

**LABORATORY SCALE STUDY TO DETERMINE THE EFFECTIVENESS  
OF IRON NANOPARTICLES FOR SELECTED PESTICIDE REMEDIATION**

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**ABSTRACT:** Groundwater contamination by pesticides remains an ongoing area of concern. Iron powder has shown limited success in pesticide remediation. Iron nanoparticles, with their large surface areas and high reactivity, have shown superior removal efficiencies compared to iron powder for a number of contaminants. However, to this date work on pesticides is very limited. In this study, iron nanoparticles were used to treat atrazine, alachlor and dicamba, three commonly used herbicides in the American Midwest. Iron nanoparticles were prepared by the borohydride reduction method under inert atmosphere. The resulting particles have diameters on the order of 30-40 nm. Reaction kinetics was observed through a series of batch trials under various buffer conditions. Atrazine degradation was found to be highly pH dependent. Alachlor degradation proceeded very rapidly without the need for any pH manipulation. This research is ongoing and additional results are expected. Iron nanoparticle characterization, proposed reaction pathways, byproducts and analytical techniques will be presented. Keywords: Iron nanoparticles; pesticides; groundwater remediation

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