# Can a Process Developed using FeCl2 and CMC Treated Brazilian Pepper Wood Fibers to Sequester Phosphate also Sequester Nitrates?

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Previous research indicates CMC/FeCl2 treated Brazilian pepper wood fibers are effective at phosphate adsorption in a laboratory setting and for treating natural waters. Nitrate is recognized as a major aquatic pollutant. This project was to evaluate if a technique developed to adsorb phosphates can also adsorb nitrates. Known concentration (ppm) phosphate/nitrate and nitrate test solutions, and polluted natural waters (Otter Creek) were filtered through treated wood fibers. Post-treatment filtrate concentrations were evaluated using photometers and test strips. Treated wood fibers significantly (t-test, p=0.05) reduced nitrate for the nitrate test solution, and nitrate and phosphate in natural waters (100% adsorption). For the nitrate/phosphate test solution a significant increase occurred for both nitrate and phosphate, and was perceived to result from high test solution nutrient concentrations overloading the treated wood fibers plus leaching of nutrients from the fibers. Leaching was previously observed when using untreated wood fibers and distilled water. Treated wood fibers used as filter medium for Otter Creek water were used as a fertilizer for plants grown from seed germination. Commercial fertilizer and distilled water were used for comparison. For plant tissue analysis significant (ANOVA, p=0.05) differences were observed between the fertilization test series for nitrate and phosphate. Tukey's HSD test indicated for nitrate using distilled water and treated wood fibers produced similar results, but were significantly lower than for commercial fertilizer, while for phosphate results using treated wood fibers and commercial fertilizer were similar, and significantly higher than for distilled water.

**Awards Won:**