

# 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. 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. 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.

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. 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.*

## 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<sub>4</sub>-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<sub>2</sub>O<sub>5</sub> (lbs/1,000 gal or lbs/ton)

Phosphorus in the manure is reported as phosphate (P<sub>2</sub>O<sub>5</sub>) 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<sub>2</sub>O<sub>5</sub> 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<sub>2</sub>O (lbs/1,000 gal or lbs/ton)

Potassium is converted to potash (K<sub>2</sub>O) 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<sub>4</sub>-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<sub>3</sub>-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**

**Submitted By**  
 AgSource Ellsworth Test Account  
 1701 DETROIT ST  
 PO BOX 247  
 ELLSWORTH, IA 50075  
**Account Number**  
 EW10000

**Submitted For**

**Date Sampled**

**Date Received**

**Date Reported**

**Test Package**  
 Comprehensive



**Laboratory Sample #**  
 BH11469  
**Information Sheet No.**  
 M-TEST1

Location HOME		Sample ID 2		Livestock Type Hog			Handling Type Liquid						
		LIQUID Est. Available Nutrient Credits (as received, lbs / 1000 gal)					DRY Est. Available Nutrient Credits (as received, lbs / ton)						
Analysis	Results (as Received)	Nutrients as lbs/1000 gal	In 1st Year			In 2nd Year	In 3rd Year	Nutrients as lbs/ton	In 1st Year		In 2nd Year	In 3rd Year	
			Injected	Incorporated*	Broadcast**				Incorporated*	Broadcast**			
Total N, (TKN)	0.67 %	56.2	49.6 - 56.2	48.1 - 55.6	37.9 - 50.6	0.0	0.0	TKN	13.5	11.5 - 13.4	8.5 - 11.5	0.0	0.0
Ammonium, NH <sub>4</sub> -N	0.67 %	55.4	48.9 - 55.4	47.4 - 54.8	37.4 - 49.9			NH <sub>4</sub> -N	13.3	11.4 - 13.2	8.4 - 11.3		
Organic Nitrogen, %N	0.01 %	0.8	0.7 - 0.8	0.7 - 0.8	0.5 - 0.7			Org N	0.2	0.2 - 0.2	0.1 - 0.2		
Nitrate, NO <sub>3</sub> -N	0.03 %	2.1	2.1 - 2.1	2.1 - 2.1	2.1 - 2.1			NO <sub>3</sub> -N	0.5	0.5 - 0.5	0.5 - 0.5		
Phosphorus, P <sub>2</sub> O <sub>5</sub>	0.34 %	28.3	25.5 - 28.3	25.5 - 28.3	25.5 - 28.3	Residual after uptake		P <sub>2</sub> O <sub>5</sub>	6.8	6.1 - 6.8	6.1 - 6.8	Residual after uptake	
Potassium, K <sub>2</sub> O	0.46 %	38.1	34.3 - 38.1	34.3 - 38.1	34.3 - 38.1	Residual after uptake		K <sub>2</sub> O	9.1	8.2 - 9.1	8.2 - 9.1	Residual after uptake	
Sulfur, S	0.05 %	4.4	2.4 - 4.4	2.4 - 4.4	2.4 - 4.4			S	1.1	0.6 - 1.1	0.6 - 1.1		
Calcium, Ca	0.14 %	12.0						Ca	2.9				
Magnesium, Mg	0.07 %	6.2						Mg	1.5				
Sodium, Na	0.08 %	6.4						Na	1.5				
Zinc, Zn	81.4 ppm	0.7						Zn	0.2				
Manganese, Mn	23.9 ppm	0.2						Mn	0.1				
Iron, Fe	134.2 ppm	1.1						Fe	0.3				
Copper, Cu	12.8 ppm	0.1						Cu	0.0				
Soluble Salts, EC (mmhos/cm)	16.0												
pH	8.0												
Dry Matter	4.66 %												
Moisture	95.34 %												

\*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. Availability 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.

DISCLAIMER: Data and information in this report are intended solely for the individual(s) for whom samples were submitted. Reproduction of this report must be in its entirety. Levels listed are guidelines only. Data was reported based on standard laboratory procedures and deviations. Page 1 of 4

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