

DEQ Completes Three-Year Clopyralid Study

Introduction

The Oregon Department of Environmental Quality (DEQ) recently completed a three-year study of clopyralid levels in compost at DEQ-permitted facilities throughout Oregon.

The final sampling taken in October 2004 showed an 80% drop in clopyralid levels in 11 of the 12 sites sampled since the October 2002 test. While one site showed a significant increase, the average level in the other 11 samples was below 7 parts per billion (ppb). Levels of clopyralid above 25 ppb are considered high.

The Oregon Department of Agriculture (ODA) restricted clopyralid use in some lawn and turf applications in July 2003.

Background

DEQ sponsored the study because of concerns that originally arose in the state of Washington when clopyralid residue was found at a compost facility in Spokane and at the Washington State University's compost site in Pullman, Wash.

A task force comprised of specialists from DEQ, ODA, Metro and the Composting Council of Oregon helped oversee the study. In addition, a technical committee consisting of pesticide, compost and weed specialists from DEQ, ODA, Oregon State University and Metro reviewed the study's lab results.

DEQ asked DEQ-permitted compost operators to volunteer to participate in the study. Twelve of the then 36 permitted facilities joined the study. Original samples, taken in June and October 2002, concluded that grass clippings collected from lawn and turf areas appeared to be a contributing factor to clopyralid residue levels. The results led ODA, in July 2003, to write rules restricting the use of the herbicide in some lawn and turf applications. Follow-up testing has shown a continual downward trend in clopyralid levels in compost.

About clopyralid

Clopyralid is an herbicide produced by Dow AgroSciences. This active ingredient is designed to kill broadleaf weeds such as clover, thistle and dandelion. Of the estimated 10,000 pesticide products registered annually for sale, distribution and use in Oregon, only 21 products containing

clopyralid were registered in 2002. Pesticides containing clopyralid are manufactured by several pesticide registrants and may be sold under various brand names.

Clopyralid may be in finished compost product at parts-per-billion (ppb) levels. Even small amounts of clopyralid can affect sensitive plants in the legume and nightshade families such as tomatoes, beans, eggplant, pea, parsley, petunias, pansies and sunflowers. The potential source of clopyralid can be lawn debris and manure.

Initial study results

A two-phase study was conducted in June and October 2002 with follow-up studies in October 2003 and 2004. "For sale" compost from 12 of the then 36 DEQ-permitted compost facilities throughout Oregon was sampled. The compost feedstocks were made up of yard debris; there was no manure-based compost sampled in this study. The samples were analyzed by both analytical laboratories and a bioassay seed germination laboratory. The initial analytical results from the June 2002 samples, using EPA method 1851A, were inconclusive (see Study Methodology). Samples collected in October 2002 were sent to second laboratory using a method the laboratory developed (meth-151) using gas chromatography/mass spectrometry (GC/MS). In this study, only one sample showed no visual impacts in the bioassay test and the GC/MS analytical test showed the following results, reported in parts per billion (ppb):

- 5 facility samples between 6 – 25 ppb
- 4 facility samples between 25 – 50 ppb
- 3 facility samples between 50 – 94 ppb

ODA restricts use

Initial study results suggested to DEQ and ODA that grass clipping collected from lawn and turf areas appeared to be a contributing factor to the clopyralid residue levels in DEQ-permitted compost facilities.

In May 2003 ODA put in place an emergency restriction on the use of clopyralid. This action was followed by a permanent rule on July 23, 2003.

The new rules prohibit the use of a pesticide product containing the active ingredient clopyralid. The rules prohibit the use on



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residential lawns, commercial and public turf plantings, school grounds, parks, or recreational areas other than golf courses. The products can continue to be used on agricultural sites, forest sties, right-of-way sites, golf courses and cemeteries.

Follow-up testing

In October 2003 and 2004 DEQ took follow-up samples at the 12 sites participating in the study. All 12 facilities continued their participation throughout the study.

The October 2003 samples showed an average decrease of 47% in 10 of 12 facilities while two facilities showed an increase. The GC/MS analytical test showed the following results, reported in parts per billion (ppb):

- 1 facility sample at 4 ppb
- 4 facility samples at 11 ppb
- 3 facility samples between 14 – 16 ppb
- 4 facility samples between 25 – 37 ppb

The October 2004 sample - more than a year after the ODA restriction was put in place - showed even a greater decrease. The average drop in 11 of 12 facilities was 80%. For example, the highest analytical sample in October 2002 was 94 ppb; that facility's level dropped to 2.3 ppb in October 2004. The GC/MS analytical test showed the following results, reported in parts per billion (ppb):

- 6 facility sample between <1.0 - 4 ppb
- 5 facility samples between 7 – 16 ppb
- 1 facility sample 55 ppb

Study methodology

Seed germination bioassay tests and analytical laboratory analysis were used for this study.

In a bioassay test, seeds from plants sensitive to clopyralid (beans, peas and clover) are planted in compost samples taken from participating compost facilities. As a control, additional seeds are planted in a compost/potting soil mix known to contain clopyralid and in a clopyralid-free potting soil. The plants are observed for 20 days for malformations that would indicate toxicity.

In analytical testing, the compost is prepared by extracting the clopyralid into a solvent and determining the concentration of organic compounds found in the extract. In order to provide as much information as possible, DEQ requested that the analytical laboratory test at a minimum detection limit of 2 parts per billion (ppb) dry weight, the lowest point of the calibration. Clopyralid can be difficult to test because labs have not traditionally tested herbicides, including clopyralid, at such low levels. Because of the inorganic and organic

chemicals in compost (such as humic acids, salts and nutrients), extracting clopyralid can also prove difficult.

The June 2002 tests used a method identified by EPA as Method 8151A. This method is typically used to test for a variety of herbicides at much higher concentrations than parts per billion. The next three tests used a second method developed by a laboratory in collaboration with DOW AgroSciences. This second method, called Meth -151, uses a gas chromatography/mass spectrometry (GC/MS) approach. The clopyralid study's technical committee concluded that the GC/MS method provides the clearest indication of clopyralid residue in compost.

For more information

For more information on the clopyralid study and state efforts to deal with this problem, please contact:

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