

Document Review and Approval
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Document Title: Monitoring Methyl Bromide and Chloropicrin Air Concentrations
Concurrently During a Field Application

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Monitoring Methyl Bromide and Chloropicrin Air Concentrations Concurrently During a
Field Application
Study X102
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Introduction

Methyl bromide and chloropicrin are widely used pesticides registered for use as preplant soil fumigants. Although the Department of Pesticide Regulation (DPR) has monitoring data for more than 40 methyl bromide fumigations, using various fumigation methods at different locations and during different seasons, it has very little data for chloropicrin fumigations. At the request of DPR, the Air Resources Board (ARB) will conduct application-site monitoring for chloropicrin under the Toxic Air Contaminants program. DPR will conduct concurrent monitoring for methyl bromide and attempt to correlate the measured chloropicrin air concentrations with the measured methyl bromide air concentrations.

Objectives

1. Monitor chloropicrin air concentrations associated with a field fumigation using a high application rate of chloropicrin. This is ARB's primary objective for the Toxic Air Contaminant program.
2. Monitor methyl bromide concurrently with chloropicrin to determine the relative concentrations of methyl bromide and chloropicrin over time.

Personnel

This study will be conducted by personnel from the Environmental Monitoring Branch under the overall supervision of Randy Segawa, Senior Environmental Research Scientist.

Key personnel include:

Project Leader	Pam Wofford
Senior Staff Scientist	Terrell Barry
Field Coordinator	Johanna Walters
Statistician/Modeler	LinYing Li
Laboratory Liaison	Carissa Ganapathy
Analyzing Laboratory	California Department of Food and Agriculture, Center for Analytical Chemistry

All questions concerning this project should be directed to Randy Segawa at (916) 324-4137.

Study Design

ARB will conduct the chloropicrin monitoring following its own protocol (ARB, 2001). The ARB protocol calls for a minimum of 8 samplers to be positioned around the application at the buffer zone distance. Samples will be collected during six time periods, for a total of approximately 72 hours. DPR will collocate a sampler at each site to collect simultaneous methyl bromide samples. DPR will attempt to correlate the measured methyl bromide air concentrations with the measured chloropicrin concentrations. If DPR can establish a reliable correlation, the methyl bromide results from the previous monitoring studies conducted can be used to estimate chloropicrin air concentrations.

DPR will document information pertinent to the fumigation, including the location, size, and configuration of the fumigation 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 bromide and chloropicrin used, and tarp model and manufacturer.

ARB will collect meteorological data at or near the fumigation site, including wind direction, wind speed, and air temperature.

Sampling Methods

Although canisters have been used most recently in methyl bromide monitoring projects, sampling will be conducted with charcoal tubes similar to most of the sampling conducted by DPR. This will allow for comparison of results with earlier studies. The ARB protocol calls for a minimum of 8 samplers to be positioned around the application, one on each side of the field and one at each corner. The samplers will be placed at the resident buffer zone distance for the application. Samples will be collected during six time periods, for a total of 48 samples, plus background samples from at least 4 sites prior to application. DPR will collocate a sampler at each site to collect simultaneous methyl bromide samples.

Each air sampler intake will be positioned approximately 1.2 m (4 ft) above ground level and will be fitted with petroleum-based activated charcoal vapor collection tubes (SKC, Cat. No. 226-38-02) stacked, two in a series, consisting of a 400-mg primary tube and a 200-mg secondary tube (Biermann and Barry, 1999). Flow rates will be set at 15 ml/min for a total collection volume of approximately 11 liters over a 12-hour sampling 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 will be performed by the California Department of Food and Agriculture Center for Analytical Chemistry. Methyl bromide will be extracted from the activated charcoal using five to ten ml of ethyl acetate, vortexing for 30 seconds. Three μ l of the extract is injected into a gas chromatograph (Hewlett Packard 5890 Series II) equipped with an HP-5 column and an electron capture detector. Concentrations for primary and secondary tubes will be reported separately to document any breakthrough in the primary tube.

Data Analysis

Data will be grouped by sampling period. Linear regression will be used to correlate the methyl bromide air concentrations with the chloropicrin air concentrations. If a correlation is established, previous methyl bromide monitoring results will be analyzed to determine theoretical chloropicrin concentrations.

Timetable

The timetable is at the discretion of ARB.

References

ARB. 2001. Protocol for Air Monitoring Around a Fumigation of Chloropicrin. California Environmental Protection Agency. Air Resources Board.

Biermann, H. and T. Barry. 1999. Evaluation of Charcoal Tube and SUMMA Canister Recoveries for Methyl Bromide Air Sampling. Report EH99-02. California Environmental Protection Agency. Department of Pesticide Regulation.