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Compost Curing and Use

OSU Extension

POWERED BY ORANGE

Cooling Down

- Cooling starts when active composting is complete at about 80-100°F
- If you add O_2 or water, no rise in temperature
- Volume of original materials reduced by 25-75%
- Reduced decomposition continues to occur
- At ambient air temp, compost is ready for curing

100% 30-35%

Curing Stage

- Takes about 30 days depending on your situation
- Curing helps stabilize long organic chains in the material to stable state
- Allows re-colonization of compost by beneficial microorganisms

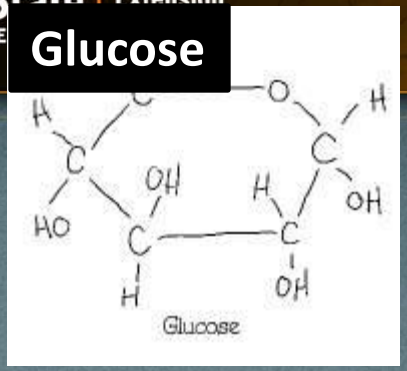
Carbon Content

- Because of the presence of readily degradable carbon (C), most organic materials initially decompose rapidly.
- Thereafter, decomposition slows because the remaining carbon compounds, lignin and cellulose, resist decomposition when other environmental factors remain constant.
- Generally, the higher the lignin content of organic materials, the slower their decomposition

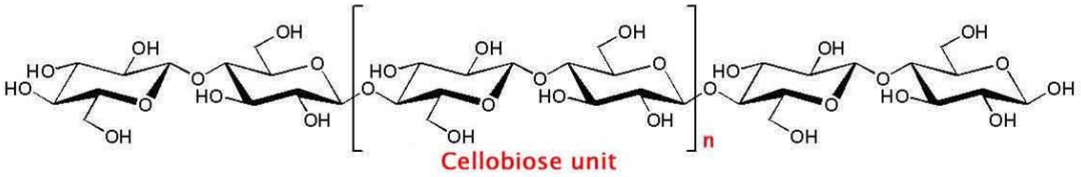
Nitrogen Content

- Readily available or labile organic nitrogen (N) is mineralized, which means that it is converted to nitrate-N, a form that plants use, by microbial activity during the first weeks of decomposition.
- As the more labile organic N disappears, the most resistant form of N to microbial degradation (recalcitrant N) predominates in the compost, and the mineralization rate slows down
- In the lab, predominance of recalcitrant organic C and N compounds in finished compost indicates a stabilization of the original organic material

Glucose

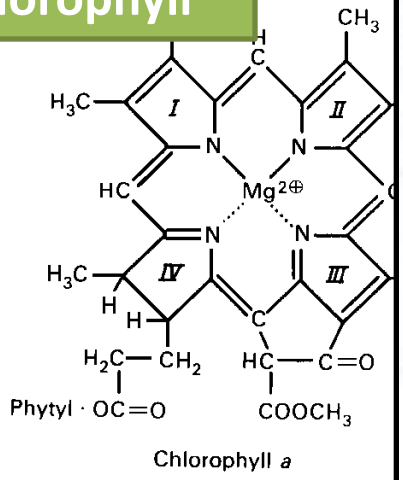


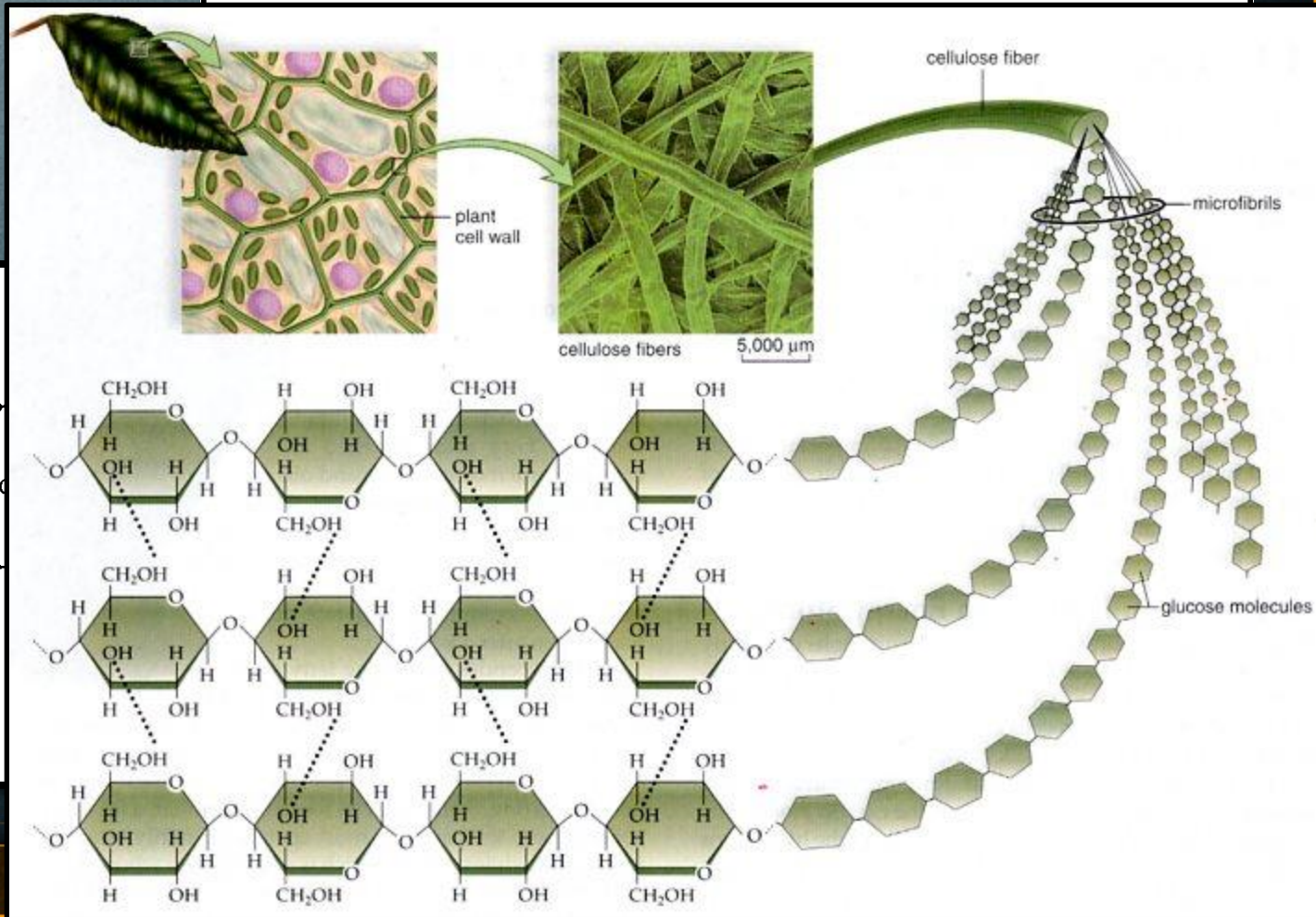
Cellulose



Is compost a Fertilizer?

Chlorophyll





How Much Compost To Apply

- Get a crop nutrient requirement e.g. use a soil test recommendation
- Test the compost for NPK
- Calculate based on either N or P recommendations depending on site

Compost Application Formula

- The amount of compost to apply equals
  - The total priority nutrient concentration of the compost times the availability coefficient = Plant available priority nutrient
  - AND THEN USE
  - the Recommended Amount of Priority Nutrient divided by the Plant Available Priority Nutrient

Compost Application Formula

- For example, if compost contains 56 lb total N/ton (wet weight basis) and the availability coefficient is 0.25 (for incorporated material), then the plant available N is 56 times 0.25,or 14 lb/ton.
- If the priority nutrient is N and the recommended amount of N for the crop is 140 lb/acre, then the appropriate application rate is 140 (recommended amount) divided by 14 (plant available N), or 10 tons of compost per acre.

Plant available N (PAN)

- The fraction of N that is available for plant uptake
- The C:N ratio of mature compost is commonly in the range of **8:1 to 18:1**.
- Composts with high carbon to nitrogen (C:N) ratios (20:1 and above) are relatively more resistant to further degradation and have lower C:N ratios.

Nutrient Availability Guidelines

Table 2. Nutrient Availability Coefficient Guidelines for Composts			
C:N Ratio	Nutrient Availability Coefficient		
	N	P	K
< 10:1	0.50	.8	.8
10 to 15:1	0.25	.6	.6
16 to 20:1	0.10	.4	.4
21 to 30:1	0.05	.25	.25
> 30:1	0.00	.10	.10

Available N second Yr

- The availability of residual compost N to crop plants in the second year after addition is not well-documented. As a general rule, 10 percent of the remaining N
- (e.g. 0.25x(10% x (56-14) in the prior example = 0.25x4.2 = 1.05 lb/ton
- Consistent, annual applications of organic matter increase the amount of available nitrogen from compost in the soil = no resting from composting

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Organic Fertilizers

- Dairy solids
- Yard trimmings compost
- Rabbit manure compost
- School compost
- Anaerobic ally digested dairy solids
- Dairy solids compost
- Yard trimmings
- Rabbit manure
- Broiler litter
- Broiler litter "compost"
- Bagged broiler litter
- Canola meal
- Feather meal
- Pelleted fish by-product
- ACADIAN SEAWEED
- Concentrate's alfalfa meal
- Wilbur Ellis Ground fish bone
- Bio-Gro 7-7-2
- Concentrate's soybean meal
- Wilbur Ellis meat & bone meal
- Wilbur Ellis bone meal
- Bio-gro 8-5-3
- Nature's Intent 9-3-4
- Wilbur Ellis fish meal
- X-Cel corn gluten meal
- Pacific Calcium gran feather meal
- Mermaid's Organic Fish Powder
- Wilbur Ellis feather meal
- Wilbur Ellis blood meal

Organic Fertilizer and Cover Crop Calculator

This free online tool compares the nutrient value and cost of cover crops, organic and synthetic fertilizers and compost. Use this Excel Calculator to develop well balanced and cost effective nutrient management programs for your farm. Developed by Nick Andrews, Dan Sullivan, Jim Julian and Kristin Pool.

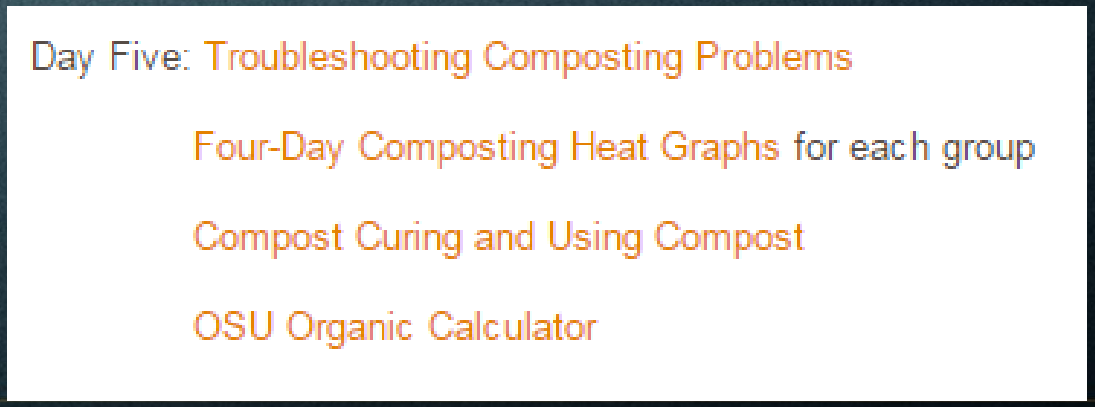
Download the Calculator

- Quick Guide & Records Sheet - the quick guide illustrates the main steps used to use the calculator, the records sheet identifies all the information needed to use the calculator.
- Cover Crop Sampling Instructions - these instructions explain how to sample cover crops in your field.
- Estimating plant available nitrogen release from cover crops (PNW 636) - this PNW Extension Publication introduces a shortcut method for estimating cover crop plant-available nitrogen (PAN) release, describes the science behind cover crop PAN estimates, and uses on-farm case studies to address other frequently asked questions about cover crop PAN.

	Total % N from label ("as-is" basis) (% of product)	Total % dry matter (% of product)	PAN at 28 days (% of amendment total N, dry wt basis) from Table 1	PAN after full season (% of amendment total N, dry wt basis) from Table 1	P_2O_5 (%)	K_2O (%)	Ca (%)	Mg (%)	S (%)	B (%)	Cu (%)	Fe (%)	Mn (%)	Zn (%)
UNCOMPOSTED MATERIALS														
Alfalfa meal (2.5-0.5-2)	2.5	92	11	26	0.5	2.0								
Bat guano—high N (10-3-1)	10.0	90	60	75	3.0	1.0								0.0
Bat guano—high P (0-15-1)	0.0	89	0	0	15.0	1.0								
Blood meal (12.5-1.5-0.6)	12.5	91	60	75	1.5	0.6								
Bone meal (3-20-0.5)	3.0	95	17	32	20.0	0.5								
Chicken manure—dried (3.5-2-2)	3.5	85	32	47	2.0	2.0	7.0	1.0	0.5					
Corn gluten meal (9-0-0)	9.0	90	60	75	0.0	0.0								
Cottonseed meal (6-0.4-1.5)	6.0	90	60	75	0.4	1.5								
Feather meal (12-0-0)	12.0	93	60	75	0.0	0.0								
Feather meal (granulated) (13-0-0)	13.0	97	60	75	0.0	0.0								
Fertibor (15% B)	0.0	0	0	0						15.0				
Fish meal (10-6-2)	10.0	92	60	75	6.0	2.0								
Greensand (0-0-3)	0.0	97	0	0	0.0	3.0						0.0		0.0
Kelp meal (1.2-0.2-2.5)	1.2	88	0	5	0.2	2.5								
Meat and bone meal (7-8-0)	7.0	93	60	75	8.0	0.0								
Nature's Intent (9-3-4)	9.0	97	60	75	3.0	4.0	3.0		1.0					
Nutri-Rich (4-3-3)	4.0	91	36	51	3.0	3.0								
Perfect Blend (4-4-4)	4.0	90	37	52	4.0	4.0	7.0	0.7	3.0	0.0	0.1	0.1	0.1	0.5
Perfect Blend (7-2-2)	7.0	90	60	75	2.0	2.0	7.0	1.5	1.5	0.0	0.1	0.1	0.1	0.5
Soft rock phosphate (0-2-0)	0.0	99	0	0	2.0	0.0								
Solubor (20.5% B)	0.0	0	0	0						20.5				
Soy meal (6.5-1.5-2.4)	6.5	90	60	75	1.5	2.4		3.0						
Sulfate of potash (0-0-50)	0.0	99	0	0	0.0	50.0		0.0	17.0					
Sulfate of potash magnesia (0-0-22)	0.0	99	0	0	0.0	22.0		10.8	22.0					
Sup-R-Green (3-2-2)	3.0	73	32	47	2.0	2.0								
Zinc—Green Cypress (7% Zn)	0.0	0	0	0					3.4					7.0
COMPOSTED MATERIALS														
Composted dairy manure (1.5-0.5-0.5)	1.5	60	5	10	0.5	0.5	1.8							

OSU Organic Calculator

- Go to our local website http://extension.oregonstate.edu/lincoln/master-composters
- Click on Day Five
- And download the calculator



Using Finished Compost

- Lawn topdressing
  - Be sure compost is very mature to avoid harming the lawn
  - Use fine (screened) compost, ¼” depth raked over lawn
  - Best if lawn is cored before applying compost
  - Retains moisture, supplies slow release nutrients, prevents soil compaction
- For gardens
  - Compost must be very mature to avoid injury to plants
  - Use fine textured compost
  - Add up to 6 inches layer and mix with soil

Using Finished Compost

- Potting mix
  - Compost must be very mature to avoid injury to plants
  - Use fine textured compost
  - Mix no more than 1/3 compost by volume
- As mulch
  - For trees, shrubs and flowers
  - Protects and enhances microbial populations

Using Finished Compost

- Compost Teas
  - Both hot made compost vermicast.