



Poultry Litter Quality Criteria

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Poultry litter can be an excellent, low cost fertilizer, soil amendment, or feed supplement, but unlike commercial fertilizer there is no state Department of Agriculture label to assure its quality. The type of poultry, type of bedding used, moisture content, and nutrient content are important factors to consider.

The value of litter is normally determined by comparison to commercial fertilizer, considering “N-P-K,” the nitrogen (N), phosphorus (P), and potassium (K) values. But poultry manure also contains calcium (Ca), magnesium (Mg), sulfur, micronutrients, and organic matter that add value if they are needed. The Ca and Mg have a small liming effect that can increase its value, especially on acid soils. Sulfur, micronutrients, and organic matter, too, may increase its value where there are soil deficiencies or a need to improve soil quality.

Litter from different types of poultry operations differs in handling characteristics, consistency, and nutrient content depending on the production system and feed. Litter from Chicken Breeder and Egg Layer operations typically have high moisture, often appearing as slurry that may require special handling equipment. Litter from a Pullet operation, on the other hand, may be relatively dry, but has relatively low nutrient content. Broil litter generally has a high value because typically it has both low moisture and high nutrient content.

Within a type of poultry litter, quality is largely a function of moisture. As shown in Figure 1, nutrient content declines as moisture increases. High moisture is undesirable also because it makes litter difficult to handle and increases odor.

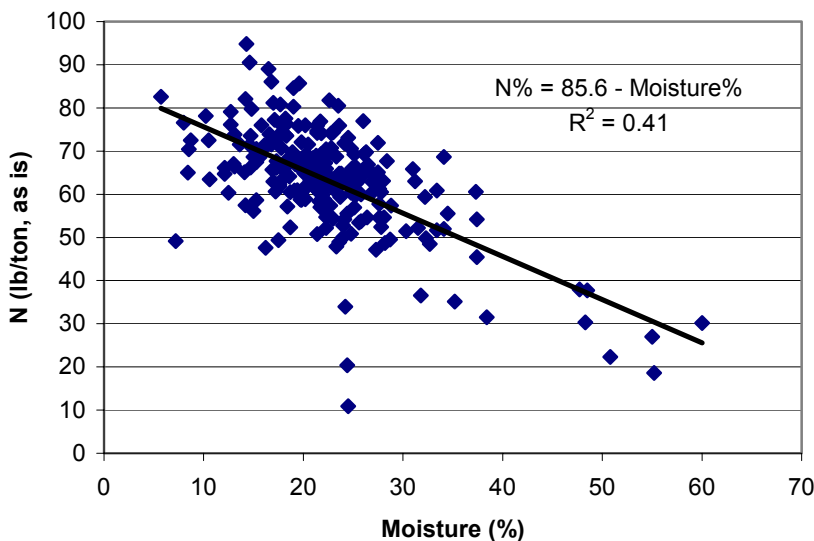


Figure 1. Nitrogen content declines as moisture increases in poultry litter. Results from 240 broiler litter samples in Delaware County, Oklahoma.

The actual nutrient value of poultry litter differs considerably from farm to farm depending on the type of birds, number of batches of birds between cleanout periods, and storage conditions. Further, if the manure crust, or “cake” is removed between cleanout periods, which will affect the quality of litter too. The average fertilizer nutrient content and other properties for three types of chicken litter are shown in Table 1 on an “as-is” basis. Nutrient content,

moisture, and pH vary considerably both within and between types of manure. Therefore, a litter analysis from a reputable laboratory is strongly recommended rather than relying on average values when poultry litter is bought or sold. A litter test can be obtained by taking a sample to your county OSU Cooperative Extension Office.

**Table 1. Averages and Ranges of Analyses (as is)\* for Major Types of Poultry Manure in Oklahoma.**

Type of Chicken	Broiler	Hen	Pullet
No. of Samples	240	80	24
pH	7.1 (6.4-8.5)	7.5 (6.5-8.8)	7.4 (6.7-8.0)
Total N (lb/ton)	63 (22-95)	44 (13-86)	40 (20-95)
P <sub>2</sub> O <sub>5</sub> (lb/ton)	61 (11-76)	62 (40-118)	47 (24-108)
K <sub>2</sub> O (lb/ton)	50 (14-67)	44 (27-69)	36 (23-61)
Ca (lb/ton)	51 (12-164)	129 (31-272)	37 (26-79)
Moisture %	23 (9-51)	33 (10-61)	23 (11-46)
Average Nutrient Value (\$/ton)**	\$29.86	\$25.32	\$20.92

\*P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O are commonly used for fertilizer ingredients instead of P and K. Some laboratory may still report in elemental P and K content. To convert using the following equations: K<sub>2</sub>O = K x 1.2 or P<sub>2</sub>O<sub>5</sub> = P x 2.29

\*\*Nutrient values are calculated based on 20¢/lb N, 16¢/lb P<sub>2</sub>O<sub>5</sub>, and 15¢/lb K<sub>2</sub>O. Ca could be worth 2¢/lb if lime is needed, and it was not included in this calculation.

When evaluating the nutrient content, consider both the “as-is” value and the moisture content. “As-is” means the nutrient content of the material in the house or on the truck. It is generally the number to consider unless further drying can occur before the litter is used. Dry weight can be converted to “As-is” by adjusting for moisture content.

Moisture content is important in three respects; (1) it affects the cost of hauling, as it adds weight to the load, (2) moisture content above about 25% may be biologically unstable, and (3) moisture above about 35% is quite wet and may require special equipment. Unstable manure can heat up or produce flammable gases. Dry manure, too, may be a problem. Litter much dryer than 20% moisture may be dusty and abrasive to equipment.

In summary, in addition to nutrient content, other quality criteria should also be considered:

1. Moisture content of the manure affects the distance it can be shipped.
2. Consistency of the manure affects the type of equipment needed to handle, process, or apply it to the land. Solids can be spread with a manure spreader or a lime spreader, but a slurry or liquid requires specialized pumps and nozzles. [Note a fertilizer spreader generally does not work for litter, because it tends to clog.]
3. Bedding type: rice hulls are preferred to either wheat straw or wood shavings.
4. Treatments such as alum may lower the phosphorus availability to plants, reducing its value. Therefore, it may not be suitable for P deficient fields.
5. Other foreign objects can damage equipment.

For more information on use of poultry litter please refer to the follow extension publications:

- F-2207 - How to Get a Good Soil Sample
- F-2228 - Fertilizer Nutrients in Animal Manure
- F-2246 - Using Poultry Litter as Fertilizer
- F-2248 - Sampling Animal Manure
- F-2249 - Managing Phosphorus From Animal Manure

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