Understanding a Manure Report

Manure is a valuable resource that provides nutrients for crop production. Before spreading manure on fields, it is important to know the concentration of the nutrients it contains so the right quantities can be applied. Meeting crop nutrient requirements without creating any potential problems is the best practice.

At a minimum, all manure samples should be analyzed for nitrogen (N), phosphorus (P), potassium (K), sulfur (S) and dry matter (DM) to determine its fertilizing value. These nutrients in the manure can be matched to the requirements of a specific crop. Then, additional nutrient sources, such as fertilizer or compost, can be applied to balance lacking components in the manure. Samples can also be analyzed for ammonium-N, nitrate-N, micronutrients, pH, or Electrical Conductivity (EC).

AgSource Laboratories' manure report provides test results on an 'as received' basis (if submitting samples to our Wisconsin lab, results will be reported on both an 'as received' and 'dry basis'). This is also called a wet-basis, reflecting the way the manure is usually spread. The nutrient concentrations of the sample are reported in percent (%) or parts per million (ppm), as appropriate. Based on the handling type indicated when submitting your samples (or the dry matter content), the most relevant area of the report to view will be highlighted in green. To help make the report easy to use, the results are also expressed in units of both liquid (lbs/1000 gallons) and dry (lbs/ton) application, so that whether you use a tank or a spreader you can calculate the application rates. Reports generated from our Wisconsin laboratories will include the estimated dollar value of the manure nutrients.

Manure nutrients are not 100 percent available the first year. AgSource Laboratories uses university research to estimate the available nutrient credits for nitrogen, phosphorus, potassium, and sulfur in the first, second and third year after application. Different methods of application have been evaluated for their effect on nutrient loss in the first year after application. Volatilization losses of ammonia nitrogen are the most significant, but they can be minimized when manure is injected, or incorporated within 4 hours of surface application. Availability of nutrients in the second and third year is most closely related to the dry matter content of the manure.

Note: Manure nutrient content and availability varies for different animal species and manure management practices, so it is wise to test each manure source on your farm. In addition, Available Nutrient Credits vary by state based on research and regulations. For samples submitted to our Wisconsin and Iowa laboratories, AgSource will follow the requirements outlined for the respective state.

Dry Matter – DM (%)
Dry matter indicates the dry weight of the manure after the water has been removed. The report indicates dry matter as the percentage of total fresh weight, which determines if it is liquid, semi-solid or dry. Moisture (%) Indicates the amount of water in the sample. (100 – DM% = Moisture %)

Total Nitrogen – (TKN) (lbs/1,000 gal or lbs/ton)
This measure of Total Nitrogen (TKN) includes both the immediately available inorganic Ammonium nitrogen (NH_4 -N), and the slowly released Organic Nitrogen. The amount of each type of N can vary dramatically (20 to 80 percent) depending upon the manure type and storage conditions. The N availability estimates are also given for the different methods of incorporating the manure in the application year, and for the following two years.

Phosphorus as P_2O_5 (lbs/1,000 gal or lbs/ton)
Phosphorus in the manure is reported as phosphate (P_2O_5) to determine the fertilizer-equivalent P content. Up to 90 percent of P is found in the solid portion of manure and availability can be as high as 90 – 100 percent in the first year. If the soil receiving the manure has a Very Low or Low soil test P level, then as little as 40 percent of the P_2O_5 may be available in the first year after applying manure. Applied phosphorus that is not used by the crop in the first year remains available for crop uptake in subsequent years.

Potassium as K_2O (lbs/1,000 gal or lbs/ton)
Potassium is converted to potash (K_2O) to determine the fertilizer-equivalent K in the manure. About 75 percent of potassium is found in the liquid portion of manure and availability is as high as 90 – 100 percent in the first year. Applied potassium that is not used by the crop in the first year remains available for crop uptake in subsequent years.

Sulfur as S (lbs./1,000 gal or lbs/ton)
The level of available sulfur, in both organic and inorganic forms, is expressed as elemental sulfur. The availability of sulfur in the first year ranges from 50 to 100 percent but declines to zero in the following years.

Other Elements

Calcium – Ca (%)
This is the level of total calcium in the manure. Availability is considered to be 100 percent in the first year after application.

Magnesium – Mg (%)
This is the level of total magnesium in the manure. Availability is considered to be 100 percent in the first year after application.

Sodium – Na (%)
This is the level of total sodium in the manure. Availability is considered to be 100 percent in the first year after application.

Zinc – Zn (ppm)
This is the level of total zinc found in the manure. Availability is considered to be 100 percent in the first year after application but can be tied up and made unavailable to the crop when soil levels of phosphorus are very high.

Manganese – Mn (ppm)
This is the level of available manganese found in the manure. Availability is considered to be 100 percent in the first year after application.

Iron – Fe (ppm)
This is the level of available iron found in the manure. Availability is considered to be 100 percent in the first year after application.

Copper – Cu (ppm)
This is the level of available copper found in the manure. Availability is considered to be 100 percent in the first year after application. Some animal manures have high levels of copper from copper foot baths. Toxic effects from applying too much copper can last for years in soil.

Other Manure Tests

Ammonium – NH_4-N (lbs/1,000 gal or lbs/ton)
This form of nitrogen is immediately available to crops after land application, but it can easily be released as a gas (volatilized) and lost into the environment when it is surface applied. Ammonium nitrogen is retained if the manure is injected or incorporated into the soil immediately after surface application. Good practice for fall application is to wait until the average soil temperature is below 50°F before applying manure that is high in ammonium.

Nitrate – NO_3-N (lbs/1,000 gal or lbs/ton)
This form of nitrogen is immediately available to crops when applied to the soil. Nitrate nitrogen is typically very low in manure and is not included in the Total N availability estimates. It is helpful to test for nitrate in manure that is stored under aerobic conditions (stockpiles or aerated lagoons).

pH
If manure is to be surface applied, knowing the pH can be beneficial because high pH can increase the proportion of ammonium-N and therefore result in increased volatilization during or after application. Manure is typically between pH 8 and 12. Do not expect the manure pH to affect soil pH levels.

Soluble Salts – EC (mmhos/cm)
This test provides an indication of the soluble salt content in manure liquids. A measure of EC may be important when using liquid manure or effluent to irrigate standing crops. Too much salt can result in 'leaf burn' damage to the plants.

Manure Analysis

AgSource LABORATORIES

Submitted By
AgSource Ellsworth Test Account
1701 Detroit St
PO Box 247
Ellsworth, IA 50075

Submitted For

Date Sapled

Date Received

Laboratory Sample #
BA70876

Account Number
EW10000

Test Package
Deluxe

Date Reported

Information Sheet No.
(2017)-M0424

Location MAP **Sample ID** MAP 17 A **Livestock Type** Hog **Handling Type** Liquid

Analysis	Results as Received	Nutrients as lbs/1000 gal	LIQUID Application Methods (Est. Available Nutrient Credits (as received, lbs / 1000 gal)) In 1st Year Incorporated* Injected	In 1st Year Incorporated* 1 - 4 Hours	In 1st Year Broadcast**	In 2nd Year	In 3rd Year
Dry Matter	4.55 %						
Moisture	95.45 %						
Total N, (TKN)	0.13 %	10.7	9.4 - 10.7	9.1 - 10.5	7.2 - 9.6	0.0	0.0
Ammonium, NH_4-N	0.01 %	0.42	0.4 - 0.4	0.4 - 0.4	0.3 - 0.4		
Organic Nitrogen,%N	0.13 %	10.2	9.0 - 10.2	8.7 - 10.1	6.9 - 9.2		
Phosphorus, P_2O_5	0.03 %	2.1	1.9 - 2.1	1.9 - 2.1	1.9 - 2.1	Residual after uptake	
Potassium, K_2O	0.11 %	9.0	8.1 - 9.0	8.1 - 9.0	8.1 - 9.0	Residual after uptake	
Sulfur, S	0.01 %	0.9	0.5 - 0.9	0.5 - 0.9	0.5 - 0.9	0.1	<0.1
Calcium, Ca	0.03 %	2.2					
Magnesium, Mg	0.01 %	0.9					
Sodium, Na	0.01 %	0.6					
Zinc, Zn	0.3 ppm	< 0.1					
Manganese, Mn	3.2 ppm	0.0					
Iron, Fe	26.7 ppm	0.2					
Copper, Cu	0.3 ppm	< 0.1					

DRY Application Methods (Est. Available Nutrient Credits (as received, lbs / ton))		Nutrients as lbs/ton	In 1st Year Incorporated* <1 Hour	In 1st Year Incorporated* 1 - 4 Hours	In 1st Year Broadcast**	In 2nd Year	In 3rd Year
TKN	2.6	2.3 - 2.6	2.2 - 2.5	1.6 - 2.2	0.0	0.0	
NH_4-N	0.10	0.1 - 0.1	0.1 - 0.1	0.1 - 0.1			
Org N	2.5	2.2 - 2.5	2.1 - 2.4	1.5 - 2.1			
P_2O_5	0.5	0.5 - 0.5	0.5 - 0.5	0.5 - 0.5	Residual after uptake		
K_2O	2.2	1.9 - 2.2	1.9 - 2.2	1.9 - 2.2	Residual after uptake		
S	0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	<0.1	<0.1	
Ca	0.5						
Mg	0.2						
Na	0.1						
Zn	< 0.1						
Mn	0.0						
Fe	0.1						
Cu	< 0.1						

*Surface applied liquid or solid manure incorporated within 1- 4 hours after application.

**Liquid or solid manure left on the surface 4 or more days without incorporation. Wind and high temperature will result in greater loss of available nitrogen.

The Total N (TKN) values are the sum of Ammonium and Organic N. Avaialbility estimates are corrected for ammonia volatilization loss due to each application method.

Available Nutrient Credit ranges are shown for soil and climate conditions prevalent in the Upper Midwest states.

Liquid manure applied as irrigation will lose more nitrogen from volatilization. An additional 15% of the Liquid TKN value should be subtracted off the Liquid Broadcast TKN Range.

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