AfOR's Information sheet

Managing the risk of herbicides clopyralid, aminopyralid and picloram in commercial composting systems

Please note that the information in this fact sheet has been taken from WRAP funded report entitled *An investigation of clopyralid and aminopyralid in commercial composting systems*[1].

Background information

Clopyralid and aminopyralid are herbicides that retard the growth of some plants by mimicking natural plant hormones (auxins). They have been licensed internationally to control annual and perennial broadleaf weeds in certain crops, turf and pastureland. Picloram is chemically similar and has similar modes of action to clopyralid and aminopyralid. It is used to control the growth of woody plants, as well as a number of broadleaved weeds. Information about products containing these three compounds can be found by visiting the Chemicals Regulation Directorate's webpage https://secure.pesticides.gov.uk/pestreg/ProdSearch.asp and carrying out a search by typing 'aminopyralid', 'clopyralid' or 'picloram' in the 'active' ingredient box.

[1] Jane Gilbert, Josef Barth, Enzo Favoino and Dr Robert Rynk, 2010. *An investigation of clopyralid and aminopyralid in commerc*ial composting systems. Published by WRAP. The report is downloadable from: http://www.wrap.org.uk/farming_growing_and_landscaping/reports_and_guidance/clopyralid_and_amino.html.

Clopyralid use

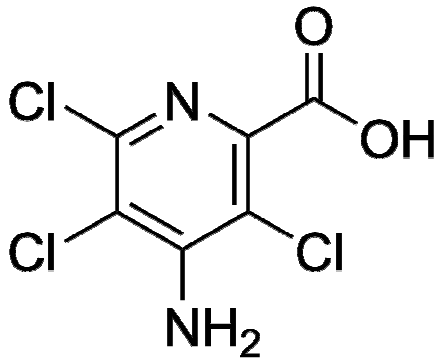
Clopyralid is sold for both amateur and professional use in the UK, either singly, or in conjunction with other herbicides. This compound does not present a risk to human health, animal health, crops or the wider environment if used according to their manufacturers' instructions. Labels on amateur products recommend use between April – September (Verdone), and April – October (Vitax), which coincide with the maximum quantities of grass clippings received at composting sites.

Aminopyralid use

Aminopyralid is currently only licensed for professional use (on agricultural grasslands grazed by cattle and sheep). **No formulations of this compound are currently available for amateur use in the UK.** This means that this compound cannot be currently used by householders to treat lawns. Further restrictions on its use are described in the following paragraphs. This compound does not present a risk to human health, animal health, crops or the wider environment if used according to their manufacturers' instructions. Details of aminopyralid approvals can be found here: http://www.manurematters.co.uk/aminopyralid.htm.

Picloram use

Picloram is currently licensed for professional use only (for example on oil seed rape (winter) and land not intended for cropping). **No formulations of this compound are currently available for amateur use in the UK**. This means that this compound cannot be currently used by householders to treat lawns.



Picloram's molecule

Risks to commercial composting

If present in compost, even in low concentrations, residual aminopyralid, clopyralid and picloram can have toxic effects on susceptible plant species (e.g. commercially-grown crops such as tomatoes). Treated plant materials (particularly grass) or manures (from animals that have eaten the affected plant material[2]) may accidentally enter the composting feedstocks from a variety of diffuse (non-point) sources process.

[2] Metabolic studies in animals have suggested that in ruminants as well as in poultry clopyralid is excreted rapidly and is unchanged in the urine.

Risks are influenced by a number of factors, amongst which:

- the proportion of affected plant material and / or manure in any one composting batch (e.g. clopyralid degradation is slower when initial concentration is higher)
- the degree of degradation that occurs during composting (e.g. clopyralid degradation is faster during the active phase of the composting process);
- composting temperatures (clopyralid degradation is faster degradation at higher temperatures);
- how long ago the herbicide was used, and
- how much affected compost is used when growing any plant species susceptible to these herbicides.

Once applied to the soil, conditions such as moisture, temperature, the application rate, the extent of aerobicity in the soil and the amount of organic matter has a significant influence over the herbicides degradation. Both aminopyralid ad clopyralid do not appear to degrade in anaerobic conditions. Alike clopyralid, aminopyralid also degrades via photolysis.

History of compost contamination

Clopyralid

Phototoxic effects of composts on commercially grown tomatoes raised in glass house were described in the USA over ten years ago. Compost contamination appeared to due to clopyralid and the source of contamination was mainly grass clippings from household lawns. However, manufacturer Dow AgroSciences stated that a number of

factors came together on that occasion that would not be expected to occur elsewhere. For example, grass clippings represented 80% in weight of the feedstocks processed at the composting site, the herbicide product was not used according to the manufacturer's instructions (off-label use) and the tomatoes were grown in 100% compost. Further cases occurred in New Zealand and in the USA. Chapter 6 of WRAP's report discusses these in more detail.

To date, no proven cases of compost contamination from herbicides containing clopyralid have occurred in the UK.

Aminopyralid

Problems associated with the use of aminopyralid were reported in June 2008 in the UK, after allotment holders experienced damage to sensitive plants following manure application.

This appears to have been sourced from animals grazed on pastures or grassland previously treated with aminopyralid-containing products, such as Forefront or Pharaoh. Dow AgroSciences has suggested that the problems stemmed from farmers ignoring label warnings about the management of manures, rather than inappropriate off-label application of aminopyralid per se

In response to these problems and the high level of associated media attention, Dow AgroSciences voluntarily requested that aminopyralid's approval be suspended. This was brought into effect on 24 July 2008. However, given that it has not been possible to ascertain the extent nor levels of contamination experienced, the Advisory Committee on Pesticides reviewed the suspension of aminopyralid during summer 2009. Nine products containing aminopyralid were subsequently approved, subject to restricted use (compared with the previous products) and increased stewardship.

Aminopyralid can now only be used for:

- Control a range of weeds on grassland for grazing (silage making or hay harvesting is not permitted within one year following application). Products may only be applied to grassland on which cattle or sheep (and not horses) may graze.
- The restrictions will also mean that most of the manure produced will remain on the treated grassland; manures collected when animals are housed (for example in milking parlours) may only be spread onto grassland and must remain on the farm of origin.
- It must not be used on land where vegetation will be cut for animal feed, fodder or bedding nor for composting or mulching within one year of treatment. Additionally, it may not be used on land that will be grazed by livestock.

Notably, potential purchasers of aminopyralid must be trained by a British Agrochemicals Standards Inspection Scheme (BASIS) certified advisor so that they are made aware of the potential risks, and checks will be made on the proposed use.

In light of the use restrictions presented above, the risk that feedstocks treated with aminopyralid enter commercial composting sites is considered to be low.

Picloram

Picloram was identified as the problematic herbicide in many of the situations experienced in Washington

State, and apparently, more recently in North Carolina and perhaps Virginia. Composts contaminated with picloram have not been reported in the literature in the UK to date.

Managing the risks

When the manufacturers' guidelines are followed, herbicide residues should not be present in materials destined for composting, and the resulting composts will present no risks to crops.

Moreover, for herbicide residues in the finished composts to be present at a sufficient dose to impact upon sensitive crops when those composts are used, a significant quantity of herbicide-contaminated material must be composted together for a sufficiently short time and the composts be applied to sufficiently sensitive crops at sufficiently high rates.

Based on the information gathered during WRAP's study, risks from persistent herbicide contamination of composts are thought to be low, particularly from aminopyralid, use of which is now more strictly controlled.

However, please see AfOR's recommendations for composters and local authorities below, particularly with regard to clopyralid and picloram, based on the recommendations given in the report to prevent or reduce the possible risks of clopyralid contamination in compost.

Recommendations for composters

The Association for Organics Recycling advises that biowaste processors should not knowingly compost plant tissues that have been treated with clopyralid, or picloram (or manures from animals that have eaten plant tissues treated with either of these chemicals).

In particular, AfOR's recommendations to composters registered on AfOR Compost Certification Scheme[3] are:

1. The HACCP plan, that is already a fundamental requirement of PAS 100 Specification, should adequately address the potential for clopyralid contamination during late spring and summer when the input of grass clippings is likely to be at its greatest.
2. Composters should communicate with suppliers of feedstocks to highlight the potential for contamination through the use of clopyralid or picloram-containing herbicides. Composters are strongly recommended to:
   a. provide copy of this fact sheet to landscapers, grounds maintenance and sports turf professionals that deliver feedstocks to the composting site to make them aware of the potential for compost contamination with clopyralid and picloram;
   b. use AfOR's Waste Suppliers Agreement template with landscapers, grounds maintenance and sports turf professionals to ensure, as far as reasonably practicable, that feedstocks are not delivered for composting when they have been treated with clopyralid or picloram-containing herbicides. Copy of the template is

[3] AfOR Compost Certification Scheme is an independent quality assurance scheme for assessment of compliance with PAS 100 and the Compost Quality Protocol requirements. Go to www.organics-recycling.org.uk to find more information about the Scheme.

available at www.organics-recycling.org.uk under section Certification.

c. Provide them with AfOR's checklist of products containing clopyralid and picloram that are currently licensed for use; an up to date list of such products can be found at http://www.organics-recycling.org.uk/page.php?article=1872&name=Herbicide+products.

3. Composters should provide copy of this fact sheet also to local authorities to make them aware of the potential for compost contamination with clopyralid and encourage them to educate householders to follow thoroughly the manufacturers' recommendations and, when possible, not to put their grass clippings into the bins used for council collection schemes or bring them to CA sites. AfOR's checklist of products containing clopyralid that are licensed for amateur use could also be provided to LAs. This can be downloaded from: http://www.organics-recycling.org.uk/page.php?article=1872&name=Herbicide+products.

Recommendations for local authorities

Local authorities can help to minimise risks associated with feedstocks collected from households by reminding householders to read herbicide product labels carefully before buying and using them, particularly bearing in mind the instructions on what to do with any garden plant wastes treated with the herbicide. Any composting restriction on the herbicide's label / accompanying product leaflet applies to home composting as well as composting via the biowaste kerbside collection service.

In particular, local authorities should strongly encourage householders not to dispose of grass clippings via council collection schemes, but to leave them in place on the lawns ('grasscycling', a practice widely adopted in the USA). This practice should be followed at least for the first four mowings after the weedkillers have been applied.

Importance of the bioassay testing

Appropriate bioassay testing is the most direct assurance of compost quality, based on experience from other countries where herbicide residues are known to have impacted upon sensitive crops. A suitable bioassay test is already compulsory under PAS 100 Specification.

At the time of writing, a WRAP supported project has started aiming to validate a bioassay that will detect low level residues of clopyralid and aminopyralid in 'spiked' compost; the bioassay currently specified in PAS 100 is included in the test procedures that are being researched and trialled.