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Minimizing Phosphorus
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Manure Testing

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Definition:

Manure testing is the process of evaluating manure nutrient content to provide specific agronomic and environmental recommendations for manure use.

Purpose:

Managing manure for economically optimum crop production with minimum environmental impact requires knowledge of manure nutrient content. While “book” values listing average nutrient contents of manures are available, they are of limited value since manure properties vary widely with animal feeding programs and manure man-

agement systems. Testing representative manure samples is needed for the accurate determination and appropriate management of manure nutrients.

Obtaining a Representative Manure Sample:

Samples submitted for testing should be representative of manure as it is used/spread. Multiple samples are generally necessary to better represent variability in manure characteristics. Composite sampling is the recommended method of addressing variability in manure properties without the added cost of submitting

multiple samples for analysis. Composite sampling involves collecting multiple samples from a single source, thoroughly mixing this material and collecting a sub-sample for analysis.

Representative sampling of manures must take into consideration the form of manure as well as the particulars of storage and handling. Variability within solid manure is often much greater than for slurries and liquid manures. For solid manures, it is generally recommended that samples be obtained from loaded spreaders, rather than from stacked manure or bedded pack. Due to segregation of liquid and solid fractions during storage, slurries should be thoroughly agitated for a minimum of 2-4 hours before sampling.

Solid manure sampling:

Sampling while loading (stack and bedded pack) – collect at least five samples from several spreader loads. Mix and collect ~1 lb sub-sample.

Sampling during spreading – drive spreader over tarp and collect several samples from tarp. Mix and collect ~ 1 lb sub-sample.



Manure testing is a key component of prudent manure management.



Sampling daily haul – place a bucket under barn cleaner while loading spreader. Repeat sampling 4-5 times. Mix and collect ~ 1 lb sub-sample.

Sampling broiler houses – collect 8-10 litter samples collected at random from across the house to the depth that will be removed during cleanout. Areas near feeders and waterers should be sampled in proportion to their spatial distribution in the house. Mix and collect ~ 1 lb sub-sample.

Sampling stockpiled manure – collect 10 samples from various locations within the pile at least 18 inches below the surface. Mix and collect ~ 1 lb sub-sample.

Sampling slurries and liquid manures:

Sampling from storage tanks - agitate manure thoroughly (2-4 hours minimum) and obtain at least five samples while loading. Combine them in a five-gallon pail. Mix and collect ~ 1 quart sub-sample.

Sampling during application – place five pails around field to catch manure from spreader or irrigation equipment. Mix and collect ~ 1 quart sub-sample.

Manure Phosphorus Tests:

Agronomic tests. A variety of methods have been developed to evaluate the phosphorus content of manures for agronomic interpretation. These tests generally determine total phosphorus concentrations in manure through ashing or chemical digestion. Manure testing reports should present this concentration as phosphate (lbs P_2O_5 per ton, or lbs P_2O_5 per 1000 gal). However, in some instances, results may be presented as elemental phosphorus (lbs P per ton or lbs P per 1000 gal).

Environmental tests. A number of states have developed phosphorus indices for field management that employ water-extractable phosphorus in manure as an indicator of the relative availability of manure phosphorus to loss pathways, such as overland flow and leaching. Water-extractable phosphorus in manure varies between livestock species, with different storage/handling methods, and as a result of the addition of “phosphorus sorbing materials,” such as alum (aluminum-sulfate).

Reference:

Peters, J., S. Combs, B. Hoskins, J. Jarman, J. Kovar, M. Watson, A. Wolf and N. Wolf. 2003. *Recommended Methods of Manure Analysis*. University of Wisconsin Extension Pub., Madison, WI. <http://www1.uwex.edu/ces/pubs/pdf/A3769.pdf>

For Further Information:

Contact your local agricultural analytical laboratory, conservation district, USDA-NRCS or Cooperative Extension office.