Quantification of *Dehalobacter*-like Species in Lake Sediments

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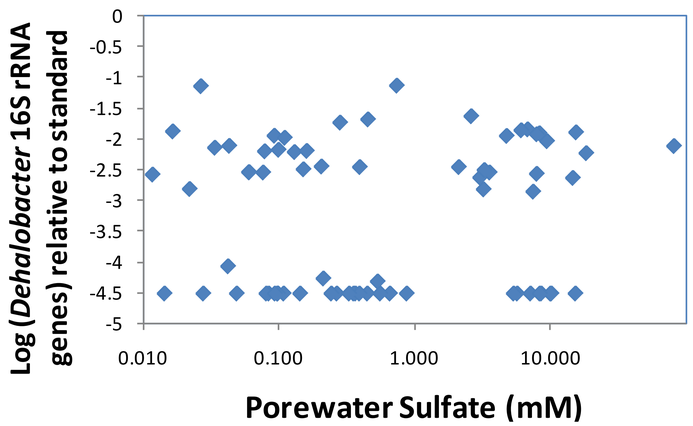
Introduction

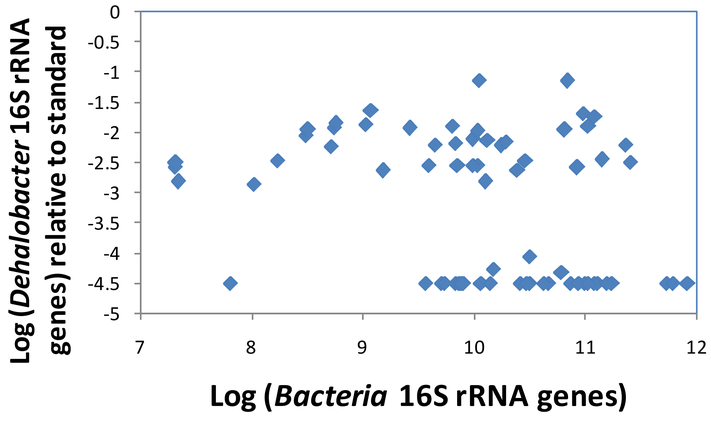
The goal of this project was to quantify *Dehalobacter*-like species in pristine environments. These bacteria are thought to use such environmental contaminants as polychlorinated biphenyls (PCBs) and tricholoroethene (TCE) similar to the way humans use oxygen, as an electron acceptor in their energy-producing metabolism. Understanding their niche in uncontaminated sites will enable engineers to manipulate them to remediate sites contaminated with PCBs and other hazardous compounds.

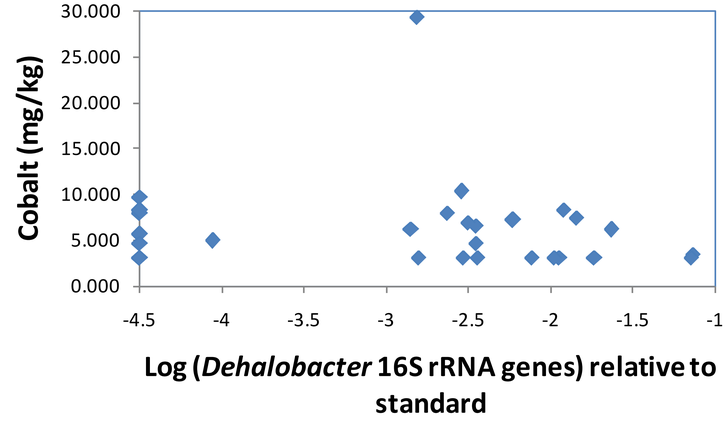
Methods

Seventy sediment samples were collected from twenty lakes in Minnesota and North Dakota in October of 2010. DNA was extracted from each sample using a MoBio PowerSoil DNA Isolation kit. Quantitative Polymerase Chain Reactions (qPCR) of the lake sample DNA was performed with a "false standard" to compare relative quantities and relate populations to environmental factors that were previously determined from the samples. Standards using a pure *Dehalobacter restrictus* culture are currently being created, and numerical estimations of the quantities of *Dehalobacter*-like species will soon follow.

Results







Discussion

The results show that *Dehalobacter*-like species are present in forty-two of seventy samples, ten of the twenty lakes. No clear relationship between these organisms and sediment or water chemistry was apparent. Cobalt was a suspected to be important for these organisms because of its presence in dehalogenase enzymes, and sulfate was suspected to be inhibitory to these organisms because of the competition it creates in the environment. It is also interesting to note that there is no relationship to *Chloroflexi* bacteria, which have a function similar to *Dehalobacter* sp.

Conclusion

This research showed that *Dehalobacter*-like organisms are present in pristine environments. No relationship to any monitored environmental factor was found, however. Despite conceptions that *Chloroflex*i may have been dependent on the same variables, no relationship between these two organisms was found. Future research will identify what limits the growth of *Dehalobacter* sp. in natural environments. Specific chlorinated organic compounds, such as chloroxanthones, may be significant for the success of these organisms.