UNIVERSITY OF MINNESOTA EXTENSION NDSU EXTENSION

Manure Composting Quick Guide

Characteristics of Successful Composting

Characteristic	Reasonable range	Preferred range
Particle size	1/16 – 4 inches	1/8 – 2 inches
Temperature	105 – 160ºF	110 – 150ºF
Moisture	40 – 65%	50 – 60%
Oxygen	5 – 20%	10 – 15%
C:N	20:1 – 40:1	25:1 – 30:1

Source: On-Farm Composting Handbook, NRAES-54

Pounds of bulk material to add per 100 pounds of manure to raise the C:N to 30:1

Material	Avg. material C:N	Initial manure C:N		
		10:1	15:1	20:1
Straw, general	80:1	295	150	75
Straw, oat	60:1	370	190	95
Straw, wheat	125:1	240	125	65
Sawdust	440:1	195	100	50
Wood chips, hardwood	560:1	190	100	50
Wood chips, softwood	640:1	190	100	50
Newsprint	625:1	190	100	50
Leaves	55:1	215	215	110

Source: On-Farm Composting Handbook, NRAES-54

Pounds of bulk material to add per 100 pounds of manure to lower the C:N to 30:1

Material	Avg. material C:N	Initial manure C:N		
		40:1	45:1	50:1
Hay, general	22:1	70	95	115
Hay, legume	16:1	30	40	50
Grass clippings	17:1	35	45	55

Source: On-Farm Composting Handbook, NRAES-54

Calibrating a Manure Spreader

Weight Method

Step 1
Pounds applied = Weight of full spreader – Weight of empty spreader

Step 2
Area applied = Length of spread area (ft) x Width of spread area (ft)

Step 3

$$\text{Tons per acre} = \frac{\text{Pounds applied (step 1)}}{\text{Area applied (step 2)}} \times 21.8$$

Tarp Method

Step 1
Pounds applied = Weight of full tarp & bucket – Weight of empty tarp & bucket

Step 2
Area of tarp = Length of tarp (ft) x Width of tarp (ft)

Step 3

$$\text{Tons per acre} = \frac{\text{Pounds applied (step 1)}}{\text{Area of tarp (step 2)}} \times 21.8$$

UNIVERSITY OF MINNESOTA EXTENSION NDSU EXTENSION

Calculating Application Rates

Step 1
Determine P needs of the crop

Crop P needs =
Expected yield x Crop P removal

Step 2
Determine Plant Available P (PAP) content of the compost

80% of total P is plant available

PAP =
Total P content of compost (from compost analysis) x 0.80

Step 3
Calculate application rate

Application rate (in tons per acre) =
Crop P needs (step 1) / PAP (step 2)

Crop P Removal Rates

Crop	Yield Units	Crop P_2O_5 removal (lbs per yield unit)
Alfalfa	Tons (air dry)	10.8
Barley (grain)	Tons (air dry)	0.41
Barley (grain & straw)	Bushels	0.55
Canola	Cwt.	1.3
Corn (grain)	Bushels	0.28
Corn (silage)	Tons (as fed)	3.8
Edible beans	Pounds	0.01
Grass or hay pasture	Tons (air dry)	8.9
Grass/legume	Tons (air dry)	11.2
Oats (grain)	Bushels	0.25
Oats (grain & straw)	Bushels	0.32
Peas	Pounds	0.01
Potatoes	Cwt.	0.14
Red Clover	Tons (air dry)	10.8
Rye (grain)	Bushels	0.44
Rye (grain & straw)	Bushels	0.59
Soybeans	Bushels	0.82
Sugarbeets	Fresh Tons	0.73
Sunflower	Pounds	0.01
Sweet corn	Tons	11.0
Wheat (grain)	Bushels	0.53
Wheat (grain & straw)	Bushels	0.64

How much plant-available N has been applied?

10 – 15% of total N in compost is available the first year
(use 0.10 for cattle & lower-N compost, and 0.15 for poultry & higher-N compost)

Plant-available N =
Total N content of compost (from compost analysis) x .10 x application rate