

Understanding your Dairy One Manure Analysis Report

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Manure is an excellent source of the nutrients crops need to grow. It can replace commercial fertilizers but it must be managed properly to optimize nutrient availability to crops and minimize losses to the environment.

In most cases, nitrogen is present in the greatest quantities making it a valuable substitute for purchased N fertilizer. It also has the greatest potential for loss to the atmosphere (air and water). Phosphorus, another important crop nutrient, must be managed carefully as well to minimize losses to the environment and optimize its contribution to crop production.

Analyzing each type of manure on your farm is the first step needed to build a database of manure analysis for YOUR operation. Average values (Table 1. below) can be helpful but are inadequate if you need to accurately account for manure nutrients on your farm. For example, the table below lists average values for manure samples from many farms and categories of livestock and includes daily spread manure, stored manure, and numerous types of bedding. The average N content is 0.39% or 7.8 pounds of total N per ton but the standard deviation tells us that the 503 samples included in this average, ranged from 3.6 pounds of N to 12.2 pounds of N per ton of manure. The only way to know where you fall in that range is to analyze each source of manure from your farm on a regular basis.

Table 1. Dairy One Manure Statistics

As Sampled Basis	%	+/- 1 sd	n
Nitrogen (N)	0.39	0.18-0.61	503
Ammonia N	0.15	0.06-0.24	503
Organic N	0.24	0.08-0.41	503
Phosphorus (P)	0.08	0.01-0.16	503
Phospate Equivalent (P2O5)	0.17	0.01-0.36	503
Potassium (K)	0.27	0.12-0.42	503
Potash Equivalent (K2O)	0.33	0.15-0.51	503
Total Solids	12.2	3.9-20.5	503
Density, kg/L	0.98	0.91-1.06	503
Copper, ppm	29		25

As the bedding (straw, wood shavings, sawdust, etc) in the sample increases, Total Solids increases and Density decreases. If sand is used as bedding, Total Solids and Density both increase.

Sampling

Of course, accurate analysis begins with a representative sample taken from the spreader or storage. Go to http://www.dairyone.com/AgroOne/ManureAnalysis/manure_sampline_instructions.htm for instructions on collecting a representative sample.



Samples should be taken at least twice during the first year and then from every "spreading event" or more often as needed or as required by CAFO regulations. It is also recommended to take at least 3 samples per sampling event. Have them analyzed separately to make sure that your manure management plans are not being based on an "outlier" sample. Remember, the analysis is only as good as the sample! Once you have established your own database, you can use a 3 year running average or the prior year's analysis for accurate planning of your current year manure applications.



Your Analysis Report

Below is a Dairy One report showing a "typical" analysis. All results are reported on an "as sampled" basis.

Column 1 - lists nutrient components.

Column 2 - displays nutrient concentrations in percentages or parts per million (ppm).

Column 3 - displays nutrients as pounds per ton of manure.

Column 4 - displays nutrients as pounds per 1,000 gallons of manure.



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Manure Analysis Report

JOHN AND JULIE FARMER
123 STREET
SOMEWHERE, NY 12345

Sample Number: 9999200
Date Sampled: 4/15/03
Date Received: 4/16/03
Date Mailed: 4/18/03
Description: Dairy Pit
Statement ID: J+J Farmer

1

2

3

4

Components	As Received	lbs/tons	lbs/1000 gal
Nitrogen (N)	.27%	5.4	22.1
Ammonia Nitrogen	.14%	2.9	11.8
Organic Nitrogen	.13%	2.5	10.4
Phosphorus (P)	.04%	.8	3.4
Phosphate Equivalent (P2O5)	.09%	1.9	7.7
Potassium (K)	.18%	3.6	14.8
Potash Equivalent (K2O)	.22%	4.3	17.8
Total Solids	5.71%		
Density	.99 kg/l	61.56 lbs/CuFt	8.23 lbs/gal

Using the Results

Nitrogen in Manure

Total nitrogen is reported but it is more important to look at the 2 primary forms of Nitrogen found in manure;

- The inorganic Ammonia N, present in the urine as urea, accounts for about half of the total nitrogen in dairy or beef manure. The ammonia N is most quickly available for crop growth but it is also very susceptible to loss as ammonia gas unless it is incorporated immediately (injected or incorporated within 1 day).
- The Organic N, present in the feces, provides a slow release N. About 35% of that slow release N is potentially available in the application year with about 12 % available the second year and 5% in the third. Residual Manure N from prior years applications must be taken into consideration when determining an environmentally sound and profitable manure applicaiton rate.

Potassium and Phosphorus in Manure

- Manure P (Phosphorus) is very similar to the P in fertilizer for building soil P levels and meeting crop needs. In most cases, manure P can be substituted for fertilizer P in fertilizer on a one to one basis. That is why both P and Phosphate (P₂O₅) equivalent are provided on your report.
- Manure K (Potassium) occurs in a very soluble form, much like fertilizer K, and can be substituted one for one for fertilizer K, also why both K and Potash (K₂O) are provided on your report.

Total Solids;

- Total solids can be used to determine how that manure is to be handled.
 - 20 - 25% total solids - considered to be a dry or solid manure (very stackable).
 - 10 - 20% total solids - considered to be "semi-solid" (somewhat stackable)
 - 4 - 10% total solids - considered to be a liquid manure that can be pumped and sprayed
 - < 4% total solids - can be pumped through irrigation equipment

Density;

- Manure density varies from about 55 pounds per cubic foot for dry manure to about 62 pounds per cubic foot for liquid manure and is very important when calculation actual manure application rates on your farm i.e., tons per spreader load = (volume x density)/2000

Manure has a dollar value because it can be used as a replacement for commercial fertilizer. It can also have a heavy economic and environmental cost if applied in excess. A manure analysis is the first step to capturing manure's full value. Soil testing will help monitor the impact of manure application on soil P and K levels and detect and correct nutrient imbalances that could adversely affect crop performance or the environment.