Composting Manure from Small Poultry Flocks

MISSISSIPPI STATE UNIVERSITY EXTENSION

How Composting Works

When done correctly, there are few disadvantages to composting manure from your backyard flock; however, there will be some loss of nitrogen, and the process takes time and labor. Additionally, if compost is repeatedly spread on the garden spot over several years, there could be a build-up of nutrients in the soil. You may want to take a soil sample from time to time if this is a concern. In contrast, composting has several advantages (Ellis et al., 2013):

- provides the opportunity for sustainable home food production
- eliminates a problematic waste potential
- provides a good source of nutrients for the garden
- improves soil texture

Proper management of a compost pile will provide microorganisms with carbon (C), nitrogen (N), water, and oxygen needed for the process to work (Bass et al., 2012). **Not only must C and N be available, but they must also be present in the correct balance**. Composting is like baking a cake. You start with a recipe and follow that recipe for the end product to turn out correctly. A reasonable C:N ratio range is 20:1 to 40:1, but the process seems to work best if the range is closer to 25:1 to 30:1. Typical C:N ratios of selected backyard composting ingredients are listed in **Table 1**.

Like all living creatures, the microorganisms in the compost pile need water and oxygen to survive. The process seems to work best if the moisture level is somewhere between 40 and 60 percent. If the pile is too wet or too dry, it will not heat. The simplest way to estimate moisture level is to squeeze a handful of compost in your fist. As a rule of thumb, it should feel moist to the touch and remain in a ball when squeezed, but you should not be able to squeeze water from it.

The pile will need to be turned every 7 to 10 days to keep a supply of oxygen to the microorganisms. Particle size will likely affect how often the pile needs to be turned. The larger the particle size, the fewer times the pile will need to be turned. A smaller particle size may reduce the movement of oxygen through the pile and prevent the temperature rising. Temperature is a key component that tells you whether the process is working. You will need a compost thermometer from your local co-op or hardware store to monitor the temperature of your pile. When the microbes are thriving, the pile's temperature is high (130°F to 160°F).

Table 1. Typical C:N ratios of common backyard compost ingredients.

Ingredient	C:N ratio1
Wood, sawdust, shavings	500:1
Waste paper	400:1
Straw	80:1
Dry leaves	60:1
Cornstalks	60:1
Shrub trimmings	50:1
Fruit wastes	35:1
Rotted manures	20:1
Grass clippings	17:1
Kitchen scraps	15:1
Vegetable culls	12:1
Alfalfa hay	12:1
Chicken manure	8:1

[1]The C:N ratio of all materials can vary considerably depending on age and source.

Temperatures below 100°F usually indicate little microbial activity, possibly because the pile is too wet, starved for oxygen, or both. If the temperature has been high and then declines for several days, the pile is likely starved for oxygen and needs to be turned. Turning should cause the temperature to rise again if no other problems exist.

Figure 1. Small flock of backyard chickens.

Composting is a fairly forgiving process. **If you mess it up, you can fix it**. If the pile is too dry and will not heat, adding a little water can make it heat. If you get the pile too wet and it will not heat, you can add some additional bulking material to dry it out; however, as mentioned previously, composting is also a slow process. Don't expect to have mature compost in a month—3 months or longer is probably more like it. Maturation depends on several factors, including the temperature, C:N ratio, particle size of the bulking material, and how often the pile is turned. As long as the pile reheats after you turn it, the compost process is still active.

Eventually, the pile will no longer reheat after it is turned. When this happens, the curing process has begun. If the temperature does not rise above 104°F after turning, the compost should no longer be turned and should be left for at least 1 month of curing to complete the composting process (Wortmann and Shapiro, 2012). Another rule of thumb for compost is that it needs to cure for as long as it was active. For example, if the pile reheated after it was turned for 7 weeks, it needs to cure for 7 weeks; however, not everyone follows this rule of thumb. Still, compost should be allowed to cure a minimum of 3 to 4 weeks.

Dry hay, straw, and other bedding materials are good carbon sources needed to help balance the high N content of poultry manure. **Carbon sources are often divided into the "browns" and the "greens."** The browns are carbon-rich and include such things as dry leaves, straw, shrub trimmings, and sawdust/shavings. The greens are nitrogen-rich and include grass clippings, kitchen scraps, and cull fruits and vegetables. All these products can be successfully composted; however, there are products that should not be composted in your pile, such as meat, bones, cooking oil, salad dressing, and cheese.

The amount of manure relative to the amount of bedding material or carbon source in the litter has an influence on the biological processes that take place during composting, the nutrient content of the final compost, and the quantity of potentially damaging salts that the compost could contain (Ellis et al., 2013). To avoid problems with low N content, start the compost process with a mixture that has a ratio of approximately 25 percent manure and 75 percent bedding (Ellis et al., 2013).

Summary

Composting is a proven method of manure management for the backyard producer. It removes a potential problem and produces an excellent soil amendment and fertilizer; however, it only works when done correctly. Help is available from several sources for manure management or any other question you may have concerning your backyard flock. Your local county Extension agent is an excellent source of information. Assistance is also available from Extension specialists at your land-grant university and at extension.org. If you have questions, take advantage of these resources and make the most of your backyard flock experience!

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