WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2004AR72B

Title: Oxide-Catalyzed Oxidation of 17b-Estradiol to Estrone

Project Type: Research

Focus Categories: Water Quality, Non Point Pollution, Surface Water

Keywords: biosolid, animal waste, estradiol, water quality, oxidation

Start Date: 03/01/2004

End Date: 04/30/2005

Federal Funds Requested: $17,703

Non-Federal Matching Funds Requested: $35,406

Congressional District: 3rd

Principal Investigator:
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Abstract

Endogenous estrogens, as emerging environmental contaminants, have received increasing attention, due to the fact that these emerging contaminants interfere with the endocrine / reproductive functions of wildlife and humans. Estrogens are widely present in biosolids and animal wastes and enter the environment primarily via land application of these solids as fertilizers. To reduce the potential environmental risk that may be caused by estrogens, the contaminants must be effectively degraded. Previous studies have suggested that 17b-estradiol is abiotically degraded in soil to estrone, followed by microbial degradation. The proposed study attempts to identify the soil component(s) that are responsible for the abiotic degradation of 17b-estradiol. We hypothsize that soil oxides, manganese oxides in particular, are effective catalysts for the degradation reaction. We will evaluate the degradation kinetics and the factors that influence the reaction in the presence of manganese oxides and iron oxides. Once verified, these oxides may be amended to soils and biosolids to enhance the degradation of 17b-estradiol. This, coupled with other remediation technologies such as biodegradation, may completely eliminate estrogen pollution in the environment.