

Nutrient Credits from Manure

Nutrients in manure vary among farms as a result of feed ration, animal type, number, size and handling method

Phosphorus, potassium, and ammonium in manure are available to plants the year of application

Introduction:

Average manure nutrient content values provide estimates that can be used for nutrient management planning. However, manure nutrient concentrations can vary significantly among different farms due to animal species, size and number of housed animals, feed ration, and manure handling and application method. For both economic and environmental objectives, it is important to know the content and availability of nutrients in the manure so that the application rate can be determined to match crop need. Information about sampling manure can be found at:

<http://extension.umass.edu/cdle/fact-sheets/sampling-livestock-manure>

Typical values for nutrient content of manure

Species/type	Dry Matter	Total N	NH ₄ -N	Organic N	P ₂ O ₅	K ₂ O	Mg	Ca
	%	-lb/1,000g						
Dairy, liquid	7	25	12	13	8	20	4	10
	%	-lb/ton						
Dairy, semi-solid	17	9	3	6	4	7	2	4
Dairy, solid (>20%DM)	26	9	2	7	4.5	7	2	6
Beef	23	12	3	9	6	12	1.5	—
Hog	9	14	8	6	11	11	1.5	—
Sheep	25	23	7	16	8	20	2.5	—
Poultry, layers	55	60	10	40	50	34	8	10
Poultry, broilers	70	73	19	54	63	46	13	30
Horse	37	9	1	8	6	11	4	—

Availability of Nutrients in Manure

Nitrogen in manure consists of two fractions. Approximately half of N is in the form of ammonium (sometimes is called inorganic) which is available to plants the year of application. The remainder of N is the organic form and releases into the soil over a longer period of time. The ammonium fraction however, is very susceptible to large losses mainly through volatilization. It has been shown that ammonium fraction of manure can be entirely lost to the environment within the first 48 hours when surface applied. Therefore, incorporating manure into soil immediately after application is highly recommended.

The availability of N in organic fraction is about 10% of the total N, with 5% and 2% availability in the second and third years after application.

The phosphorus in manure is available only slowly to a crop; however, manure P is not fixed readily into unavailable forms in soil like highly soluble P fertilizers are.

The net result is that the P in manure is very similar to the P in fertilizer in meeting the requirements of crops. Since manure P is not available soon after application, in certain conditions such as low soil temperature, application of starter fertilizer may benefit crop growth.

Resources:

Agronomy fact sheets. Cornell University nutrient management spear program.
nmsp.cals.cornell.edu/guidelines/factsheets.html

Nutrient recommendation for field crops in Vermont. University of Vermont Extension.
pss.uvm.edu/vtcrops/articles/VT_Nutrient_rec_field_crops_1390.pdf

The Agronomic Guide 2013-2014. College of Agricultural Sciences, Penn State.
extension.psu.edu/agronomy_guide

For more information visit:
<http://extension.umass.edu/cdle>

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