



# Manure as an Asset

By Dale Cowan, CCA-ON

The Nutrient Management Act has highlighted concerns for protecting water quality in Ontario. At the center of this legislation is a set of regulations governing the management of prescribed materials destined for land application. These regulations detail how manures are to be applied to the land with concern for protection of the environment. The Best Management Practices are also included for achieving maximum agronomic benefit from the nutrients contained within these materials.

In order to recognize manure as an asset it is important to understand the nutrient value and how that can benefit the management of crop production. Manure is a package of nutrients containing predominantly nitrogen, phosphorous, potassium and micronutrients as well as organic matter and organic acids that aid in soil quality improvements. The easiest way to realize the benefit of manure is to submit a representative sample to an accredited laboratory. The quality of the result is directly linked to the quality and care that is taken in sample collection.

When sampling liquid manure it is essential that the sample be collected from an **agitated** storage or at intervals covering the spreading operation. Dipping from the storage at different intervals covering the emptying process and placing a small quantity (1 cup) in a collection pail is one way to gather a composite sample. (Please do this in a safe manner never, never enter a tank). When there are at least 20 cups collected, stir the pail and from that pail fill an **approved laboratory sampling container**. Most labs provide this collection jar free of charge, take advantage of this so a representative sample is assured of reaching the lab with the integrity of the sample intact.

Dry or solid manures are more challenging due to the different components, some of which are liquid or fine in size and some that are coarse and easily segregated. Nonetheless, a reasonable sample can be obtained. At various locations on the edge of the pile, collect a minimum of 10 fork fulls, place them on a clean area of the yard, chop with a clean shovel, then mix and quarter the pile discarding three quarters. Keep quartering and mixing and discarding until you have reached a volume that will fit in a large zip lock freezer bag. Fill in the laboratory submission form, properly identify the farm, and manure type and submit early in the week to avoid layover in the courier system on weekends.

## The benefit of good sampling practices results in reasonable and reliable laboratory results.

Most of the intra laboratory variances are due to sample variability. Most labs analyze for total nitrogen (N), ammonium nitrogen (NH<sub>4</sub>), total phosphorous (P), potassium (K) and dry matter. These are the most important elements to measure they determine the nutrient value of manure and application rates.

Total N is a measure of all nitrogen containing materials in the manure it includes organic and inorganic (NH<sub>4</sub>) measurements. Ammonium is a measure of only ammonia based N this is the most readily available form of N and most easily lost to the environment. The difference between total N and NH<sub>4</sub> is the organic N. Phosphorous is a measure of the total P and potassium is a measure of the total K.

Most labs will calculate the available P and K per 1000

gallons or per ton that is available in the year of application; P is factored at 40% and K at 90% of the totals. These are Nutrient Management Planning Standards.

## Nitrogen is more complex due to the organic and NH<sub>4</sub> forms.

Organic N breaks down in the soil slowly. Availability is dependant on manure type and moisture content only 20 -30 % of this form may be available in the year of application. The NH<sub>4</sub> is readily available both to the crop in the year of application and to losses to the environment by volatilization. Manure that is injected or incorporated in 1 day will capture and retain more N for the crop than manure that is surface applied and not incorporated. The following example of swine manure spring applied from feeder pigs illustrates the impact of management timing in the value of N retained for crop production.

Application	N available lbs/ 1000 gallons
Incorporated in 1 day	22
5 days	17
Not incorporated	11

At an application rate of 3000 gallons per acre the difference in N available to the crop between incorporation and not incorporating is 33 pounds. N valued at \$0.39 per pound is \$12.87 per acre of lost value.

There are many application options available from spring to late fall, the timing of applications affect not only nutrient availability but compliance issues concerning N-Index and P-Index. Your local CCA agronomist is up to the challenge to explain and determine the best course of action to meet compliance and agronomic goals. Just ask them.



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There are over 500 Certified Crop Advisers (CCA) in Ontario. Each CCA has demonstrated their knowledge about Ontario crop production by passing the required exams. In addition, they have the crop advisory experience, the education, the commitment to continuing education and have signed a comprehensive code of ethics, which places the grower's interests first.

This industry driven program helps ensure that Ontario crop producers are well served by those providing their crop production advice. This article was written by one of those CCAs.