

Livestock Manure Sampling Procedures

Introduction

Laboratory analysis of manure is an essential component of manure nutrient management planning. Estimates of manure nutrient contents are available from a number of published sources. Manure nutrient composition, however, varies widely between regions and between farms within one region due to animal species, operation management practices, weather conditions, manure production period, and manure storage and handling. Estimates have not yet been determined from sources specific to New Brunswick. That is why manure testing for nutrient content determination is highly recommended prior to fertilizing cropland with animal manure. Proper manure sampling and laboratory testing provide actual manure nutrient concentrations that are needed to plan for maximum crop yield and minimal impact upon the environment.



Why Proper Manure Sampling

Proper manure sampling is the best way to get accurate manure test results. Manure analysis is only as good as the sample taken. A good manure sample will represent the manure stored. The manure sample submitted to the Agricultural Laboratory must truly represent the manure that will be applied to the fields. Separate samples should be collected from different manure storage sites or piles, as well as from different manure types, age, and sampling periods. Effective sampling methods will depend on whether manure is solid ($> 15\%$ dry matter content), slurry ($5 - 15\%$ dry matter), or liquid ($< 5\%$ dry matter).

Sampling Liquid and Slurry Manures

GENERAL PROCEDURES

Liquid and slurry manure can be stored in holding tanks, ponds, or lagoons. Since solids tend to settle during storage, the manure is agitated and mixed prior to taking a sample. Depending on conditions, agitation times will vary from 2 to 8 hours or more.

- A sample can be taken from the lagoon, the spout of the pump or from the manure spreader.
- Use plastic cups or buckets to collect manure samples. Special sampling devices may be needed to sample manure in ponds or lagoons.
- Collect sub-samples every 30 cm (12 in) in depth or every 5 loads as the storage is emptied.
- Collect sub-samples from various locations of the storage.
- Thoroughly mix sub-samples to make a composite sample. More than one composite sample may be taken and sent to the laboratory.

SAMPLING FROM UNDER A SLATTED FLOOR

For manure stored in pits under a slatted floor, a composite sample may be collected without agitation as follows:

- Extend a length of 1.25 to 2 cm (0.5 - 0.75 inch) diameter PVC pipe vertically into the manure down to the pit floor.
- Seal the upper end of the pipe with your hand.
- Pull out the length of pipe and empty it into a plastic bucket.
- Repeat the operation 6 to 8 times to collect a composite sample. This method permits manure testing without agitation and prior to time of application.

SAMPLING FROM THE SPREADER

- Liquid and slurry manure samples can also be collected from the spreader prior to application.
- Manure samples can also be collected during the spreading operation by laying pans or other devices on the ground to catch samples there. This sampling method is the most accurate since samples are collected as the material is applied on the ground. It also permits the application pattern to be checked.



COLLECTING A COMPOSITE SAMPLE

Whatever the sampling procedure:

- A composite sample is taken based on 10 single samples or more.
- The composite sample should be stored in a 1 liter, clean, wide-mouth plastic bottle.
- Do not exceed 2/3 full; leave about 1/3 air space for gas expansion.
- Tighten the lid and label the bottle as per instructions of the manure sample form of the Agricultural Laboratory of the New Brunswick Department of Agriculture and Aquaculture (NBDAA).

Sampling Solid Manure

- The easiest way to sample a manure pile is to take samples from several loads as the manure is being hauled.
- Solid manure samples can also be collected from the spreader prior to or during application (as for liquid manures).
- If the above choices are not possible or they are undesirable, start collecting sub-samples from a depth of 30 cm (12 inches) and continue to the centre of the pile. Collect more than 10 sub-samples from random areas and various depths.
- For solid manure that has not been stacked into a pile, use a shovel to randomly collect more than 10 sub-samples of about 500 ml each from different areas and to full depth of accumulation.
- Whatever the procedure, place the samples in a clean plastic bucket (or on a dry, clean area), and mix them thoroughly.
- Collect a composite sample from the mixture and put it in a plastic bag (4 liter size) and double bag it, or put it in a plastic container with a secure lid.



What Is The Best Time For Manure Sampling?

Manure should ideally be sampled and analyzed just prior to being land-applied. This may not be practically feasible since liquid and slurry manure are only agitated and mixed at spreading time. There is not much time left then for manure samples to be taken, analyzed, and for nutrient recommendations to be made prior to manure application. Consequently, manure application rates will generally be based on typical manure contents. Having manure tested, however, remains valuable for the following reasons:

- Amounts of nitrogen and phosphorus nutrients supplied to your crop from manure will be better known.
- On-farm manure history and land nutrient application records can be established.
- An on-farm manure database can be compiled and used for future calculations, provided that feeding practices do not change over time.

Getting manure sampled and tested at the same time of year, year after year, will promote the general consistency of results. This is particularly important for uncovered manure storage facilities. In-field manure test kits are available to get an estimate of the nitrogen levels in the manure at spreading time.

Manure Sample Handling

Storing manure samples at room temperature will trigger mineralization and lead to a misrepresentation of sampled manure. In order to avoid this:

- Store the sample in cool conditions, on ice in a cooler and deliver it to the Agricultural Laboratory as quickly as possible.
- When delivery is delayed, immediately refrigerate or freeze the manure sample.
- Send (via Express mail) or deliver samples early in the week.
- Avoid weekends and holidays which could delay delivery.
- Send or bring the samples to:

**New Brunswick Department of Agriculture and Aquaculture
Agricultural Laboratory
850 Lincoln Road
Fredericton, New Brunswick
E3B 9H8**

Warning: For safety reasons, do not use glass containers to store livestock manure samples. Built-up pressure may cause glass containers to explode. Samples submitted in glass containers will not be analyzed at the NBDAA Agricultural Laboratory.

References

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