Bioremediation of DDE, DDD, and DDT in Sandy Soil from Site ZSS3027 in Field ZSE-J in the Lake Apopka North Shore Restoration Area

John Thomas
Soil and Water Science Department
University of Florida
Telephone: 352-392-1951
Email: thomas@ufl.edu

Ben Coppenger
Soil and Water Science Department
University of Florida
Adviser: Dr. John Thomas
Email: bjc22388@ufl.edu

Abstract: DDT is an organochlorine pesticide (OCP) that was almost completely banned in the United States in the 1970s due to the public negative attention given to DDT after the book *Silent Spring* questioned the usage of DDT. It is still used, however, for disease vector control with malaria-carrying mosquitos. Due to its insolubility in water and its tendency to bond strongly with soil organic matter, it still persists in soils today. The main purpose of this paper is to test the feasibility of *in situ* bioremediation of DDT contaminated soils by spent mushroom substrate (SMS). Sandy soil from the Lake Apopka North Shore Restoration Area (NSRA) was taken to the University of Florida and sampled for four months to test the biodegradation rates of p,p' and o,p' isomers of DDE, DDD, and DDT (DDx). DDx biodegradation due to extracellular enzyme production was compared between mesocosms without SMS and mesocosms with SMS from *Pleurotus ostreatus* (oyster mushroom) and SMS from *Agaricus bisporus* (commonly called white button mushroom or, when mature, the portabella mushroom). Bioremediation of the Lake Apopka NSRA soil is necessary, because of the potential threat to wildlife these soils pose, if flooded. The findings of this particular research found that the *Agaricus bisporus* and *Pleurotus ostreatus* SMS did not produce the amount of extracellular enzymes in sufficient quantities

needed to efficiently biodegrade the OCPs, but that fungi native to the soil, identified as a *Nectria* species, caused a greater rate of DDx biodegradation than in the SMS mesocosms.