Undergraduate Internship Project #5 of 10 for FY07

Intern Jennifer Handlin’s project, co-sponsored by the DWRC and the UD’s Department of Plant and Soil Sciences, was titled “Evaluating the Use of Zero-valent Iron to Remove Pathogens from Water.” She was advised by Dr. Yan Jin of the UD’s Department of Plant and Soil Sciences.

Abstract

The removal of pathogens, especially viruses, has been one of the biggest challenges facing water treatment facilities today. The use of chlorine to disinfect has been shown to be less effective against viruses than bacteria due to viruses’ small size and resistance to disinfection and filtration. The pathogens come from a variety of point and non-point sources such has runoff and infiltration from animal waste-amended fields, leaking septic tanks, wastewater discharge, and land disposal of biosolids. The use of zerovalent technology has already been shown to remove viruses from water at neutral pH (You et al., 2005). This research has been focused on evaluating the removal efficiency of viruses by zero-valent iron at three different pHs, 5, 7.5 and 9. The research showed that zero-valent iron was effective over the wide range of pH tested. At all three pHs, a 6-log (99.9999%) removal was achieved. This technology would prove to be very beneficial in reducing dependence on chlorine for disinfection, thus reducing the harmful disinfection byproducts (DBP’) resulting from its use.