

Effect of Pesticides on Seed Germination of *Parthenium hysterophorus* L. as Monocropping and Co-Cropping System

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ABSTRACT

Present work has been carried out to evaluate the potential use of *P.hysterophorus* as a monocropping and co-cropping system for the bioremediation of pesticides like chlorpyrifos, cypermethrin and fenvalerate. The effect of the three pesticides on the germination of *Parthenium hysterophorus* seeds was investigated using pesticide spiked soil at the concentrations 10, 25, 50, 75 and 100 mg/kg while unspiked soil has been taken as control. The finding shows that chlorpyrifos was more toxic than other two at higher concentrations (= 75 and 100 mg / kg) for seed germination of plant under text.

INTRODUCTION

Phytoremediation has been recognized as an alternative for the removal of organic pollutants from soil (Cunningham *et al.*1995). The metabolic fate of pesticides is dependent on abiotic environmental conditions microbial population, plant species under test, pesticides characteristics and biological as well as chemical reactions. The first step in optimizing the rhizospheric bioremediation of organic contaminants is finding the plant species from a vast array of species (OECD, 1984). The prime objective of this experiment is to investigate the effect of three chemical pesticides on seed germination of *Partheniumhysterophorus* and associated rhizospheric microbial biomass.

MATERIALS AND METHODS

- Plant : *Parthenium Hysterophorus* (ASTERACEAE)
- Soils, Collection and characterization ; Total nitrogen, sodium and potassium were determined according to APHA method and total phosphorus was determined according to perchloric sulphuric acid digestion (APHA, 1998) and Murphy *et al.*, 1962; Olsem *et al.* 198.
- Spiking of Soil : Experimental soil was treated with solvent acetone containing pesticides separately.
- Seed germination test: A seed germination test was performed in order to investigate the stress tolerance of plants to the contaminant. After surface-sterilization 10 seeds were sown in a plastic pot as one replicate, containing

uncontaminated soil and three such replicates were used for each plant for monoculture or co-cropping system.

RESULTS AND DISCUSSIONS

The germination trials have several advantages, such as sensitivity, simplicity and low cost. The toxicity assessment of chemical substances serves as a tool of evaluating the stress tolerance of plants and is particularly relevant when phytotoxic contaminants are present in soil.

- Soil analysis : Shows Physico-chemical characteristics.

Soil Parameters	Values
pH	6.4
Moisture Content	42.4
Organic Carbon	72 gm / kg.
Total Nitrogen	5.8 gm / kg.
Total Phosphorus	0.72 gm / kg.
Potassium	21 mg / kg.
Sodium	23 mg / kg.

Germination of plant seed is an important stage in plant growth, and is particularly sensitive to contaminants (Banks MK *et al.* 2005). Plants are direct recipient of agrotoxics, so they can be used for environmental monitoring of pesticides (Cabrera *et al.* 1994). As the concentration of pesticides was increased in the soil there was reduction and delay in seed germination. These results suggest that cropping pattern has no effect on the seed germination properties of

testing plant cultivated in contaminated soil with chlorpyrifos, Cypermethrin and Fenvalerate.

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