

Department of Pesticide Regulation
Environmental Monitoring Branch
1001 I Street
Sacramento, California 95812

Comparison of Monitoring Methods for Methyl iodide Air Concentrations
during a Field Application
Study 261
October 2009

Introduction

Methyl iodide is a pre-plant biocide used to control insects, plant parasitic nematodes, soil borne pathogens, and weed seeds. It is a fumigant pesticide and may be used as a replacement for methyl bromide. This pesticide is not currently registered for use in California, but the University of California and registrants are authorized to conduct research studies on methyl iodide. In the event DPR registers methyl iodide, the needs of high use and extensive monitoring may be expected. DPR requests limited monitoring of an application site as part of the process to validate the sampling and analytical methods.

University of California, Davis is working on an efficacy study of methyl iodide and will conduct an application of this pesticide in October, 2009. DPR will monitor this application to evaluate efficient air sampling method for methyl iodide. DPR will use sorbent media method. At the request of DPR, the Air Resource Board (ARB) will conduct concurrent monitoring using air canister method, which will be compared with DPR result.

Objectives

Compare the results of two sampling methods for methyl iodide monitoring: air canisters and sorbent tubes.

Personnel

This study will be conducted by personnel from the Environmental Monitoring Branch under the overall supervision of Pamela Wofford.

Key personnel include:

Project Leader	Jing Tao
Senior Staff Scientist	Randy Segawa
Field Coordinator	Shifang Fan
Statistician	Jing Tao
Laboratory Liaison	Sue Peoples
Analyzing Laboratory	California Department of Food and Agriculture, Center for Analytical Chemistry

All questions concerning this project should be directed to Pamela Wofford at (916) 324-4297.

Study Design

DPR will document information pertinent to the fumigation of methyl iodide, including the location, size, and configuration of the site, as well as all other fumigations in the same area for the prior two weeks. DPR will document the application method, date, time, rate and total amount of methyl iodide used, and tarp model and manufacturer.

ARB and DPR will conduct the methyl iodide monitoring by two different methods: air canisters and sorbent tubes. Samplers will be collected at 4 locations around the application area during 3 time periods (0-12 hr, 12-24 hr, and 24-36 hr) after the application. DPR will compare the measured methyl iodide air concentrations using two methods and decide the efficient sampling method for methyl iodide monitoring.

Sampling Method

ARB has developed a protocol for the air canister portion of the study. For each of sampling method, 4 samplers will be positioned around the application area, one on each side of the field. The samplers will be located at 25 ft to the edge of the application area. Samples will be collected during 3 times periods (0-12 hr, 12-24 hr, and 24-36 hr) after the application, for a total of 12 samples for each method, plus background at two sites prior to the application. In addition, two field spikes, a blank, and a duplicate will be collected for quality control. Each DPR air sampler intake will be positioned approximately 1.5m (5ft) above the ground level and will be fitted with charcoal air sampling tubes (SKC-226-16-02). Flow rate will be set at 50 ml/min, for a total collection volume of approximately 36 liters over a 12-hr period. Once samples are collected, each tube opening will be tightly capped and samples will be placed on dry ice and remain frozen until analysis.

Chemical Analytical Methods

Chemical analysis for air canister samples will be conducted by ARB under the direction of ARB protocol. Chemical analysis for DPR sorbent tubes will be performed by the California Department of Food and Agriculture Center for Analytical Chemistry. In the laboratory, methyl iodide absorbed onto activated charcoal is desorbed from the charcoal with ethyl acetate. Subsequently, methyl iodide is quantified using a gas chromatograph equipped with a HP-5 megabore column and an electron capture detector (ECD). Method detection limit is determined as 0.0181 µg/sample and report limit is 0.05 µg/sample.

Data Analysis

Methyl iodide concentrations will be compared to test if two sampling methods can detect the chemical at the same concentration levels. If not, the regression between results of two methods will be statistically analyzed. The correlation between two methods will

also be estimated to demonstrate if they exhibit the same concentration trend along the sampling intervals.

Timetable

October 27-30, 2009: Conduct sampling at methyl iodide application

December 2009 – February 2010: Obtain analysis results from CDFR laboratory

April 2010 – June 2010: Receive laboratory results and report from ARB

August 2010: Write analysis of study results