

## Compost Calculations

### Mature compost has approximately:

- pH 7
- Total N 1%
- ammonia content <100mg/kg
- C:N ratio 15-20:1
- soluble salt <3.5 mmhos/cm (<2mmhos/cm in greenhouses)
- moisture content 40-50%

**Maturity test:** Place 2 liters of compost in a sealed container with a thermometer for 2-3days. Mature compost should be at 86°F and immature compost can reach 140°F or more.

### Useful Conversions:

**Parts per million times 2 = pounds per acre**

**1 ton = 2,000 lbs**

**Cubic yards of compost required to cover a specific area:** \_\_\_\_ ft<sup>2</sup> x \_\_\_\_ inches of compost x 0.0031 = \_\_\_\_ yd<sup>3</sup>

**Example:** 43,560 ft<sup>2</sup> x 1 inch of compost x 0.0031 = 135 yd<sup>3</sup> per acre

### Calculating nutrient application rates from compost

#### A) Volume method

- 1) Calculate cubic yards of compost applied per specific area (see above)
- 2) Determine lbs nutrients applied per specific area:
  - a. Compost application rate (yd<sup>3</sup>/area) x nutrient content (lbs/cubic yard)  
= lbs of nutrient/specific area
  - b. **Example:** 135 yd/acre x 6.56 lbs N/cub yd (from test) = 885.6 lbs Total N per acre

#### B) Weight method

- 1) Convert compost application rate from cubic yards to pounds:
  - a. Compost application rate (yd<sup>3</sup>/area) x compost bulk density (lbs/cubic yard)  
= lbs of compost/specific area
  - b. **Example:** 135 yd/acre x 1025 lbs/cub yd (from test) = 138,375 lbs moist compost / acre
- 2) Determine compost application rate (per area) on a dry weight basis:
  - a. Application rate (lbs/specific area) x dry solids content of compost (%)  
= lbs of dry compost applied
  - b. **Example:** 138,375 lbs compost/acre x 0.57 = 78,873 lbs of dry compost applied
- 3) Determine nutrient application rate:
  - a. Lbs of dry compost applied x percent nutrient on dry weight basis  
= lbs (total) of specific nutrient applied
  - b. **Example:** 78,873 lbs dry compost x 0.012 Total N (from test) = 883.4 lbs Total N per acre

### Calculating Soluble Nitrate in compost

- 1) Convert moist weight mg/kg to %:  $146 \text{ mg NO}_3/\text{kg (from test)} \times 0.0001 = 0.0146 \%$
- 2) Calculate lbs NO<sub>3</sub> /cubic yd. of compost:  $0.0146\% \text{ NO}_3 \times \text{bulk density } 1025 \text{ lbs/cubic yd (from test)} / 100 = 0.15 \text{ lbs NO}_3/\text{cubic yd of compost.}$
- 3) Calculate soluble nitrate available to your crop at the time of application:  $0.15 \text{ lbs NO}_3/\text{cubic yd.} \times 135 \text{ yd}^3 \text{ per acre} = 20.25 \text{ lbs NO}_3/\text{acre}$

### Calculating Plant Available Nitrogen (PAN) from compost

In most New England soils, a common mineralization rate is 10-15% N made available to the crop in the first year following application. Each subsequent year, half the amount mineralized in the year prior will be available. So, for example:

First season:  $10\% (885.6 \text{ lbs Total N per acre} \times 0.1) = 88.56 \text{ lbs PAN}$   
 Second season:  $5\% (885.6 \text{ lbs Total N per acre} \times 0.05) = 44.28 \text{ lbs PAN}$   
 Third season:  $2.5\% (885.6 \text{ lbs Total N per acre} \times 0.025) = 22.14 \text{ lbs PAN}$

### Calculating Plant Available Phosphorus from compost

In the first season following application, 15-20% P is made available; the rest precipitates as sparingly soluble iron, aluminum and calcium phosphates. Once these binding sites are full, phosphorus will leach or run off.

**Example:**  $135 \text{ yd/acre} \times 0.86 \text{ lbs P/cub yd (from test)} = 116.1 \text{ lbs P/acre}$   
 $116.1 \text{ lbs P/acre} \times 0.15 = 17.4 \text{ lbs P available}$

### Maximum Compost or Organic Amendment Application and total P<sub>2</sub>O<sub>5</sub> per Soil Test Category and P<sub>2</sub>O<sub>5</sub> Concentration<sup>1</sup>

Compost/organic amendment P <sub>2</sub> O <sub>5</sub> content	Soil Test Phosphorus Category				
	Very Low/Low Optimum		Optimum		Above Optimum
	P <sub>2</sub> O <sub>5</sub> (lbs/acre)	Compost (tons/acre)	P <sub>2</sub> O <sub>5</sub> (lbs/acre)	Compost (tons/acre)	
% P <sub>2</sub> O <sub>5</sub> (dry wt.)	P <sub>2</sub> O <sub>5</sub> (lbs/acre)	Compost (tons/acre)	P <sub>2</sub> O <sub>5</sub> (lbs/acre)	Compost (tons/acre)	
Low (0.1 to 0.5%) 0.25% <sup>2</sup>	330	120	82	30	No application
Medium (0.5 to 1.5%) 1%	330	30	55	5	No application
High (1.5% to 3.0%) 2%	330	15	No application		No application

<sup>1</sup> Assumes moisture content of the compost or organic amendment of 45%.

<sup>2</sup> Percentage used to calculate amounts of P<sub>2</sub>O<sub>5</sub> applied for various rates of compost applications. From: New England Vegetable Management Guide, 2014-2015 ed. Pg 17.