

# Effects of Pyrite Amended Media on Denitrification Rates in Constructed, Subsurface Wetlands

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## Hypothesis

- Sulfide minerals, like pyrite, can be used as the electron source to fuel denitrification.
- The addition of pyrite to subsurface wetlands will enhance the denitrification rate and overall nitrogen removal rate.

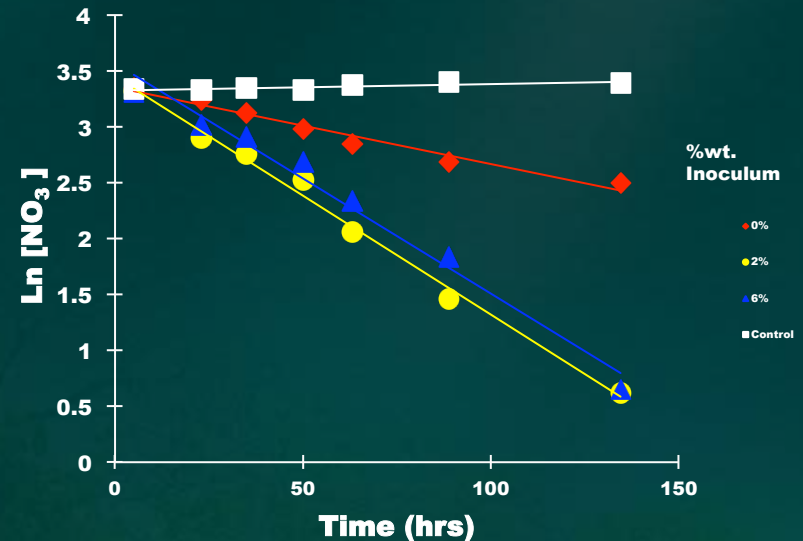
## Methods

Various microcosm batch and semi-batch studies were performed. The amounts of sand, wastewater, inoculum, woodchips, and pyrite were varied based on what was being studied.

## Analysis

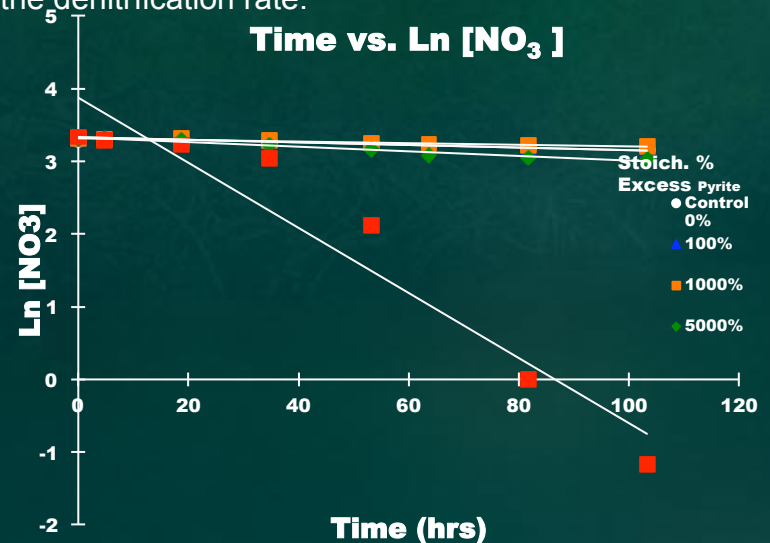
Ion Chromatography and Total Organic Carbon readings were taken.

### Time vs. LN [NO<sub>3</sub> ]



Results of a microcosm study showing that varying the amount of pyrite in a batch experiment does not affect the denitrification rate.

### Time vs. Ln [NO<sub>3</sub> ]



Results of a microcosm study showing that an increase in the stoichiometric excess of pyrite based on its reaction with nitrate results in an increase in the denitrification rate.

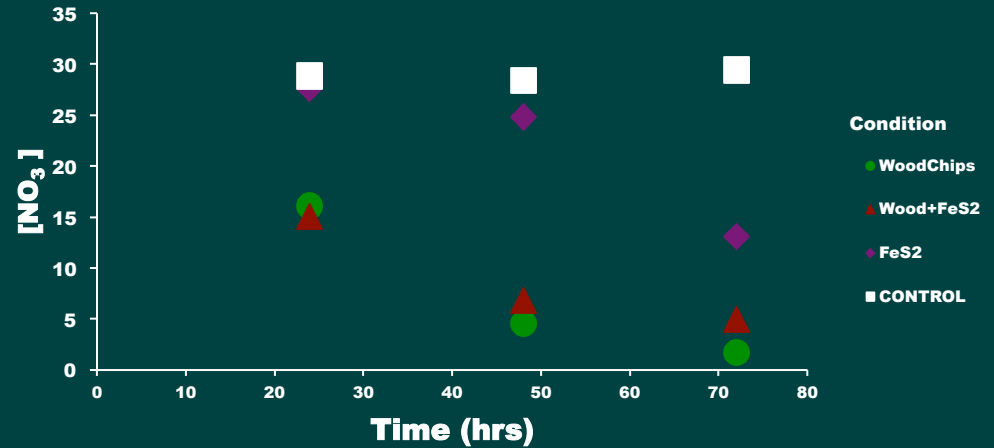
## Results

Our data proves inconclusive due to errors in the methods.

## Conclusions

Pyrite can, indeed be used as the electron source to fuel denitrification. However, it remains unclear the effects of pyrite on denitrification rates and overall nitrogen removal in constructed wetlands.

## Time vs. $[\text{NO}_3^-]$



Results of a microcosm study in which the denitrification rates using 3 electron sources were compared: woodchips alone, woodchips and pyrite, and pyrite alone.