Manure testing: what to request?

Charles Shapiro, Charles Wortmann and Richard Deloughery

Manure testing is necessary to make optimum use of manure while protecting water resources. The Manure Sample Submission Form requests information required for reliable interpretation of the results.

Tests desired
The tests most frequently needed to optimize nutrient management are total and ammonium nitrogen (N), phosphorus (P₂O₅), potassium (K₂O), pH, soluble salts, sodium, and dry matter content.

Nitrogen. Manure contains both organic and inorganic forms of nitrogen. Ammonium-N is the primary inorganic form in manure and is readily available to crops. Nitrate-N is usually too small to affect management decisions, unless the manure is composted.

Organic N is determined as the difference between total N and inorganic N. Organic N becomes plant available as manure decomposes, with 20 to 50% of organic N available to the first crop after application. Much of the remaining organic N becomes available in subsequent years.

Phosphorus. Most, about 75%, manure P (about 75%) is in inorganic forms. P analysis allows calculation of the most economical manure rates while avoiding over-application of P with severe consequences to surface waters.

Other tests. Tests for potassium, sulfur, zinc, and other nutrients may be useful. When manure is applied to meet N or P needs, other nutrients are generally adequate for soils in Nebraska. If liquid manure is applied to a crop through sprinkler irrigation, test for soluble salts or electrical conductivity to avoid leaf burning. Electrical conductivity is useful in managing anaerobic lagoons.

Report information

Units. Specify if the results should be reported in pounds of nutrient per ton (spreader), per 1000 gallons (tanks or umbilical cord), or per acre-inch (irrigation). This depends on your method of application. Phosphorus and potassium K should be reported in the oxide form (P₂O₅ and K₂O) so its fertilizer value is easy to calculate.

Moisture. Reporting the results on an “as is” or “wet” basis allows a producer to determine the nutrient application rate use the results without adjusting for water
content additional moisture calculation.

**Nutrient availability.** Laboratories can estimate the amount of nutrients available in the first year, and the amount of manure N available during following years. This is especially important for solid manures.

**Application basis.** Manure is often applied on a “nitrogen basis”, to supply enough N to meet crop needs. When soil test P is excessive, manure may be applied and a producer may want to apply manure on a “P basis”, that is at a rate sufficient to match P removal by the crop.

**Estimation of crop available N**

The information requested is used to estimate crop available N from manure. Select the appropriate ammonium-N loss factor for the time of manure application, and days until incorporation to enable an estimate of ammonium-N loss to the atmosphere. Indicate the type of manure and species as these affect are major determinants of organic-N availability. If manure applied in the past is similar to the current sample, give information on Past Year Applications and the Rate applied to estimate the amount of organic N available to this year’s crop from the previously applied manure.

Suggestions on how to interpret a manure analysis are given in the NebGuide G97-1335-A Determining Crop Available Nutrients from Manure (http://www.ianr.unl.edu/pubs/wastenrt/g1335.htm).

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Manure Sample Submission Form

Client information:
Name: ____________________________
Address: ____________________________
Phone: ____________________________
Account: ____________________________
E-mail: ____________________________
Fax: ____________________________

Analysis results to be communicated to:
Q Mail address
Q Fax number
Q e-mail address

If sent to e-mail address, would you like a:
Q pdf file
Q txt file
Q wks file

Sample names:
________________________________________________________________________
________________________________________________________________________

Sample collection date:
________________________________________________________________________

Send copy to: ____________________________
________________________________________________________________________
________________________________________________________________________

Tests Desired
Q Nebraska Minimum (Total N, NH₄-N, Organic-N, P, K, moisture)
Q Standard lab analysis
Q pH, salts, sodium
Q ______________________
Q ______________________
Q ______________________
Contact your lab for their ‘options’.

Report Information

Units:
Q lbs/ton
Q lbs/1000 gallons
Q lbs/acre inch
Q ppm or %

Moisture:
Q As received or wet basis
Q Dry matter basis

Nutrient availability:
Q 1st year availability only
Q Additional years

Estimate application rate on a:
Q Nitrogen basis
Q Phosphorus basis

Application rate units:
Q Tons/acre
Q 1,000 gallons/acre
Q Inches/acre

For the Estimate of Crop Available Nitrogen

Ammonium-N factors
Time of Application
Q Fall
Q Winter
Q Spring
Q Summer
Manure incorporation
Q Immediately
Q One day later
Q Two days later
Q Three days later
Q Four to seven days later
Q Not incorporated
Sidedress application
Q Incorporated as applied
Q Sprinkler irrigated

Organic-N factors
Type of manure
Q Solid
Q Solids with litter or bedding
Q Composted solids
Q Stored liquid
Q Fresh, daily scrape

Species
Q Dairy
Q Beef
Q Swine
Q Poultry - layer
Q Poultry - broiler
Q Turkey
Q Other: ____________________________

Past Year Applications
Q Every year
Q Every other year
Q Every third year
Q Every fourth year
Q First time application

Rate applied (if known):
________________________________________________________________________

Notes: ____________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

This generic manure sample form is provided by UNL Cooperative Extension.