USDA United States Department of Agriculture

Sampling Manure for Nutrient Management

Manure as a Resource

Overview

Nutrients needed for crop production can be supplied by manure, commercial fertilizer, or a combination of the two.

Regardless of the source, nutrients must be applied in the right amount to meet crop production needs and prevent surface and ground water pollution.

By knowing the nutrient content of the manure applied, producers can adjust the amount of commercial fertilizer needed to meet crop requirements.

Producers have two options for determining the nutrient content of manure produced on their farm:

1. Estimate using published values (see figure 1) or

2. Use the results of a laboratory analysis from the manure that will be applied.

The preferred and most accurate method is a laboratory analysis that estimates the nutrients and manure from a specific operation.

The nutrient content of manure varies with the type, age, weight of livestock, feed program, weather conditions, and manure handling system. Manure can also be tested for other crop needed nutrients (i.e. calcium, sulfur, etc.).

At minimum, manure should be tested for total nitrogen, inorganic nitrogen, total phosphorus and total potassium. An analysis for these nutrients provides the information needed to develop a nutrient management plan.

For information about how to interpret manure test results, refer to “Using Results from a Manure Analysis” (SD-NRCS-FS-38). For information about land application, refer to Calibrating Manure Spreader Application Rates (SD-NRCS-FS-43).

How to Sample Manure

The accuracy of a laboratory analysis depends on the quality of the manure sample received. A solid manure sample collected as close to the time of land application as possible provides the best information about its fertilizer value. It is important, however, to allow the laboratory time to complete the analysis and return the results. Usually three weeks is sufficient. Liquid manure must be agitated before sampling and is usually land applied before the sample is taken. Therefore, it is suggested that producers handling liquid manure use the average of several years of nutrient test results to estimate the nutrient level in the manure. When information from past years is not available, cooperative extension and NRCS can provide publications that list the estimated nutrient levels commonly found in liquid manure.

Sampling Solid Manure

1. Collect manure from at least 10 different locations in the feedlot, manure stack or bedpack. The locations selected should be similar in moisture, feed, hay and bedding content. Avoid areas near waterers, drains, and feedbunks where materials other than manure often accumulate. If sampling stockpiled manure, collect manure from several depths. Avoid the exposed outer layer of the pile.

2. Dump the manure collected on a hard, flat surface or a large bucket. Use a shovel or pitchfork to mix the manure until the pile looks uniform.

3. Take several small samples from the mixture until about a gallon has been collected or the lab-supplied container is full.

4. Place the mixture in a heavy weight plastic freezer bag. Squeeze the bag to remove the air. Place the bag in a second freezer bag to prevent leakage.

For more information

- Contact SD NRCS
- Local Conservation District
- NRCS Agricultural Nutrient Management Team
  1820 N. Kimball Suite 4, Mitchell, SD 57301
  (605) 996-1564, Ext. 4
- SD NRCS Nutrient Management Web page
- **For information or assistance with regulatory requirements:**
  South Dakota Department of Agriculture and Natural Resources Livestock Services Program
  Pierre, SD
  Phone: (605) 773-4647
  https://danr.sd.gov/Agriculture/Livestock/FeedlotPermit/default.aspx

5. Freeze or store the sample in a cool place until ready to ship.

Sampling Liquid Manure

1. Agitate the manure in the storage facility thoroughly before loading the tank spreader. If this step is omitted, the sample will not accurately estimate the nutrient value of the manure in the storage pit.

2. Collect one quart samples from at least five different tank spreader loads using a clean plastic container.

3. Pour the samples into a clean, large plastic pail.

4. Thoroughly stir the contents of the pail. Use a long handled dipper to transfer several cups of the swirling mixture to a clean, one quart plastic bottle until the liquid is about two inches from the top of the bottle. DO NOT OVERFILL.

5. Place the bottle in a heavy weight resealable plastic freezer bag to prevent leakage.

6. Freeze or store the sample in a cool place until ready to ship.

Sampling Identification and Shipping

1. Attach a label to the bag or bottle of manure. List:

- Name
- Mailing address
- Telephone number
- Sample site (feedlot, pit, pond)
- Type of manure (beef, dairy, swine, chicken, turkey)
- Date the sample was collected.

2. Complete a laboratory information sheet. If possible, use an information sheet from the lab that will complete the test.

3. Place the frozen or refrigerated sample and laboratory information sheet in a styrofoam or similar insulated container. Add cold packs and packing materials to protect the sample during shipment.

4. Deliver the sample to the lab or ship by overnight mail or courier. If using regular mail, ship the sample early in the week so that it arrives at the lab by Thursday. Samples that arrive on the weekend may warm up and start to decompose. The nitrogen test for these samples will be inaccurate.

Nutrient Content of Stored Manure

Animal Type	Liquid Manure (lb./1000 gallons)			Solid Manure (lb./tons)		
	N	P2O5	K2O	N	P2O5	K2O
Beef						
Cows	20	16	24	7	44	7
Finishing Cattle	29	18	26	11	7	11
Dairy						
Cows	31	15	19	10	3	6
Heifers	32	14	28	10	3	7
Swine						
Farrowing	15	12	11	14	6	4
Nursery	25	19	22	13	8	4
Gestation	25	25	24	9	7	5
Finishing	58	44	40	16	9	5
Poultry						
Broilers	63	40	29	46	53	36
Layers	57	52	33	34	51	26
Tom Turkeys	53	40	29	40	50	30
Hen Turkeys	60	38	32	40	50	30
Horse				14	4	14
Sheep				18	11	26

Data courtesy of Extension at University of Minnesota.

South Dakota
Natural Resources Conservation Service
www.sd.nrcs.usda.gov

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