

Bioassay Test for Herbicide Residues in Compost

Using the Bioassay – General Procedures

This bioassay, developed by Washington State University, is intended for use by homeowners, gardeners, and farmers. In this protocol, peas (or beans) are planted and allowed to grow for two to three weeks until three sets of leaves have appeared. The plants are compared to control plants grown at the same time and evaluated for herbicide damage.

Materials

- Test material (compost, manure, or topsoil)
- Potting mix (compost-free; peat-based commercial mix with fertilizer included)
- 4" plastic pots (new, manufacturer not specified; volume = 0.75 liters)
- Plastic saucers
- Garden pea seeds

Specific Procedures

1. Evaluate test material (compost, manure, topsoil mix)
 - Record observations of odor and general condition of compost to be tested.
2. Set up control pots
 - Fill 3 pots with potting mix, tapping several times on the counter top to settle mix uniformly.
 - Label pots.
3. Prepare test pots and label pots. The mix will vary depending on garden scenario:
 - If testing soil or topsoil mix where plants grown exhibited suspicious symptoms in the previous growing season: fill 3 pots with straight soil/topsoil mix.
 - If testing compost received for the current growing season: mix 2 parts compost to 1 part plain potting mix in a clean plastic bag. (The ratio is 2:1 by volume, compost to potting mix.). Fill 3 pots with the compost blend.
4. Plant 3 seeds in each prepared and labeled pot, pushing seeds into potting mix so they are just under the surface.
5. Grow plants
 - Water each pot carefully. Keep potting mix uniformly moist; minimize water leaching into saucer.
 - If excess water drains into saucer, allow it to be re-absorbed back into the pot.
 - Maintain consistent growing conditions – could be done inside near a bright window or in a greenhouse – where temperatures should not drop below 50 F at night.
6. Evaluate plant growth
 - Record germination from each pot.
 - Grow plants until three sets of leaves appear, from 14 to 21 days, depending on growing conditions.
 - Compare plants from compost-blend pots to control.

If poor germination or distorted growth is seen, then you may not want to utilize that soil or manure. Typically the herbicides in question take at least 18 months to breakdown. However, that is in ideal conditions (ample moisture, high humidity, good airflow, and active microbial activity). Frequently, manure or compost piles are not adequately maintained and the herbicide could persist for years.

