

For More Information

For information or assistance with **management options** contact your local Natural Resources Conservation Service (NRCS) or conservation district office.

Natural Resources Conservation Service
10 East Babcock Street
Federal Building Room 443
Bozeman, MT 59715
(406) 587-6813
<http://www.mt.nrcs.usda.gov/>

Montana Assoc. of Conservation Districts
501 N. Sanders
Helena, MT 59601
(406) 443-5711
<http://www.macdnet.org/>

For information or assistance with **regulatory requirements** of manure management, contact the Montana Department of Environmental Quality.

Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901
(406) 444-2544
<http://deq.mt.gov/index.asp>

Manure as a Resource Series

Three additional brochures are in this series. To receive a copy of any of the following brochures, visit your local NRCS office or <http://www.mt.nrcs.usda.gov/>.

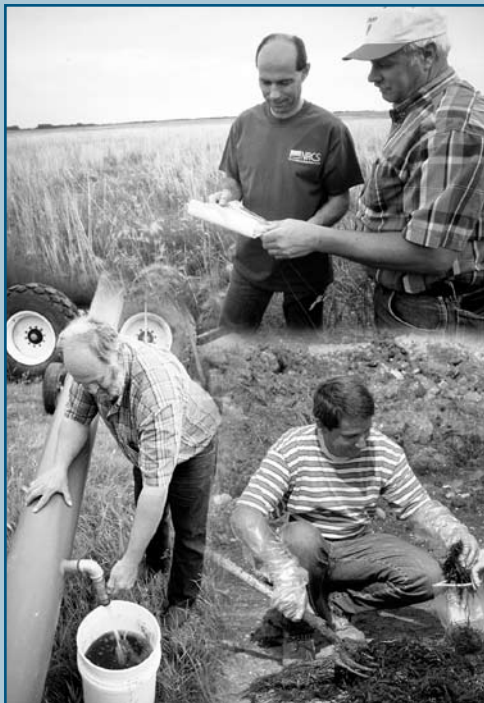
- Calibrating Manure Spreader Application Rates
- Using Manure Analysis Results
- Sampling Soils for Nutrient Management



United States Department of Agriculture
Natural Resources Conservation Service

Sampling Manure for Nutrient Management

Manure as a Resource Series



Helping People Help the Land

Sampling Manure for Nutrient Management

Nutrients required for optimum crop production can be supplied by several sources including manure, commercial fertilizer, or a combination of the two. Regardless of the source, nutrients must be applied in the right amount and at the right time to meet the crop needs and producer objectives while preventing surface and ground water contamination.

By determining the nutrient content of manure sources, producers can adjust the amount of commercial fertilizer needed to meet crop requirements. With the cost of commercial fertilizers steadily increasing, the use of manure as a nutrient source reduces inputs to crop production.

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

1. Estimate nutrient concentration using published values, or
2. Laboratory analysis.

Estimated values found in published databases are averages from samples collected and tested over a period of years from a wide variety of locations. Estimated values, therefore, have the potential for wide variation when compared to actual nutrient values on site.

A laboratory analysis is the preferred and most accurate of the two methods. An analysis measures the nutrient concentration in manure produced on a specific site. In Montana, permitted facilities are required to obtain manure analysis annually whenever manures will be applied.

Estimated Nutrient Content of Manure

Nutrient content of manure varies significantly with species, age, and weight of livestock; feed program; and manure handling and storage. To compound matters, nutrient content is also affected by climatic conditions, application methods, and timing of incorporation.

Minimally, manure should be tested for total nitrogen, inorganic nitrogen, total phosphorus, total potassium, and percent moisture. An analysis of these nutrients provides the necessary data required to develop a nutrient management plan.

	Nitrogen	Phosphorus	Potassium
Solid Manure (lb/ton)			
Beef feedlot	14.2	12.8	17.8
Dairy	11.2	4.6	12.0
Hogs	10.0	6.4	9.2
Poultry	31.2	18.4	8.4
Liquid Manure (lb/1,000 gallons)			
Dairy	4.8	0.1	4.6
Hogs	0.2	0.1	0.2

Adopted from MontGuide 8704 "Soil Testing, Procedures, Interpretation, and Fertilizer Sources," Montana State University Extension Service, 1996.

Sampling Manure for Nutrient Management

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 fertility value. It is important, however, to allow the lab enough time to complete the analysis and return the results. Usually three weeks is sufficient. Liquid manure must be agitated before sampling and is usually applied to land after 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, NRCS professionals can provide and estimate of nutrient levels using the MMP (manure management planner) software.

Sampling Solid Manure



An accurate lab analysis of solid manure hinges on collecting a representative sample.

1. Collect manure from at least 10 different locations in the barnyard or feedlot. The locations selected should be similar in moisture, feed, hay, and bedding content. Avoid areas near waterers, drains, and feed bunks where materials other than manure often accumulate. If sampling from stockpiled manure, collect manure from several depths. Avoid the exposed outer layer of the pile.
2. Place the manure collected on a hard, dry, flat surface. Use a shovel or pitchfork to mix the manure until the sample pile looks uniform.
3. Take several small samples from the mixture until about a gallon has been collected.
4. Place the gallon sample into a heavy weight plastic freezer bag. Squeeze the bag to remove the air. Place the bag into a second freezer bag to prevent leakage.
5. Freeze or store the sample in a cool place until ready to ship. See information in this brochure detailing how to complete sample identification and shipping instructions.

Sampling Liquid Manure



Sampling from a loading pipe or tank spreader is the preferred method of collecting a liquid manure sample.

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 concentration 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 FILL TO THE TOP!**
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. See information at right for sample identification and shipping instructions.

Sample Identification and Shipping

1. Attach a label to the bag or bottle of manure.
 - 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 material 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, rendering the nitrogen test for these samples inaccurate.

The lab operating in Montana is:
Energy Laboratories
1120 South 27th Street
P.O. Box Billings, MT 59107
(406) 252-6325
<http://www.energylab.com/>

A “chain of custody” form for submitting samples is available online at
<http://www.energylab.com/CertsForms.asp>.