

GUIDELINES FOR SAMPLING AGITATED LIQUID MANURE during the pump-out of a liquid manure storage structure

Manure is an excellent source of nutrients for crop production. Unlike synthetic fertilizer, however, the nutrient content of manure is highly variable and unknown for a given operation in the absence of laboratory test results. Published values can be used until a farm-specific database is created through repeated testing.

To make the most of manure as a fertilizer, measures must be taken to homogenize the manure and estimate the amount of nutrients being supplied to the crop. For liquid manure, the first steps in using manure as a fertilizer are, therefore, (1) thorough agitation of the manure and (2) collection of samples that represent the manure being applied to land.

Representative samples are very small quantities of manure properly collected to generate good estimates of nutrient and moisture contents for a much larger supply of manure. For a sample to be representative, it must be collected according to protocol before or during pump-out and application.

The following steps are guidelines for collecting samples of agitated liquid manure during the pump-out of a manure storage structure, as well as preserving and shipping the samples for laboratory analysis.

- 1 Obtain sampling supplies and shipping instructions from an accredited laboratory or the agronomist if one has been hired by the operation.
 - Supplies can consist of jars, bags and submission forms.
 - Ideally, either the desired analytical package or a quote/job number is already identified on the submission form.
- 2 Consult with the operation's agronomist regarding any specific instructions. For a particular sampling job, it may be appropriate to modify the guidelines contained in this document.
- 3 To properly sample agitated manure during pump-out or application, follow this protocol:
 - a. Wait until the manure is well agitated before taking any samples.
 - Recognize that complete agitation of the manure is rarely if ever possible.
 - Note that the degree of agitation that is achievable depends on a number of factors including:
 - degree of access to multiple locations, lateral and vertical, within the storage
 - solids content
 - accumulation of solids at the bottom of the storage.
 - Look for a consistent solids content that indicates that the manure is as agitated as possible.
 - The duration necessary to approach full agitation is typically more than three hours.
 - Note that sometimes agitation is actually undesirable because the intent of an agronomist or producer is to target certain fields with certain manure (e.g. low/high in solids and therefore phosphorus content).



- b. Collect manure throughout the pump-out of the storage to generate three to five representative, **composite samples** for the entire manure storage, or just the portion that will actually be applied.
- A **composite sample** is formed by
 - collecting three to five individual samples at a given stage of the pump-out (e.g. early, mid and late in the process),
 - combining the individual samples in one container (e.g. five-gallon pail),
 - mixing the contents and then
 - filling one sample container for shipment to the lab.
 - Despite agitation, changes in nutrient and solids contents are common as liquid manure is pumped from large storage structures.
 - Multiple composite samples over the course of the pump-out (i.e. top, middle and bottom of storage or at the beginning, middle and end of the emptying process) will account for these changes.
 - Test results from multiple composite samples will allow the agronomist and/or producer to estimate the nutrient rates that were applied to different parts of a field or on different fields. This knowledge is particularly important in the management of soils with varying levels of phosphorus.
 - A tap located at the main pump-out station may be the best place to collect samples.
- c. Make notes about each sample.
- At a minimum, record barn identification, date and time of sampling and stage of pump-out (early/mid/late).
 - Also record the circumstances of sampling, particularly any deviations from the sampling protocol. Such notes can confirm that sampling was done properly and aid in the interpretation of results.
 - Additional questions to address in the notes as appropriate include:
 - Was the manure agitated? Was agitation partial/thorough/complete?
 - Is the storage system single or two-cell?
 - Was the storage partially or fully emptied?
 - Where were samples taken?



4 Take care to ensure that the samples will not be compromised or degraded.

- Clearly label all sample jars with the farm name, date, time, pump-out stage and any other necessary information.
- Do not completely fill sample jars with manure. Fill jars only to within a couple of inches of the top to allow for accumulation of manure gases.
- Immediately store samples in a cool place until they can be shipped. Do not leave



- samples in the sun or in a warm vehicle.
- Ship samples to the lab as soon as possible. Do not ship on a Friday or before a holiday. Samples should not spend more than two days in transit.
- If samples cannot be shipped to the lab within one day, freeze them.
- Sample jars should be tightly sealed and placed in plastic bags to avoid leakage during shipping.

PRACTICE SAFE SAMPLING PROCEDURES!

Do not place yourself or others at risk around manure storage structures or pumping equipment in order to obtain samples.

Contact a **local MAFRI GO Office or Centre** to receive information about commercial labs offering manure analytical services to Manitoba livestock operations, custom applicators and agronomists.