 3.5 | 2.7 | 2.0 | 3.2 | 6.4 | 2.2 | 4.3 | 0.0 |
| CR average | 1 | 0.05 | 0.10 | 0.10 | 0.20 | 0.17 | 0.06 | 0.13 | 0.31 | 0.022 | 0.034 | 0.35 | 0.15 |
| 2 | 0.05 | 0.10 | 0.08 | 0.13 | 0.09 | 0.06 | 0.06 | 0.15 |
| 3 | 0.03 | 0.08 | 0.07 | 0.08 | 0.06 | 0.06 | 0.05 | 0.10 |
| 4 | 0.03 | 0.07 | 0.07 | 0.09 | 0.06 | 0.07 | 0.07 | 0.05 |
| 5 | 0.05 | 0.07 | 0.08 | 0.06 | 0.12 | 0.05 | 0.04 | 0.05 |
| 6 | 0.05 | 0.08 | 0.08 | 0.09 | 0.11 | 0.05 | 0.08 | 0.04 |
| Fast-corrosion= beads lost more than 1% of total weight |
| Slow-corrosion=beads lost less than 1% of total weight |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |



Figure S1: Methane production [mM] by *Methanobacterium* IM1 (yellow) compared to the abiotic control (blue) over 14 days. Error bars indicate the standard deviation of three replicates (IM1) or duplicates (control).



Figure S2: Formation of hydrogen sulfide [mM] by *D. ferrophilus* IS5 (green) and *D. alaskensis* 16109 (red) compared to the abiotic control (blue) over 14 days. Error bars indicate the standard deviation of three replicates (IS5 and 16109) or duplicates (control).



Figure S3: Correlation between incubation days and average corrosion of section 1 for *Methanobacterium* IM1