California Department of Food and Agriculture
Environmental Monitoring and Pest Management
1220 N Street, Room A-149
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PROTOCOL FOR MONITORING ENDOSULFAN IN MONTEREY COUNTY 1988

I. Introduction

The California Department of Fish and Game (DFG) has found endosulfan to be ubiquitous in aquatic organisms of the Moss Landing drainage area of Monterey County since 1980 (Fleck, et al. 1988). In response, personnel from the Environmental Hazards Assessment Program (EHAP) of the California Department of Food and Agriculture (CDFA) conducted a study to determine the source of contamination and to determine the general distribution of endosulfan in soils and sediments of agricultural areas of Monterey County. The 1986 study concluded that endosulfan was more prevalent in Moss Landing than other parts of the county probably due to its heavy use on artichokes (Fleck, et al. 1988). The Old Salinas River,

Moro Cojo, Reclamation and Tembladero Sloughs were identified as possible sources of endosulfan contamination (Fleck, et al. 1988). In response to the continuing presence of endosulfan in Elkhorn Slough, personnel from EHAP will conduct this study to quantify the concentrations and mechanism of movement of endosulfan in soil and surface runoff from artichoke fields and collector drains of the Moss Landing drainage area of Monterey County.

II. Objectives

1. To assess the concentrations of endosulfan in soil of artichoke fields, and adjacent drains, prior to and following the first fall application.

2. To quantify the concentration of endosulfan in surface runoff from artichoke fields after the first major rainfall event following a fall application.

III. Personnel

This study will be conducted by EHAP personnel under the overall supervision of Randy Segawa. Other key personnel include:

Project Leader: Joan Fleck

Senior Staff Scientist: Lisa Ross

Study Design/Data Analysis: Sally Powell

Field Coordinator: Debra Denton

Lab Liaison/Quality Control: Nancy Miller

Agency and Public Contact: Mark Pepple (916) 322-2395

IV. Study Plan/Experimental Design

Data from the CDFA's 1986 Pesticide Use Reports indicates that artichokes have the highest usage of endosulfan in Monterey County. Three artichoke fields in the Moss Landing drainage area will be selected for the sampling of soil and surface runoff to characterize movement of endosulfan from artichoke fields. Site selection will be based on the relationship of the agricultural field to an adjacent collector drain, field topography, scheduled date of fall

application of endosulfan to the field, and accessibility to the field. The study plan consists of sampling soil from artichoke fields and from an adjacent drain prior to and following the first fall application. Soil field samples will be taken from each field, excluding a 10 meter border for edge effects. Soil drain samples will be taken from a small collector drain immediately adjacent to the field. Surface runoff samples will be collected from the collector drains at the exit of each field prior to entrance into a larger drain following the first fall rainfall event.

Soil field samples: 3 sites X 2 events (pre and post treatment) X 8 replicates = 48

Soil drain samples: 3 sites X 2 events (pre and post treatment) x 8 replicates = 48

Runoff water samples 3 sites X 1 events (post treatment) X 6 intervals X 3 replicates = 54

Runoff water samples (minius sediment): 3 sites X 1 events (post treatment) X 6 intervals X 3 replicates = 54

Quality control samples = 40

Total samples = 244

Selected samples will also be analyzed for DDT and its breakdown products to determine if DDT is entering Elkhorn Slough by the same mechanism.

V. Sampling Methods

Soil: Soil samples will be collected with stainless steel tubes with a length of 15.2 cm and inner diameter of 5.9 cm for field and drain. Soil cores will be collected to a depth of 5 cm. Each sample will be a composite of 5 subcores randomly selected in the agricultural fields and collector drain. The soil will be placed in a 1-quart glass jar, sealed with foil and stored on dry ice.

Runoff: Water and sediment runoff samples will be collected from V-ditches at the edge of artichoke fields after the first major rainfall event following a fall endosulfan application. Water samples will be collected at appropriate intervals with a maximum of six intervals total. Water samples will be collected in 1-quart glass bottles and stored on wet ice.

Chemistry Methods/Quality Control

Residues of endosulfan I, II and sulfate will be extracted, cleaned up on a Florisil column and analyzed by gas chromotography using an electron capture detector and a Hall electrolytic conductivity detector. Soil will be analyzed for endosulfan I, endosulfan II, and endosulfan sulfate and percent moisture with results reported in ppb on a dry weight basis. Water will be analyzed for the same compounds with results reported in ppb. Selected samples will also be analyzed for DDT and its breakdown products.

Method Validation: Five replicate samples will be spiked at 3 different concentrations for each media (soil and water) for each of the following compounds; endosulfan I, endosulfan II, and endosulfan sulfate. The results from the method validation study will be used to establish control limits for the field study.

Continuing Quality Control: One solvent blank and one matrix spike sample will be analyzed with each set of samples for each matrix. Ten percent of the samples for

each matrix will be split between and analyzed by two different laboratories.

Storage Dissipation Study: A storage dissipation study will be conducted to determine breakdown of endosulfan in cold storage over the duration of the study.

VII. Timetable

Field Site Selection:	November 1988
Sampling Preparation:	November 1988
Sampling Period:	November - December 1988
Chemical Analysis:	December 1988 - Feb 1989
Statistical Analysis:	March 1989
Report Preparation:	May 1989
Final Report Draft:	June 1989

VIII. Budget

Personnel Expenses:	10,000
Operating Expenses:	5,000
Chemical Analysis:	37,000
Total Costs:	52,000

IX. References

Fleck, J.E. and L.J. Ross, and K. Hefner. 1988. Endosulfan and Chlorthal-Dimethyl Residues in Soil and Sediment Of Monterey County. Environmental Hazards Assessment Program.

Gonzalez, D. and L.J. Ross, R.Segawa and B.Fong. 1987. Variation of Endosulfan Residues in Water and Sediment Taken From The Moss Landing Drainage of Monterey County. Environmental Hazards Assessment Program.