

US EPA ARCHIVE DOCUMENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

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Case No: 046754  
Chemical: 123000/Isoxaflutole

January 11, 1999

MEMORANDUM:

SUBJECT: Isoxaflutole Tile Drain Water Monitoring Study

TO: Daniel Kenny, PM Team Reviewer  
Registration Division (7505C)

FROM: David Wells, Hydrologist  
Environmental Risk Branch II

Thru Betsy Grim, Acting Chief  
Environmental Risk Branch II  
Environmental Fate and Effects Division (7507C)

"Balance" (Isoxaflutole) is a newly registered low application rate corn herbicide. Review of laboratory and field studies has concluded that isoxaflutole (and its degradates) are mobile and persistent. OPP is concerned that isoxaflutole residues could reach ground or surface water which is used as a source of irrigation and affect non-target crops or the environment. Rhone-Poulenc submitted a protocol for a Tile Drain Water Monitoring field study to support this new registration. This study is intended to measure isoxaflutole residues in water draining from a tiled corn field where it has recently been applied.

This protocol was received informally through E-mail along with the protocols for the isoxaflutole small-scale ground water monitoring studies. As of this date, we have not received a final copy of this protocol through the proper channels.

This document is the result of a review by OPP's Water Quality Tech. Team (WQTT) and represents the review and comments from eight EFED scientists.

Summary: This protocol was found to be too general, somewhat inconsistent and needs to be "tightened up." Site characterization data for the proposed sites is critical and needs to be submitted. EFED has proposed major changes. These include increasing the number of study sites, the use of rainfall simulators, using a tracer, significant changes in the proposed sampling schedule, collection of water flow data, and gathering other on site information. The protocol is not acceptable as it currently stands.



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Discussion:

It is not clear from the protocol if this study is intended to represent the tightly controlled tile drain monitoring study or the tile drain "grab" samples that were discussed during the registration process.

There is currently no standard process or guidelines in EPA for conducting a tile drain study of this type. We would like to suggest that it follow a process similar to OPP's Pesticide in Ground Water (PGW) studies. The order of this would be:

- site selection
- site characterization
- development of a monitoring program
- implementing a monitoring program

Using this approach, the reports should also be similar to the PGW studies.

This protocol only focuses on the development of a monitoring plan and does not provide any site specific information. A single study location will not be sufficient to determine how tile drains will impact the movement of isoxaflutole in the environment. A minimum of 2-4 study sites should be tested. We had previously discussed selecting study sites that are representative or typical of corn production in the Midwest or Plains states. The protocol discusses that standard or local agronomic practices would be used. An alternative to using the typical EPA study approach would be to work with the universities and conduct the studies at preexisting research sites.

Generally we agreed that these studies would be one growing season in length, however droughty conditions, lack of discharge from the drains, or similar problems with the water balance could necessitate extending the sampling period past the end of the growing season.

A critical deficiency in most of the proposed isoxaflutole field studies has been the lack of irrigation or rainfall simulators. For a full tile drain study, rainfall simulators are needed! Test plots can be designed with metal borders to minimize surface water runoff and maximize infiltration.

The studies should also use a conservative tracer to better account for the movement of the water in/on the field. Bromide or chloride tracers would be appropriate and could be applied with the test compound. Background measurements for the tracer anion will need to be taken from the drain discharge, the ditch and the stream prior to commencement of the study. Also if irrigation water is applied to the plot, samples should also be taken of this water.

A critical part of this study will be the site characterization which should include a detailed soil characterization. The soil morphology at the test site should be described to accurately document the potential flow paths. Also field measurements or estimates of infiltration rates and saturated hydraulic conductivity are needed. Soil water content should be measured weekly to document the field soil water regime.

It is not clear in the protocol what sample collection system will be used for collecting the daily water samples. The protocol also does not indicate whether all the samples will be analyzed. Daily sample analysis alone is not of great value. The samples need to be related to water volumes and flow rates need to be measured in the drain, ditch and stream. With the limited field size of 2 acres, the study director should be able to capture information on the water volume. An automated water flow monitoring device and sampler is recommended. An automated sampler that "kicks-in" when the flow increases would provide event driven data. Another method would be to base the sampling on the breakthrough of the tracer. This approach might not be as practical depending upon the "turn around time" for the lab to analyze for the tracer and get the results back to the field sampler.

For this tile drain study, we concluded that lysimeters were not needed to sample the soil pore water. We are however asking for weekly measurements of the soil moisture content.

Most tile drain spacing is a maximum of 80 feet apart so it is better to monitor individual tile drains and not just the main collector if possible. The layout and history of the field drain system should be documented. An accurate map of the existing tile drain system should be included with the site characterization information. Diagrams of the specific plots should also include information showing the topography. Historical and field management practices should also be recorded including information on other chemicals and fertilizers applied to the study plots. Data on solar radiation and wind should also be collected for use in any potential modeling.

The document should be clearer about which compounds will be analyzed for in the study. In part "B" under the discussion of the "Study Reference Substance (Analytical Standard) Identification" the analytes are named, however in many parts of the protocol it appears that only parent isoxaflutole is being analyzed for. The study should use an EPA approved method of analysis. The protocol states the method is still under development and when finalized will be referenced in an amendment and included in the final report.

This protocol was also reviewed by OPP's Quality Assurance representative who provided several comments and questions. (Section I- Field part L) For the field fortification of the analytes, is the distilled water or field water spiked? (Section II -Part D - Subpart 2) Where does the control water comes from? Also the term "control sample" should be called a reagent blank. The final report should also include control charts of the recovery samples.

### Summary

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