

August 14, 2015

to: Tracy Perry, EPA/OPP
fr: Cary Oshins, Fred Michel, Craig Coker, USCC
re: Recommendations to EPA regarding persistent herbicides (PH) dissipation in compost and other research needs

Due to the heterogeneous nature of the composting industry, in terms of inputs (feedstocks) and processing technology, we recommend using 3 different feedstocks at two different temperature regimes. There also are questions about the rate of herbicide degradation under thermophilic versus ambient conditions.

The feedstocks that seem to pose the highest likelihood of being contaminated are:

- Horse manure
- Dairy manure
- Grass clippings (if the specific PH is approved for use on turf)

Each feedstock would need to be mixed with a material with high cellulosic carbon content, such as sawdust, leaves or wood shavings, to achieve the desired initial parameters of

- C:N ratio of 30:1
- Bulk density of <.5 kg/l
- moisture content of 55% (can be achieved by the addition of water)

The tests would be conducted in laboratory scale systems that mimic full scale composting conditions in terms of aeration and temperature. Ideally C-14 labelled PH would be used in the studies so that complete fate studies could be conducted that account for losses due to biodegradation, volatilization, complete mineralization and incorporation into humic matter.

Some have suggested that PH degrade more slowly at thermophilic composting temperatures than they do at ambient temperatures. Although this is likely a misconception that is based on the loss of organic matter during composting, we suggest testing this hypothesis by conducting tests at two temperature setpoints:

- 25 deg. C. (room temperature)
- 55 deg. C. (minimum compost temperature)

There has also been some discussion that at the upper range of composting temperatures, 65-75C, degradation continues to slow. This could be due to changes in the microbial community, molecular changes to the herbicide, or some other mechanism, but in any case, the first step would be to validate this phenomenon. Therefore, if a third temp setpoint could be added, that would be

- 70 deg. C. (maximum compost temperature)

Another variable that is important to test is the extent of degradation at concentrations found in feedstocks to which a standard herbicide application has been applied, versus the overall concentration likely to be on feedstocks in a particular region given the use rate of PH and the amounts of different feedstocks composted. Therefore we suggest two initial concentrations scenarios (we can work with your group to estimate these):

- Concentration on a feedstock after label-directed application
- Concentration based on regional PH use and amounts of different feedstocks composted

As we pointed out in the meeting, an outstanding issue is how low is low enough, not in terms of producing any symptoms, but in terms of yield impact. Therefore we recommend that yield of sensitive plants be determined as a function of PH concentration. Test crops could include tomatoes (determinate type) and bush beans which are widely grown and reach maturity in a few months. These likely would be conducted in a greenhouse.

To fund these studies we would like to propose that the registrants contribute funds for the studies to the non-profit US Composting Council Research and Education Foundation (our sister organization). This organization would be happy to write a request for proposals and administer the studies.

There was interest at one point on the part of USDA ARS in developing a rapid indicator test that could be used on feedstocks, rather than finished compost. We strongly recommend that this avenue be pursued. Dr. Patricia Milner <pat.miillner@ars.usda.gov> was specifically interested in this.