Neutrophilic iron-oxidizing bacteria: occurrence and relevance in biological drinking water treatment - DTU Orbit (17/12/2018)

**Neutrophilic iron-oxidizing bacteria: occurrence and relevance in biological drinking water treatment**

Rapid sand filtration (RSF) is an economical way to treat anoxic groundwater around the world. It consists of groundwater aeration followed by passage through a sand filter. The oxidation and removal of ferrous iron, which is commonly found in anoxic groundwaters, is often believed to be a fully physicochemical process. However, persistently low temperatures in RSF across Denmark may negatively affect the kinetics of chemical oxidation. The slower chemical oxidation of ferrous iron may increase the chances for iron bioconversion by neutrophilic iron-oxidizing bacteria (FeOB), which are found naturally in many environments. In this study, we used a combination of a cultivation-based opposing gradient enrichment technique and 16S rRNA gene targeted molecular tools to isolate, quantify and identify FeOB from a RSF. The microscopic quantification of selectively enriched FeOB cells revealed that in RSF, neutrophilic iron oxidizers were present at the level of up to $7 \times 10^5$ cells g$^{-1}$ sediment. The spatial abundance and diversity of FeOB inferred by denaturing gradient gel electrophoresis fingerprinting differed greatly both between and within individual sand filters. The results suggest a larger than assumed role of FeOB in iron removal at waterworks using RSF technologies.

**General information**

State: Published  
Organisations: Department of Environmental Engineering, Residual Resource Engineering, Urban Water Engineering  
Contributors: Gülay, A., Musovic, S., Albrechtsen, H., Smets, B. F.  
Pages: 1295-1301  
Publication date: 2013  
Peer-reviewed: Yes

**Publication information**

Journal: Water Science and Technology: Water Supply  
Volume: 13  
Issue number: 5  
ISSN (Print): 1606-9749  
Ratings:  
BFI (2018): BFI-level 1  
Web of Science (2018): Indexed yes  
BFI (2017): BFI-level 1  
Scopus rating (2017): CiteScore 0.7 SJR 0.258 SNIP 0.432  
Web of Science (2017): Impact factor 0.674  
Web of Science (2017): Indexed yes  
BFI (2016): BFI-level 1  
Scopus rating (2016): CiteScore 0.65 SJR 0.273 SNIP 0.473  
Web of Science (2016): Impact factor 0.573  
BFI (2015): BFI-level 1  
Scopus rating (2015): CiteScore 0.64 SJR 0.295 SNIP 0.473  
Web of Science (2015): Impact factor 0.532  
Web of Science (2015): Indexed yes  
BFI (2014): BFI-level 1  
Scopus rating (2014): CiteScore 0.47 SJR 0.273 SNIP 0.456  
Web of Science (2014): Impact factor 0.394  
BFI (2013): BFI-level 1  
Scopus rating (2013): CiteScore 0.57 SJR 0.41 SNIP 0.384  
Web of Science (2013): Impact factor 0.505  
ISI indexed (2013): ISI indexed no  
Web of Science (2013): Indexed yes  
BFI (2012): BFI-level 1  
Scopus rating (2012): CiteScore 0.51 SJR 0.316 SNIP 0.404  
ISI indexed (2012): ISI indexed no  
BFI (2011): BFI-level 1  
Scopus rating (2011): CiteScore 0.53 SJR 0.372 SNIP 0.359  
ISI indexed (2011): ISI indexed no  
BFI (2010): BFI-level 1  
Scopus rating (2010): SJR 0.303 SNIP 0.379