

TIMELY INFORMATION

Agriculture & Natural Resources

S-02-07

May, 2007

(updated version of T.I. S-03-98)

Manure Testing for Fertilizer

Some Alabama livestock producers must analyze manures as a result of CAFO (confined animal feeding operations) and AFO (animal feeding operations) regulations. The Soil Testing Laboratory at Auburn University has offered manure testing services since 1991. Until recently, producer demand for manure analyses has been light. Increasingly, the lab is asked to run industrial wastes, products and composts for land application.

Who should be responsible for sampling and testing manure?

Sampling, testing, and guaranteeing the analysis is the responsibility of the person who produces the manure and/or the person who sells or spreads it for someone else. Landowners should never accept a “free” material or buy manure without first asking for a laboratory analysis from the person who produced the manure or is distributing the manure. Certified Animal Waste Vendors (CAWVs) who sell and spread animal manures should be willing to test and guarantee a minimum fertilizer value for their customers.

Why should manures be sampled?

Poultry broiler litter. Some manures are more variable than others. Dry, poultry broiler litter is, perhaps, the most consistent manure produced in Alabama. It has an average fertilizer value equivalent to a 3-3-2 fertilizer when it comes out of the house. But the number of flocks raised on the litter, type of bedding, and storage and handling facilities can affect the actual analysis of each batch of litter. Producers can do an acceptable job of land application assuming the average analysis of 3-3-2 or 60-60-40 pounds N-P₂O₅-K₂O per ton for fresh litter applied directly from the house (see Extension Cir. ANR-244). However, if one is buying or selling broiler litter, periodic testing would protect both the buyer and seller and establish a documented basis for the nutrient management plan.

Layer and breeder litter/manures. Manure from these birds are handled differently by each producer and integrator. Routine samples over a period of time by the producer can establish the variability for each production system.

Dairy and swine lagoon effluents. These are the most variable from one farm to another. Average values are of little use in a nutrient management plan. The effluent being applied should be tested regularly from each unit until relatively consistent analyses are established.

Feedlot and stable manures. These are also highly variable from one operation to another. However, once a base value is established for a feeding operation, manure will not have to be tested as frequently.

Composted manures. The composting process greatly alters the concentration and availability of plant nutrients. Dry manures must be moistened in order to compost properly and this reduces the nutrient concentration on an as-sampled basis. All composted manures should be sampled regularly until a reasonable value can be established for each process.

Other organic amendments. Municipal biosolids (sludges), industrial by-products for land application, urban yard wastes, composted yard wastes, septage, and other types of organic materials for land application should be regularly tested for their fertilizer value. Alkaline materials should also be evaluated for their agricultural lime value (wood ash, paper mill lime, lime-activated biosolids, etc.)

How should manures be sampled?

Fresh poultry broiler litter. Take a handful of litter from 15 to 20 spots throughout the house as the litter is being removed. Mix these in a clean, plastic bucket and put about 1 quart in a heavy duty plastic freezer bag to send to the laboratory.

Dry-stacked or stored poultry litter. Using a shovel, dig into the stack 2-3 feet and take about a handful of litter from within the stack. Repeat this at 10-20 spots around the stack. Mix these subsamples in a clean, plastic bucket and put about 1 quart in a heavy duty plastic freezer bag to send to the laboratory.

Layer and breeder litter/manures. Sample the same as for fresh or stored poultry litter.

Dairy and swine lagoon slurry from under-slotted-floor pit (see Extension Cir. ANR 1102). Extend a ½-inch nonmetallic conduit that is open on both ends into the manure all the way to the pit floor. Place your thumb over the upper end of the conduit to seal it to trap the manure that has entered the lower end. Remove the conduit from the pit and empty the slurry into a plastic bucket. Repeat this from 5 or more locations. Mix well and save about 1 quart in a clean, plastic bottle for the laboratory. Refrigerate or freeze until sample can be delivered to the laboratory.

Dairy and swine lagoon slurry from outside storage lagoon or tank. Mix the manure well using a liquid manure chopper pump or propeller agitator. Continuous agitation for at least 12 hours is necessary for a lagoon or storage pond to be properly mixed. Take subsamples from about 5 locations around the lagoon or from the output from the

agitator pump or propeller agitator, or from the manure spreader. Mix the subsamples in a plastic bucket and save at least 1 quart for the laboratory. This should be put into a clean, plastic bottle (such as a soft drink bottle with a plastic screw cap). Refrigerate or freeze the sample until delivery to the laboratory.

Dairy and swine lagoon liquid effluent. From the recycle system, collect about 1 pint from the inflow pipe to the flush tanks. From the lagoon, place a small bottle (about ½ pint) on one end of a 10- to 15-foot pole. Extend the bottle 10 to 15 feet away from the edge of the lagoon. Brush away any floating debris, and submerge the bottle within 1 foot of the surface. Retrieve the bottle, and empty it into a plastic bucket. Repeat this process about 5 times around the lagoon; mix the samples and pour about 1 quart into a clean, plastic bottle (such as a soft drink bottle with a plastic screw cap) and refrigerate or freeze until delivery to the laboratory.

Feedlot and stable manures (semi-solid manures). After manures are scraped into a spreader, collect about 2 pounds of manure from different locations in the spreader. Mix these in a clean, plastic bucket and put about 1 quart in a heavy duty plastic freezer bag or plastic bottle to send to the laboratory.

Composted manures. Sample the same as dry-stacked or stored poultry litter.

Other organic amendments. Try to get a representative sample by collecting 10-20 subsamples from throughout the stack, pile, bin, lagoon, etc. Mix the subsamples in a clean, plastic bucket and submit at least 1 quart to the laboratory for analysis. Samples may be dried if moisture is of no concern.

Where do I send the sample for analysis?

Soil Testing Laboratory

ALFA Building
S. Donohue Drive
Auburn University, AL 36849
Phone: (334) 844-3958
FAX: (334) 844-4001
e-mail: bryanh@auburn.edu

There are private agricultural labs and environmental labs who may also be set up to do similar analyses. Make certain that they are able to give you the FERTILIZER VALUE and/or lime value of the manure. There is no state or national certification of soil testing, plant analysis, or manure testing laboratories but any laboratory offering these services should participate in the North American Proficiency Testing Program (NAPT) for quality assurance. Engineering and environmental laboratories may not subscribe to such a program.

What should I expect on a manure analysis?

The Auburn University laboratory will give you the following information on the sample as it was submitted (see sample report)

***Moisture (%)**

***Ash (%)**. This gives the amount of inert material such as soil that may contaminate the sample; the higher the ash, the lower the fertilizer value.

***Dry litter analysis: total N, P, K, Mg, Ca, Cu, Zn, B**

***Liquid lagoon analysis: total N, ammonium-N, P, K, Ca, Mg, Cu, Fe, Mn, Zn, B, Mo, Al, Ba, Co, Cr, Pb, Na**

***Fertilizer grade** expressed as percentage total N-P₂O₅-K₂O

***Total N-P₂O₅-K₂O** expressed as pounds per ton or pounds per 1,000 gallons for liquid samples.

Certain other analyses could be run on the sample but must be requested such as total sulfur (S), neutralizing value (lime value), nitrate-nitrogen and soluble salts.

What does it cost?

The routine manure analysis is \$25 per sample. Additional analyses are approximately \$5 per analysis.

POULTRY LITTER ANALYSIS REPORT

May 14, 2006

NAME : ~~Charles Mitchell~~
 DEPARTMENT : ~~Agriculture - Soils~~
 SAMPLE I.D.: Chicken Litter
 LAB I.D. : K13-06
 ANALYSIS : Poultry Litter for Fertilizer Value
 INCLUDES : Minerals, Total Nitrogen, Ash, Moisture, Fertilizer Value.
 UNITS : %, ppm, and Lbs/Ton in material on a As Sampled, Wet Weight basis.

SAMPLE I.D.		Cullman		Sand Mountain
		-- % --		-- % --
MOISTURE		26.2		20.3
ASH		24.6		31.3
		-- % --		-- % --
NITROGEN	N	4.17		3.70
PHOSPHOROUS	P ₂ O ₅	4.63		3.98
POTASSIUM	K ₂ O	3.54		3.24
CALCIUM	Ca	3.26		4.56
MAGNESIUM	Mg	0.67		0.92
		PPM		PPM
ALUMINUM	Al	1862		1834
BORON	B	51		41
COPPER	Cu	391		221
IRON	Fe	1887		1878
MANGANESE	Mn	475		410
ZINC	Zn	427		349

As Sampled
 Fertilizer Value
 ----- Lbs/Ton -----

N	P ₂ O ₅	K ₂ O
83	93	71
74	80	65

Example of a poultry litter analysis report for 2 samples.

Prepared by:
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