

Understanding a Manure Report – Great Plains



Manure is a valuable resource that provides nutrients for crop production. Before spreading your fields with manure, you should know which nutrients it contains so that you're adding the right quantity and not creating any potential problems.

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. You can also have samples 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 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. Methods of application are evaluated for their effect on nutrient loss in the first year. Volatilization losses of ammonia nitrogen are 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.

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 includes both the immediately available inorganic ammonium – N ($\text{NH}_4\text{-N}$), and the slowly released Organic-N. 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 is converted to phosphate (P_2O_5) to determine the fertilizer-equivalent P in the manure. 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 level, then as little as 40 percent of P_2O_5 may be available in the first year of 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 – S (lbs/1,000 gal or lbs/ton) This is the level of available sulfur, in both organic and inorganic forms in the manure. The first-year availability is estimated to be between 55 and 100 percent. Sulfur is a mobile nutrient and does not have carryover availability in the second and third year after application.

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 – NH₄-N (lbs/1,000 gal) 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 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 high in ammonium.

Nitrate – NO₃-N (lbs/1,000 gal) This form of nitrogen is immediately available to crops when applied to the soil. Nitrate 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
 AgSource Report Example

Date Sampled
 6/12/2018

Date Received
 14-Jun-2018

Date Reported
 06-Jul-2018



Laboratory Sample #
 BH11469

Information Sheet No.
 M-TEST1

Location HOME

Sample ID 2

Livestock Type Hog

Handling Type Liquid

| Analysis | Results (as Received) | LIQUID Est. Available Nutrient Credits (as received, lbs / 1000 gal) | | | | | | DRY Est. Available Nutrient Credits (as received, lbs / ton) | | | | | |
|---|--------------------------|---|-------------|---------------|-------------|-----------------------|----------------|---|---------------|-------------|------------|-----------------------|----------------|
| | | 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 ₄ -N | 0.67 % | 55.4 | 48.9 - 55.4 | 47.4 - 54.8 | 37.4 - 49.9 | | | NH ₄ -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 ₃ -N | 0.03 % | 2.1 | 2.1 - 2.1 | 2.1 - 2.1 | 2.1 - 2.1 | | | NO ₃ -N | 0.5 | 0.5 - 0.5 | 0.5 - 0.5 | | |
| Phosphorus, P ₂ O ₅ | 0.34 % | 28.3 | 25.5 - 28.3 | 25.5 - 28.3 | 25.5 - 28.3 | Residual after uptake | | P ₂ O ₅ | 6.8 | 6.1 - 6.8 | 6.1 - 6.8 | Residual after uptake | |
| Potassium, K ₂ O | 0.46 % | 38.1 | 34.3 - 38.1 | 34.3 - 38.1 | 34.3 - 38.1 | Residual after uptake | | K ₂ 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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