

When commercial fertilizer is purchased, a label or information sheet with nutrient content, application instructions and pertinent warnings is provided. This pamphlet can similarly be used for those selling, trading or giving away manure.

Manure Information:

Source: _____

Animal Type: _____

- Solid Liquid
 Slurry Compost

Date of analysis: _____

Results (identify units):

- ppm percent lbs/acre in.
 lbs/1000 gal lbs/ton

TKN	Nitrate	Total P
P_2O_5 equivalent = Total P x 2.3		

Lab Name: _____

Notes: _____

For more information on manure use, nutrient management and agricultural water quality, please contact your local county Extension agent, an Extension specialist or local USDA - Natural Resources Conservation Service (NRCS) District Conservationist.

To locate your local Extension Office please visit:
<http://extn.msu.montana.edu>, or
 call: 406.994.1750.

To contact the author:
Thomas Bass
Livestock Environment Associate Specialist
 call 406.994.5733, or
 e-mail: tmbass@montana.edu.

To locate your local USDA-NRCS Field Office:
www.mt.nrcs.usda.gov/contact/directory
 Additional resources are available online at:
www.animalrangeextension.montana.edu
 - click on "Natural Resources"



"The U.S. Department of Agriculture, Montana State University and the Montana State University Extension Service prohibit discrimination in all of their programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30 1914, in cooperation with the U.S. Department of Agriculture, Douglas Steele, Vice Provost and Director, Extension Service, Montana State University, Bozeman, MT 59717."

EB0184

Using Manure as Fertilizer

Tips for Purchasers or Recipients of Manure from Animal Feeding Operations

Thomas Bass | *Livestock Environment Associate*
 Animal and Range Sciences Department
 Montana State University Extension



Manure Basics | Livestock manure, mixtures of manure and related organic by-products make excellent fertilizers and soil amendments. Manure from cattle, swine, and poultry are all beneficially used for crop production in Montana. Manure also provides additional benefits to the soil, as well as offsetting the amount of nutrients needed in commercial fertilizer purchases.

Manure contains necessary plant nutrients such as nitrogen, phosphorus and potassium, in addition to a variety of micro-nutrients. Also, the high organic content of manure and manure compost can help improve soil quality by enhancing tilth, leading to better water and nutrient holding capacity.

Nutrient Content and Availability | Organic nutrients in manure are usually not available to your crop all at once. You can expect no more than

half of the nitrogen content to be available in the first season (range of 25 to 50%), with the other half divided between residual value for the next year and volatilization (loss to the atmosphere). Your application method can also affect the amount of nitrogen available for your crop; see next section.

Approximately 70 – 90% of phosphorus and potassium will be available the first year. Phosphorus in particular will persist in the soil and remain available if erosion and run-off are controlled. If applying manure based on the nitrogen needs of a crop, phosphorus will inherently be over applied or exceed the crop's annual use of phosphorus. In subsequent years, this phosphorus can be utilized by crops. Fields with significant residual soil test phosphorus may need a rest from manure applications, and only a commercial nitrogen product applied to meet nutrient needs.

Application Methods | The method of application will largely be determined by the type of manure you are dealing with. Solids are usually broadcast from a box type spreader. Slurries, a mix of solid and liquid, are applied with a tanker or big-gun irrigator, while low solid liquids may be applied with pivots or similar irrigation systems.

Spraying manure liquids can volatilize 50 - 70% of the analyzed nitrogen in the sample. This must be accounted for when determining application rates. Low pressure irrigation or drop nozzles on a pivot can reduce this loss significantly.

Tanker applied manure slurry or solid manure broadcast on the surface has around 25 – 50% nitrogen availability for the first year.

Incorporation is necessary to prevent significant volatilization and to maximize nitrogen availability. Incorporation should be done within 1-4 days of application and also reduces odors.

Application Rates | Application rates for any fertilizer should be based on a recent soil test and the particular crop's nutrient needs. Simply take the crop nutrient needs, subtract what is present in the soil and then calculate a rate based on manure nutrient content, taking into consideration first year availability. The next year's application will require the additional consideration of residual organic N which will become available. As previously mentioned, phosphorus will persist and can be utilized by subsequent crops.

Timing | This is particularly important for nitrogen. Nitrogen can be lost by leaching below the crop root zone or volatilizing to the atmosphere. Therefore manure should be applied as close to the crop's use of the nutrient as possible. Manure should not be applied in extremely wet conditions or on snow-covered or frozen ground. Doing so increases the potential for runoff and contamination of water resources.

Water Quality | While nutrients are essential to all life, plant or animal, in the wrong place and at the wrong concentration they can be pollutants. Set backs from environmentally sensitive areas should be observed to avoid run-off and sub-surface flow of soluble nitrogen from the application area. A 35 foot vegetated set-back will help prevent water pollution. That does not mean the area of the set back cannot be farmed, but manure should not be applied in that area. If farmed, the setback width

should be increased to 100 feet.

The organic matter in manure can also be a pollutant in water. The decay of organic matter depletes oxygen and can result in death of aquatic life. Good manure management practices can also prevent organic matter, sediment and phosphorus from reaching surface waters. In addition to a set back, a permanent riparian (stream-side) buffer can filter out these pollutants associated with run-off and erosion.

Exact buffer and set back widths should take into account slope and erodibility of the field in question. The information here is based on broad generalities.

Assistance | Extension and NRCS can help prepare specific field nutrient budgets and selection of appropriate management practices. Conservation District supervisors and staff may also be able to provide technical assistance and recommendations.

Manure Analysis and Information | Owners of state or federally regulated animal feeding operations are required to provide recipients of transferred manure with the most recent nutrient analysis (Circular DEQ 9, Feb '06, pg 30). The analysis should include: Total Kjeldahl Nitrogen (TKN), Nitrate Nitrogen and Total Phosphorus (Circular DEQ 9, Feb '06, pg 21).