

DETERMINATION OF TRANSFERABLE TURF RESIDUES
ON TURF TREATED WITH <TEST SUBSTANCE>



EPA Guideline Requirement

Series 875:
Occupational and Residential
Exposure Test Guidelines
Group B: Post Application Exposure

Prepared By

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**DETERMINATION OF TRANSFERABLE TURF RESIDUES
ON TURF TREATED WITH <TEST SUBSTANCE >**

STUDY DIRECTOR:

<Name>

LANDIS INTERNATIONAL, INC.

P. O. Box 5126

3185 Madison Highway

Valdosta, GA 31603-5126

ANALYTICAL TESTING FACILITY:

<Name>

<Address>

<Address>

Phone <number>

PROTOCOL NUMBER:

Trial No.	Location (EPA region)	Field Cooperator

TEST SYSTEM: <test system>**TEST SUBSTANCE:**

<Pesticide Trade Name>

Formulation:

<Percent active ingredient, type>

Lot No.:

Will be recorded in the study file

CAS No.:

<Number>

CAS Name:

<Name>

Common Name:

<Name>

EPA Reg. No:

<Number>

IUPAC Name:

<Name>

PROTOCOL RECIPIENTS:

(1) Sponsor

(2) Study Director

(3) Quality Assurance Unit

(4) Field Cooperator(s)

(5) Analytical Laboratory

**DETERMINATION OF TRANSFERABLE TURF RESIDUES
ON TURF TREATED WITH <TEST SUBSTANCE>**

GLP NOTEBOOK RECIPIENT:

(1) Field Cooperator

SAMPLE ACTIVITY I.D. LOG RECIPIENTS:

(1) Sponsor

(2) Study Director

(3) Field Cooperator

(4) Analytical Laboratory

PROPOSED EXPERIMENTAL START DATE:
earliest

*<Expected date of application at
test site>*

PROPOSED EXPERIMENTAL COMPLETION DATE:

<Date>

OBJECTIVE

The objective of this study is to measure the dislodgeable foliar residues (DFRs) of *<test substance>* in turf collected before and after application of *<test substance>* insecticide to growing turf grass in *<state>* at the maximum label rate and minimum dilution. This information will be used with activity-specific transfer coefficients developed by ORETF to calculate potential human exposure involving contact with pesticide-treated turf. This study is designed to fulfill the requirements under Series 875: Occupational and Residential Exposure Test Guidelines, Group B: Post Application Exposure; for reregistration of *<test substance>*. This study will be conducted in accordance with EPA, FIFRA, Good Laboratory Practice Standards (GLP); 40 CFR, Part 160 (October 1989).

JUSTIFICATION OF TEST SYSTEM

Application of *<test substance>* as the *<formulation>* formulation to turf grass represents a reasonable "worst-case" reentry scenario for potential exposure to individuals among current registrations. The study design and procedures detailed in this protocol were developed by ORETF in an attempt to standardize assessment of transferable turf residues.

This study has been designed to conform as closely as possible to all EPA requirements. The location of the study is within the major use area of the product. The formulation of *<test substance>* used in this study is typical of the end use product and application accurately reflects the maximum label rate in the areas where the study will be conducted.

EXPERIMENTAL DESIGN

Test Substance: The test substance will be *<test substance>*, formulated as a *<type of formulation>* containing *<percent of a.i.>* active ingredient. Documentation of the purity, stability, methods of synthesis, composition, and other characteristics defining the test substance will be maintained by the Sponsor. The test certified formulation of *<test substance>* used will be a typical end use product applied at the maximum label rate of *<amount>* g of active ingredient per 1000 ft². The analytical grade of the active ingredient will be used to establish calibration curves.

Test site: Test plots will be established in one geographical site in *<state>*. The turf will be mixed fescues, typical of those grown in the area and commercial turf cropping practices will be observed. The test plots selected will be typical for the intended use of *<test substance>*. The study will be located on a site that has not had a *<test substance/pesticide type>* application for at least *<time frame>*. Test plots will not be treated with any fertilizers or pesticides other than the test substance during the course of this study.

Test site layout: The study will consist of *<number>* treated and *<number>* non-treated control plot. The *<test substance>* treated plots will be divided into three replicate subplots. The treated and control plots will be separated by at least 150' buffer. The control plot will be located upwind and upslope from the treated plots to prevent any potential cross contamination. The total treated plot size of 3000 ft² (3 x 1000 ft²) and 1000 ft² for the non-treated control will be large enough to obtain the necessary samples for analysis.

Application: At least 24 hours before the first application, the turf plots will be mowed to a grass blade length of approximately 2.5 inches. The treated plot will receive *<number>* applications of *<test substance>*, *<number>* days apart, using pressurized ground spraying equipment that simulates commercial application. The sprayer will be cleaned and calibrated before each application. The details of calibration and application will be recorded. Each application of *<test substance>* will be applied at a targeted maximum label rate of *<amount>* g a.i./1000 ft² in *<amount>* gallons of water, according to label directions. The application method will conform to label recommendations. The true application rate will be calculated based on the calibrated output of the application equipment, the active ingredient concentration as determined by the test substance characterization assay and mixing/loading data, and the rate of travel or land area covered.

If needed, the plots may be mowed (mower setting of 2.5") 24 hours before the second application. Do not remove mowed clippings. Following application, the number of mowings should be kept to the minimum required for maintenance. The dates and height of the turf before and after each mowing will be recorded in the field logbook.

At the time of each application, wind direction and speed, air and soil temperature, and relative humidity will be recorded. For the duration of the study, daily weather conditions, including rainfall and minimum and maximum air and soil temperatures, will be recorded from an on-site station or a weather station nearest to the test site. Application will be planned to avoid rainfall within 24 hours following application.

Watering schedule: Watering events can be made up to the time of application. Do not water in the first 24 hours following application. The total number and frequency of watering should be the minimum that is consistent with label instructions, normal practice, and climatic conditions. The dates of each watering event will be recorded in the field logbook.

SAMPLING

Irrigation and Test Substance Mix Water and Product Samples: Prior to or at the time of the final application, at least 1L of irrigation water and 1L of the water used to mix the spray application will be collected and stored at ambient temperature. Also, <number> samples of test substance of approximately <amount> grams each will be collected and stored at ambient temperature prior to shipment. These samples will be shipped to the analytical laboratory at ambient temperature along with a copy of the calibration records from the GLP notebook and a photocopy of the Application Verification Product Sample Information form. Reference LANDIS INTERNATIONAL SOP #4.20-Current Revision, *Sprayate Method Validation and Recovery Determination* and SOP #4.18, Current Revision, *Collection of Irrigation Water for Analysis*, for further guidance in handling of these samples.

Turf Residue Samples: Samples will be collected using the Modified California roller technique. Reference LANDIS INTERNATIONAL SOP #4.36-Current Revision, *Transferable Turf Residue Sampling Technique*. Any deviations from this standardized technique will be documented and included in the final report. At each sampling interval, <number> samples will be randomly collected from each of the <number> treated and <number> non-treated turf plots for each sampling period. A specific randomization procedure should be used and recorded for sampling the subplots. Sampling will begin prior to treatment application and will continue for 35 days (additional samples will be collected at intervals beyond 35 days, if needed to establish dissipation curve). Treated and non-treated plots will be sampled immediately before the first application of the test substance (pre-treatment, Day -8), immediate post-treatment, application number two (after spray dries, Day 0) and Day 1, 2, 5, 7, 14, 21, 28, and 35. If rain occurs on a sampling date, samples will be collected as soon as the foliage has dried.

Once collected, the samples should be folded with the fortified or treated area within the sample (not touching the container). The folded cloth should then be placed in a container which will not interact with the analytes or disintegrate on freezing (some plastic bags may have this problem). The containers with the sample media will be kept cool or frozen by placing them immediately on ice for transport to a freezer. Samples should be frozen as soon as possible after collection.

Field Fortification Samples

Purpose: Fortified samples (spikes) will also be prepared to permit evaluation of possible residue deterioration during shipping and/or storage. Stability may be demonstrated by fortifying cloth samplers with the active ingredient. Field spikes should be handled and shipped exactly as the field samples.

Number of samples: Field spikes should be performed in triplicate at two separate levels. Unless prior data indicates otherwise, the lower level should be at the Limit of Quantification of the analytical method. The higher level should be at 10X the Limit of Quantification. Fortification should be performed a minimum of two sampling times, including Day 0. Not all field spikes need to be analyzed. Once the stability of the analytes on the cloth matrix is proven, by this means, then analysis of these fortified samples may be discontinued at the discretion of the Study Director.

Spiking Matrices: A solution of certified <test substance> reference standard of known concentration should be pipetted onto the cloth and spread out over as much area as possible. The volume of the solution used to fortify the samples should be measured accurately. Volumes of at least 0.5 ml will be less prone to error than smaller volumes. This volume measurement is most easily done by using a calibrated pipettor (positive-displacement type is highly recommended when using a volatile solvent). If using a solution made with a volatile solvent, allow the solvent to evaporate before bagging the sample. If using an aqueous spiking solution, allow the fortification volume to dissipate into the cloth before bagging the sample.

Control matrices: Day zero fortifications may be performed from samples taken on the test plot before treatment (i.e., use cloth that was subjected to the rolling technique on untreated turf). These samples would then allow verification of the analyte on samples exposed to the same sampling techniques as the treated samples. On subsequent days, field spikes may be performed on pristine sampling matrix.

SAMPLE HANDLING

Samples will be stored in freezers set to maintain temperatures below freezing (at or below 5°F suggested). Samples must be placed in the freezer as soon as possible following collection.

All samples will be packed and shipped frozen to the analytical laboratory.

SAMPLE SHIPMENT

Packing/shipping forms provided by LANDIS INTERNATIONAL, INC., will be completed and the appropriate documents included for shipment (see LANDIS INTERNATIONAL SOP #5.12-Current Revision, *Cooperator Instructions for Packing/Shipping Samples*).

Samples Shipped from Field Site to the Analytical Laboratory

The "**white**" and "**yellow**" copies of the packing/shipping form will be sent with the samples to the selected laboratory. Upon receipt at the laboratory, they will complete the section at the bottom of the form and retain the "**yellow**" copy for their files and return the "**white**" copy to LANDIS INTERNATIONAL, INC. The field Study Scientist will provide the "**pink**" copy for LANDIS INTERNATIONAL, INC. archives and retain the "**gold**" copy for the GLP Field Notebook.

STATISTICAL ANALYSIS

Means, standard deviations, and percentages will be calculated as necessary for data interpretation.

ANALYSIS OF TEST MATERIAL AND RESIDUE ANALYSIS

Methodology and statistical methods specific to analysis of test material as well as residues of *<test substance>* will be appended to this protocol as an amendment.

RECORD KEEPING

The following data will be obtained by the Field Study Scientist:

- (1) A weather station will be positioned in a clear area to record air and soil temperatures, rainfall and relative humidity at the site. Alternatively, data will be collected from an appropriate weather station located within 20 miles (32 kilometers) of the test plots. When using this second approach, on-site weather information will be recorded on the days of application.
- (2) A description of the test site, including a map of the test plots indicating their location, topography and size, slope, and location and size of the control plots in relation to the test plots will be provided.
- (3) Crop and pesticide use history on the plots for at least three years, and preferably five years preceding this study will be provided.
- (4) Cultural agronomic practices prior to application and during the course of the study will be provided.

RECORD KEEPING (CONT'D)

- (5) Turf characteristics such as age [if known]; type; variety [if known]; height at application and after each mowing, and at each sampling; and how clippings were handled will be provided.
- (6) The date and method of application including calibration information will be provided.
- (7) Climatic and edaphic conditions at each application will be provided.
- (8) A description of the source of irrigation water and the amount will be provided.
- (9) A description of the test material (lot number, purity, and identifying codes) will be provided.
- (10) The date of each sampling, a description of the sampling technique, description of dislodging method and estimate of elapsed time between sampling and placing samples in the freezer.
- (11) A copy of the chemical storage temperature log for the critical period of time that the test substance was stored (i.e., from receipt through date of final application).
- (12) All correspondence and other miscellaneous raw data needed to reconstruct the trial.

REPORTING

A draft report will be issued to the Sponsor upon receipt of all pertinent information from the Field Study Scientist. Upon approval by the Sponsor, a final report will be issued. The report will include, but not be limited to the following:

- (1) Name and address of the facility performing the study and the dates on which the study was initiated and completed.
- (2) Objectives and procedures stated in the approved protocol, including changes in the original protocol.
- (3) The test and control articles identified by name, code, number, composition, and stability, as supplied by the Sponsor.

REPORTING (CONT'D)

- (4) A description of the analytical methods used.
- (5) A description of the test system.
- (6) A description of the application equipment and application procedures.
- (7) A description of all circumstances that may have affected the integrity of the study.
- (8) The name of the Study Director and other scientists and supervisory personnel involved in the study.
- (9) A description of the transformations, calculations, or operations performed on the data, a summary and analysis of the data, and a statement of the conclusions drawn from the analysis.
- (10) The signed and dated reports of each of the individual scientists involved in the study.
- (11) The locations where all samples, raw data, and the final report will be stored.
- (12) The statement prepared and signed by the Quality Assurance Unit which specifies the dates inspections were made.
- (13) The signature of the Study Director on the final report.

Additions or corrections to the final report will be in the form of an amendment by the Study Director. The amendment will clearly identify that part of the final report that is being amended or corrected, the reasons for the additions or corrections, and will be signed and dated by the person responsible.

All compound remaining at the end of the study will be returned to the Sponsor or dispersed according to the Sponsor instructions.

QUALITY CONTROL AND QUALITY ASSURANCE

LANDIS INTERNATIONAL, INC., will be responsible for assuring that practices conform to the U. S. Environmental Protection Agency Good Laboratory Practices (GLP). Each protocol will be reviewed by the Quality Assurance Unit of LANDIS INTERNATIONAL, INC. and the Sponsor. Each study will be subject to one or more inspections to ensure that study methods conform to the requirements of GLP and applicable protocols.

Each study report prepared will be examined by the Quality Assurance Unit of LANDIS INTERNATIONAL, INC. and the Sponsor, and this review will be documented by the Quality Assurance Officer's signature of the final report.

The analytical laboratory will be responsible for the quality assurance of the analytical portion of the study.

PROTOCOL SIGNATURE PAGE

Sponsor

Date

Study Director

Date

Auditor, Quality Assurance Unit

Date