

# Composting Poultry Litter in your Backyard

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## Introduction

Keeping laying hens in the backyard is popular, but, along with a daily supply of eggs, the hens also produce a large supply of manure. Fresh poultry manure has an unpleasant odor and will attract flies. Bedding material, such as pine shavings, is put down on the coop floor to help control odors and flies, but eventually the litter (manure and bedding material) needs to be replaced. While poultry manure can be an excellent fertilizer, it should not be used fresh. 'Raw' manure can burn plants and may contain pathogens that could contaminate any plants being grown for consumption. Composting makes the manure safe to use as a fertilizer on any lawn or garden. Composting involves a process by which billions of beneficial soil organisms decompose the organic material. Simply piling up waste is not really composting. With the right proportions for materials, the process has minimal offensive odor and destroys most of the pathogens in the manure. Compost is both science and art.

## Equipment Required

Composting takes several weeks to be completed. Since your chickens continue to produce manure during this time, it is best to have at least three composting bins. There are different types of composters available. They can be commercial plastic bins (Figure 1) or can be made from wood (Figure 2). The size of the bins will depend on the amount of litter to be composted. See the side bar for the calculation of the amount of litter and manure produced. It is best to keep the bins in a shaded area, so the contents do not dry out during the composting process.

You should also have a shovel or pitchfork for stirring the materials and transferring the materials between bins. You will also need a compost thermometer.

## Materials Required

The suggested carbon to nitrogen ratio for successful composting should be about 30:1. Typical carbon to nitrogen ratios of possible compost material are shown in Table 1.

Components of a successful compost pile include the following:

**Carbon source.** The compost pile should be 70-75% carbon-containing material such as bedding material (e.g., wood shavings) plus dead leaves or yard and garden waste.

**Nitrogen source.** The compost pile should be 25-30% nitrogen-containing materials such as manure and grass clippings or fruit and vegetable scraps.

**Moisture.** There needs to be a relatively high level of moisture (40-60%) in the compost pile without being dripping wet (see the clump test in the procedure section).

**Oxygen.** The organisms involved in composting require oxygen, which if not in enough supply, the compost bacteria will change to anaerobic species, and the compost will stink. This can be achieved by including coarse material in the pile to allow air to move through the pile, or by periodically turning the material to introduce oxygen.

**Heat.** The compost pile will generate heat as it matures. It should reach a temperature of 130-150°F during the composting process, as measured with a probe thermometer.

**Table 1.** Typical carbon to nitrogen ratios of possible compost ingredients

Ingredient	Average Carbon: Nitrogen Ratio
Wood shavings	500:1
Waste paper	400:1
Straw	80:1
Dry leaves	60:1
Shrub trimmings	50:1
Fruit wastes	35:1
Grass clippings	17:1
Kitchen scraps	15:1
Alfalfa hay	12:1
Chicken manure	8:1

## Procedure

1. Clean the litter out of the poultry coop when the litter has about 40% manure and 60% bedding material. This will affect how often the poultry coop needs to be cleaned out and is dependent on the size of the house, the depth of the bedding and the number of hens.
2. Add about six inches of some poultry litter to the compost bin first. If you have concentrated manure collected from under the perches, add a 3-inch layer of the manure next. Since

manure is wetter and higher in nitrogen than the litter, you will need to add a layer of carbon containing-material such as leaves, straw, wood shavings or wood chips to balance the carbon-to-nitrogen ratio. This is followed by a layer of manure, then the carbon source, etc. Continue to build up layers of the materials until all has been placed in the compost bin.

1. Cover the compost bin with a solid roof or secured tarp and leave it undisturbed for at least two weeks.
2. It is best to monitor the temperature with a compost thermometer during this time. The middle of the compost pile should heat to 130-150°F. If it fails to reach this temperature, check out the trouble shooting section.
3. After at least two weeks, transfer the material from the first compost bin to a second bin, cover and let sit three more weeks. This opens the first bin for the next clean out.
4. When the first bin is full, transfer the material in the second bin to a third bin. The material in the first bin should be transferred to the just emptied second bin. The first bin can then be used for the next cleanout. Finally, the third bin is moved and used as fertilizer, or stored in a covered area having proper drainage.
5. Continue in this manner.

Moisture level is important to the successful composting of poultry litter. To evaluate the amount of moisture in the compost pile, take a representative sample of the compost material and make it into a ball. Squeeze the ball of compost in a paper towel to see how much water is released and the compost remains clumped when you release the pressure. The towel should be damp.

## Using the Compost

Properly composted litter is safe to use with any lawn or garden. You can mix the compost into the soil before planting flowers or add it as mulch in a vegetable garden. You can also blend the compost with peat moss or perlite to produce a great potting soil for potted plants.

## Troubleshooting

### Compost smells bad.

There are two possible reasons the compost pile may produce off odors. The first is that the pile is too wet. The excess moisture reduces the levels of oxygen present in the compost pile and the preferred composting aerobic bacteria are unable to grow. Instead, anaerobic bacteria grow and produce gases which give the compost pile its offensive odor. It smells like rotten eggs. To remedy this, turn the compost pile to help it dry out. Add dry material such as dry leaves or wood shavings to absorb the moisture.

The second reason may be that the ratio of carbon to nitrogen is not right. There is either too little carbon or too much nitrogen. This result will be litter that smells like ammonia. Again, turn the compost pile and add leaves or other carbon material to the pile to increase the carbon to nitrogen ratio.

### Compost fails to reach 130-150°F.

There are three primary reasons that the compost pile may not heat properly. The compost pile may be too dry. Turn the pile and moisten the layers. The second reason may be that the

pile is too small. Continue to add layers of litter and manure as they are removed from the poultry coop. The third reason is that there is a problem with the carbon to nitrogen ratio in that there is not enough nitrogen or too much carbon. Add more nitrogen-containing matter such as chicken manure.



Figure 1. Black plastic garden compost bin.



Figure 2. Wood compost bin.

## Calculation of Litter and Manure Produced by an Egg-laying Flock

You should clean out the poultry coop when you have 40% manure and 60% bedding material. If you have few chickens or a large poultry coop, you will have less need to clean out the litter. If you have a higher number of chickens or a smaller poultry coop you will need to clean out the coop more often. If you have waterers that overflow, you will need to clean out more frequently and adjust the amount of carbon sources in your compost.

### AMOUNT OF BEDDING MATERIAL (CARBON SOURCE) PRODUCED:

\_\_\_\_\_ ft<sup>2</sup> of floor space/hen x (\_\_\_\_\_ inches of bedding/12) x \_\_\_\_\_ hens = \_\_\_\_\_ ft<sup>3</sup>/clean out

### AMOUNT OF POULTRY MANURE (NITROGEN SOURCE) PRODUCED:

*A hen will consume about ¼ lb. of feed daily. The efficiency of using this feed is about 45%.*

0.25 lb. feed consumed/day x 45/100 feed efficiency x \_\_\_\_\_ hens x \_\_\_\_\_ days between clean outs \_\_\_\_\_ = lb. manure