Sampling Liquid Manure

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Liquid animal manure sampling can be an important management tool. Proper sampling provides the producer with nutrient analysis results that can be used in a sound farm fertilization program. Nutrient analysis of manure, in conjunction with soil sampling, helps determine how much manure should be applied to fields to maintain adequate fertility while minimizing potential environmental problems such as ground and surface water pollution. However manure applications should not exceed the maximum application rates in a manure management plan until sufficient data can be collected to justify revising the plan.

When to Sample

Liquid animal manure should be sampled for nutrient analysis as close to land application time as possible. This helps ensure that the reported nutrient content accurately reflects what is being applied to the land. If the manure is sampled as it is being land applied, the results will not be available to govern present application rates. It does, however, provide information for future land applications of animal manure, if the manure management remains fairly constant over time.

How to Collect a Liquid Manure Sample

During Land Application

The easiest way to collect liquid animal manure samples is to collect the manure as it is being land applied. This approach ensures what is sample reflects what is applied. Randomly place catch pans in the field to collect the liquid manure as it is land applied by an irrigation system or honey wagon. Flexible rubber feed pans work well. Immediately after the manure has been applied, collect the manure from the catch pans, combine in a bucket to make one composite sample and mix well by stirring. This bucket will be the source of the manure sent for analysis.

From a Storage Facility

If collecting liquid animal manure samples during land application is not possible, collect the samples from the storage facility. Liquid animal manure storage facilities have a tendency for the manure to stratify with the solids settling to the bottom and the liquids remaining on top. It is also not uncommon for some solids to form a floating crust. This stratification affects the manure nutrient concentrations in the storage facility. The nitrogen and potassium will be more concentrated in the top liquid, while the phosphorus will be more concentrated in the settled solids. This stratification of nutrient concentrations increases the challenge of getting samples that represent what will be applied to a particular field. If the liquids from the top and middle of the profile will be applied, only this material should be sampled. If the settled solids will be applied, then they should be sampled. However, if the manure is to be agitated before pumping, as has been the traditional recommendation, the sample should contain representative proportions of manure from the top, middle, and bottom. The idea is to collect a sample of an entire column of manure to represent the manure after agitation.

If agitating the manure prior to sampling is not possible, an alternative approach is to make a sampler to collect the required sub-samples. The sub-samples are then mixed to represent the manure after agitation. The easiest to construct is simply a container such as a cup, attached to the end of a pole. Liquids from the manure surface can be simply scooped up. To collect liquids from the middle depths, or settled solids, the container is held up side down, trapping air, until the desired sampling depth is reached. Then the container is rotated, releasing the air and collecting the sample. When collecting a sample of the entire profile of the manure, sub-samples are collected and mixed in a bucket.

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A sampler design that automatically collects a sample of the entire profile uses 10 foot, 1 ½ inch PVC pipe with a PVC ball valve at the bottom. The handle of the ball valve is replaces with a lever arm about 2 feet long. The free end of the lever arm is attached to the end of a 10 foot, 1 inch PVC pipe. The lever arm and smaller pipe allow the ball valve to be operated while holding to top of the sampler. To use the sampler the valve is opened and the sampler is inserted (in a line, not and arc) into the manure. When the foot of the valve is at the bottom of the settled solids, it is closed. Then the sample of the entire manure profile can be removed from the manure and placed in a bucket.

Sketch of Cup Sampler

Sketch of Foot Valve Sampler

Whichever sampler is used, at least 8 locations around the manure storage unit should be sampled and mixed in a bucket to serve as a final composite sample. This bucket will be the source of the manure sent for analysis

Getting the Sample Analyzed

After thoroughly mixing the final composite sample, fill a one liter plastic bottle half full. These bottles may be obtained from your county Extension office. Never fill the bottle more than half full to allow for gas expansion of the sample and to prevent the bottle from exploding. Keep the samples as cool as possible until you can take them to your county Extensions office for shipping to the University of Arkansas lab for analysis. There you will get assistance in filling out an information sheet on your manure sample. There is a fee to have the sample analyzed. While the sample can be sent to a private lab, the fees are often higher. If you are required by the Arkansas Department of Environmental Equality (ADEQ) to sample your liquid animal manure as part of your Regulation No. 5 permit, make sure that you inform the individual helping you with the paperwork so the correct set of analyses can be performed. In addition to the analyses to determine the fertilizer value of manure, it is recommended to analyze for the amount of phosphorus in the manure that is water soluble. Water soluble phosphorus is needed to evaluate the potential environmental risk associated with phosphorus application rates specified in manure management plans. Having good farm based information should help planners develop plans tailored to and individual farm.

Key Points to Remember

The important things to remember in collecting a liquid animal manure sample are:

- Collect a sample that best represents the nutrient content of the manure in that storage facility and what will be applied. If only the top water is to be applied it should be sampled. If the storage unit will be agitated prior to application the sample should contain material from the entire depth profile.
- Only fill the sample bottle ½ full.
- Keep the sample cool prior to shipping.
- Ship the sample to the lab as soon as possible.