

ON-FARM MEASUREMENT OF AMMONIA IN MANURE WITH AGRO QUICK TESTER

On-farm Use of Quick Test for Ammonia

In order for manure to be used effectively as a fertilizer, there must be methods available to determine the nutrient content quickly and easily because nutrient content in manure is so variable. To do this, several quick testers for ammonia have been developed in recent years in response to stricter manure application regulations in Europe. We tested one of these ammonia quick testers, determined by an Ontario Ministry of Agriculture and Food research project to be the best available at this time. It was the Agros tester, made in Sweden and imported by an American company.

There are other ammonia quick testers available, however we did not test any beside the Agros tester, so we cannot comment on their accuracy or reliability.

What is an Ammonia Quick Tester?

It is a quick, on-farm chemical or physical test which determines the amount of ammonia in manure. With a quick tester, the results are available in a few minutes. There have been several different ones designed, all based on different designs and some are more accurate than others.

Why Use an Instant Ammonia Tester?

Manure is quite variable in nitrogen content due to ration composition, dilution with water inside and out of the barn, volatilization loss of ammonia-nitrogen in the barns and during storage and loss of ammonia

during and following spreading. Because of this variability, nitrogen content cannot be predicted accurately. Lab analyses can take several days to complete at a time when the producer may need the results immediately so he can spread manure. An ammonia quick tester offers quick, on-site results so that nitrogen application rate can be accurate.

How Does the Agros Nitrogen Meter Work?

The Agros meter works by reacting the ammonia in the manure with calcium hypochlorite (chlorinated lime) to create nitrogen gas and measuring the pressure created during the release of the gas in an airtight container. The pressure is measured by a gauge which is calibrated to read in kilograms of ammonia per cubic metre of manure.

Although the Agros tester determines ammonia instead of total nitrogen, ammonia is perhaps a more useful test. The ammonia represents the portion of nitrogen that is immediately available for crop growth, while the remainder becomes available as the organic matter degrades in the soil. It is comparable to an application of urea or other chemical nitrogen.

The nitrogen content can be predicted with reasonable accuracy from ammonia. In hog manure, an average of 75% of the nitrogen exists as ammonia. This percentage varies somewhat depending on the moisture content and the length of storage of the manure. With longer storage, more organic nitrogen is converted to ammonia. Similarly, manure with lower solids content generally has a higher percentage of ammonia.

Accuracy of Tester

Table 1 shows the results of some of our samples analyzed with the tester and by the lab. Variability between the lab analysis and the tester was between 3.4 to 8.5%. In general, we found the tester to be very accurate for on-farm use and could replace a lab analysis. Researchers have found that the tester is very accurate when used with hog slurry and somewhat less accurate, although still good, when used with cattle slurry due to interference from the high matter in that slurry.

Simplicity of Use of the Tester

The tester is very simple to use. It consists of a 8.5 cm (3.5”) square stainless steel reaction chamber with tight fitting lid, a manure measuring cup, reagent and measuring spoon for the reagent. It takes about 5 minutes to complete the test. A well-mixed manure sample is measured into the small cup supplied with the kit then poured into the reaction vessel. An equal amount of water is then added to the manure. The appropriate amount of reagent is added to a small

bucket in the box and the lid tightly closed. By turning a handle on the outside, the reagent is mixed with the manure and the reaction begins. When the gauge measurement stabilizes, a reading is taken. Because the gauge reads directly in kg ammonia per m³ of manure, no conversions are required.

Concerns with the Tester

With this piece of equipment, successful results depend on an accurate pressure reading. Any leaks from the box will make the reading faulty so the manure must not contact the reagent before the lid is tightly on. Care must be taken when removing the lid after a test as the box is under pressure. Other than these small concerns, the tester’s design seems foolproof and very reliable.

Available of the Tester

The tester is available from Agriwaste Technology Inc., 3504 Sloan Court, Raleigh, North Carolina U.S.A. 27606. It costs approximately \$500 U.S. It comes with space enough reagents to do about 30 tests and more can be ordered by contacting the supplier.

Table 1. Manure analyses comparing the quick tester with lab data.

Sample	% nitrogen lab value	% ammonium lab value	% ammonium Agros tester	% variability
1	0.39	0.30	0.28	6.6
2	0.39	0.29	0.28	3.4
3	0.26	0.19	0.18	5.3
4	0.60	0.42	0.45	8.5

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