UNIVERSITY OF FLORIDA

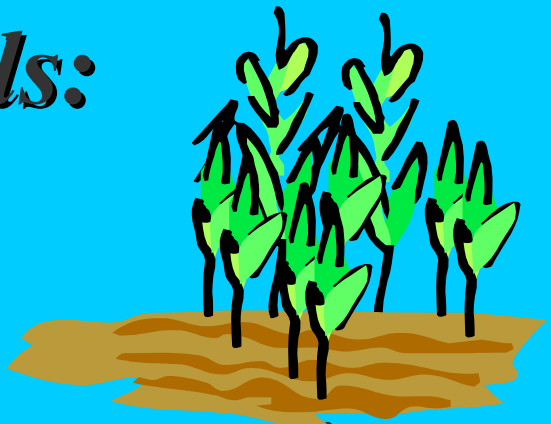
How to Select the Right Compost

Monica Ozores-Hampton
University of Florida/IFAS

Benefits of Organic Materials:

Buffers soil temperature

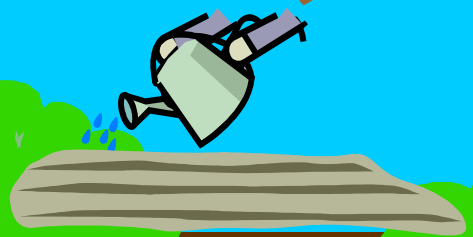
Increase water holding capacity



Increase cation exchange capacity

Prevents erosion

Organic matter helps soil tilt and structure



Increase soil microbial activity

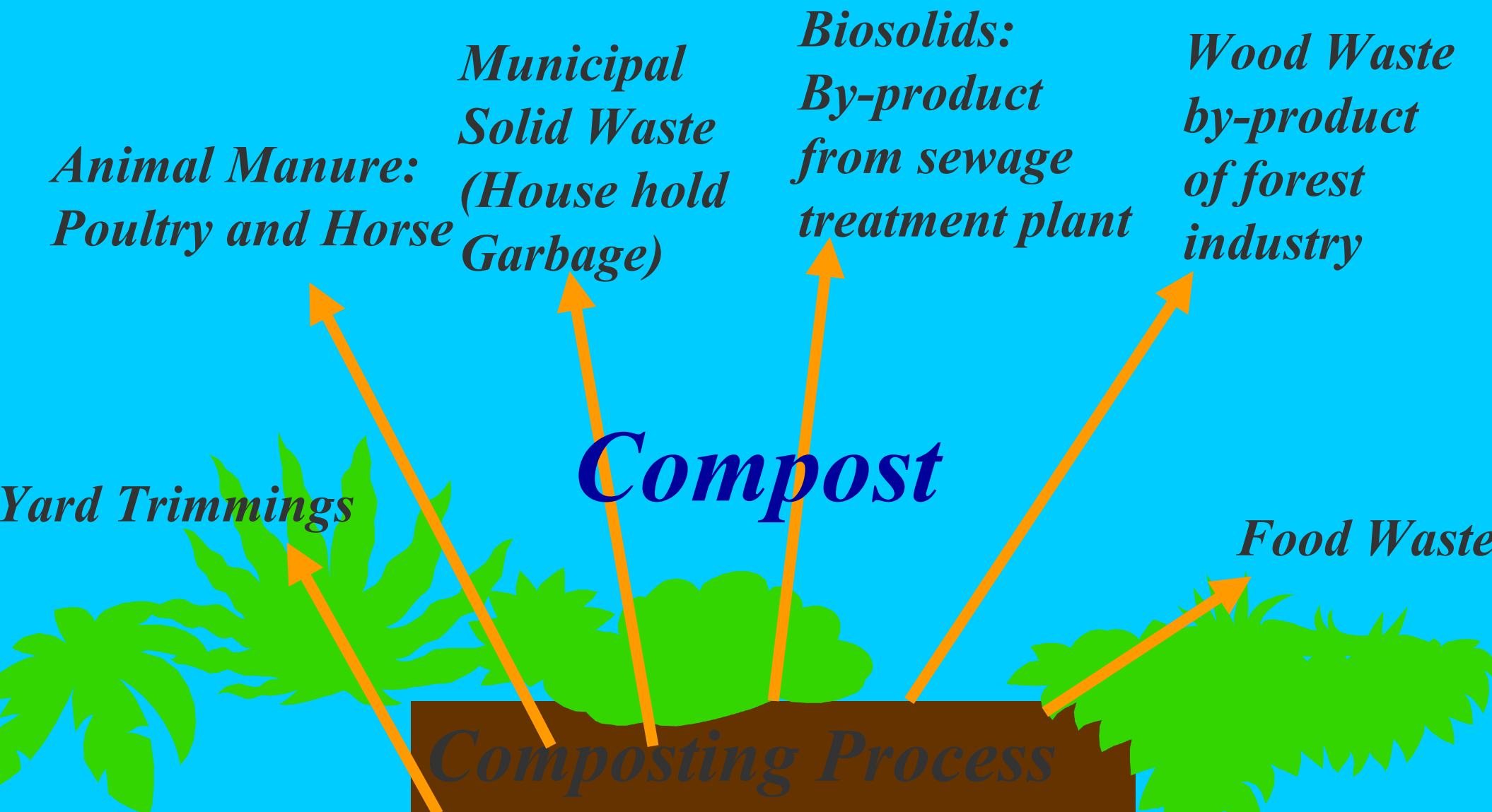
How Much is Available?

-USA produced about 375 million tons of solid waste (5-10 lb per person per day).

- If all biodegradable material was composted, 188 million tons of compost would be produced annually.

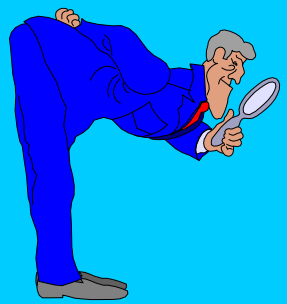
Materials Available for Composting

In USA: 375 millions tons of waste



Questions about Compost Materials:

What's in them?



What about heavy metals?

How fast do they decompose?

Are they toxic to plants?

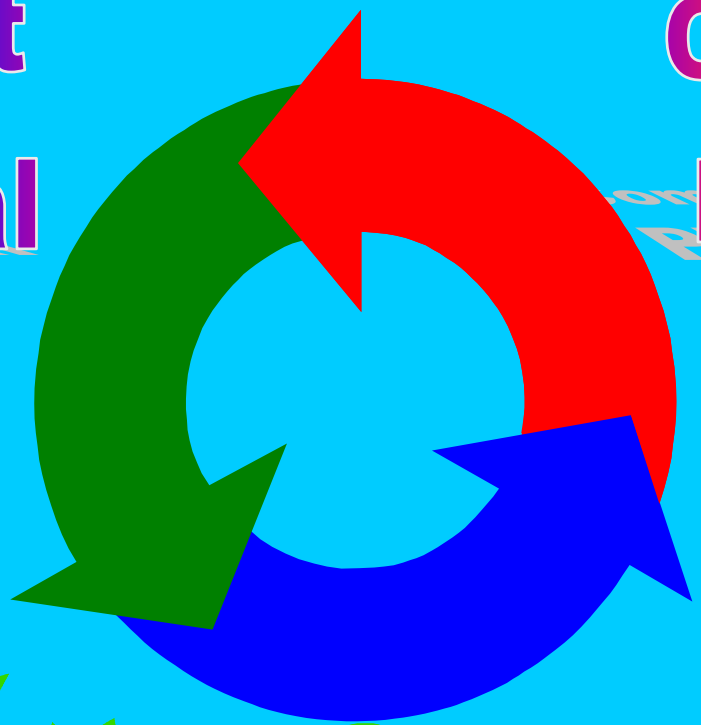
How is soil changed?

What is the application cost?

How is the Soil Changed?

Compost Chemical

Compost Physical



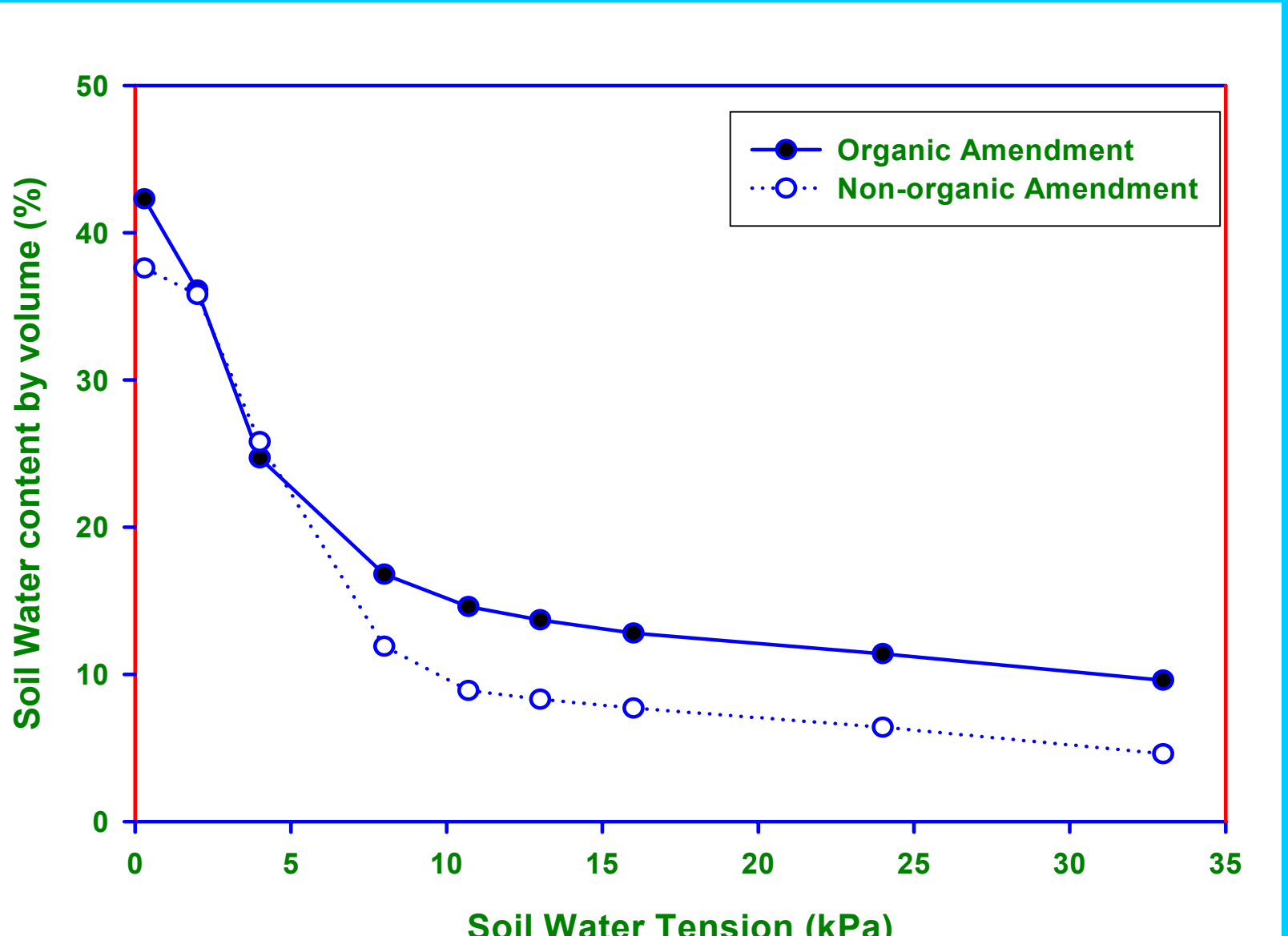
Compost Biological

Effect of Compost on Soil Chemical Properties

Farms	Treatment	pH	OM	C	P	K	Ca	Mg	Cu	Fe	Mn	Zn	C.E.C
			%	mg·kg									meq/100 g
A	No compost	7.4	0.8	0.6	87	18	156	31	10.4	19	4.6	3.2	6.1
A (10 years)	Compost	8.1*z	3.1**	1.6*	439*	31	2,619*	184*	8.5	33	16.8*	41**	14.8*
B	No compost	7.2	1.7	1.2	115	37	768	71	8.4	14	13.4	7.0	5.7
B	Compost	7.5*	1.9	1.3	302	59*	1,746*	97*	7.3	18*	22.1	12*	6.8**
C	No compost	7.1b	1.9c	1.4c	369	36b	1,507b	67b	31	40b	17b	23c	6.7c
C	Compost	7.2b	2.4b	1.5b	385	47b	1,872b	99a	31	70a	32ab	32b	9.4b
C	Organic (mulch)	7.6a	4.1a	1.6a	450	83a	2,884a	92a	25	78a	37a	40a	12.1a

Effect of Compost on Soil Physical Properties

Soil Water Holding Capacity



Effect of Compost on Soil Biological Properties

Total Species Richness Diversity (SRDT)

Aerobic Bacteria
Anaerobic Bacteria
Fungi
Actinomycetes
Pseudomonads
Nitrogen-Fixing Bacteria

Parameter	SRDT
A No Compost	9.3 (Moderate diversity)
A Compost	10.6* (Moderate diversity)
B No compost	9.7 (Moderate diversity)
B Compost	12.8 (High diversity)
C No Compost	10.2 (Moderate diversity)
C Compost	11.9 (Moderate diversity)
C Compost/Mulch	12.0 (Moderate diversity)

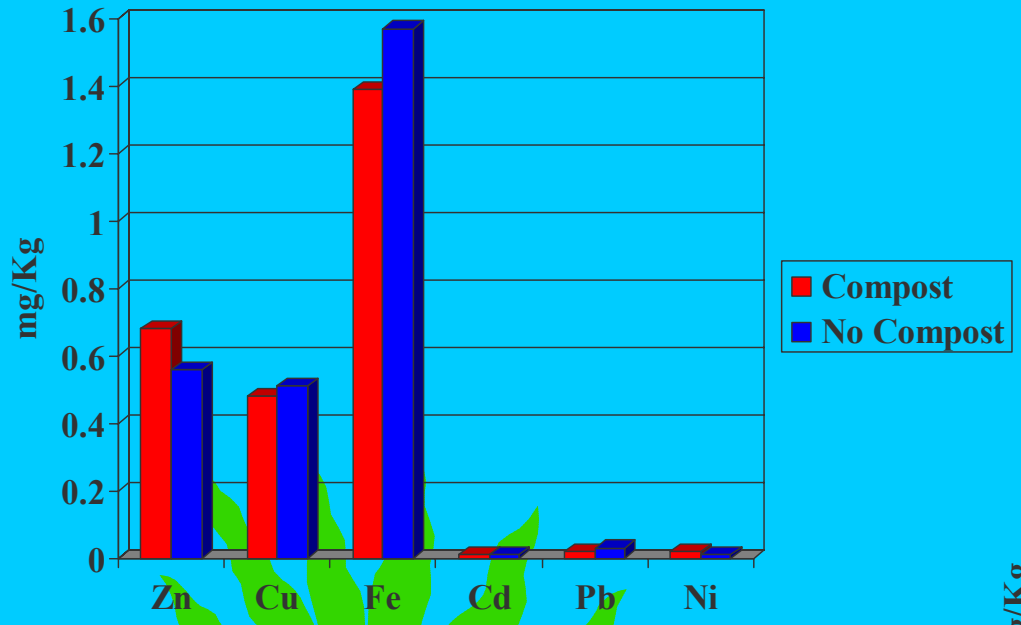
Long Term Application of Organic Amendments
10 years

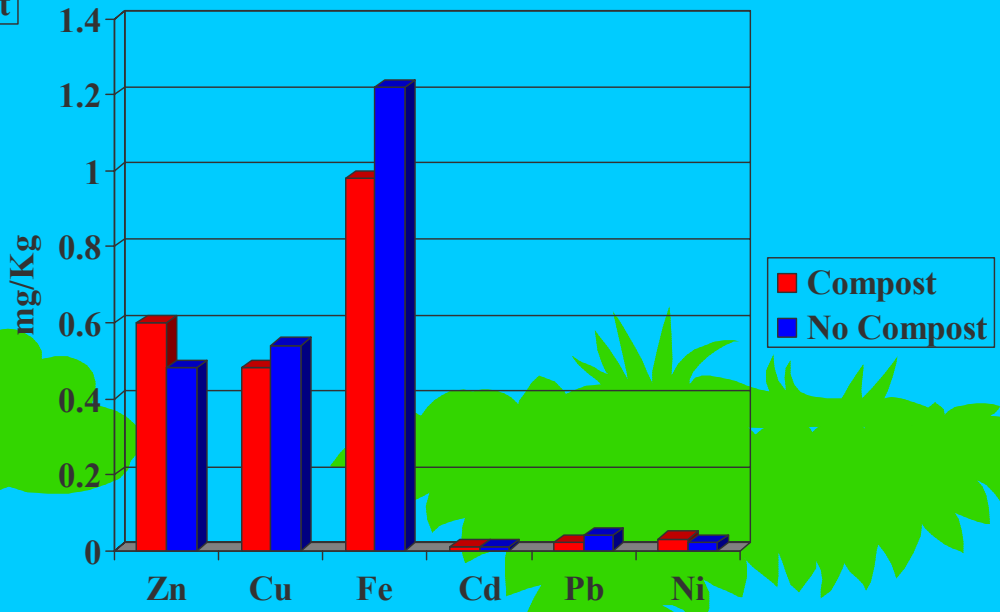
What's in Them?
Organic Amendments Chemical Analysis

Materials	pH	Moisture	N	P	K	C:N
		----------(%)----------				
MSW compost	7-8	30-50	1.2	0.3	0.4	17-40
YTW compost	7-8	30-50	0.5-0.8	0.1	0.3	21-43
YTW/BS compost	7-8	30-50	1-3	2.5	0.2-0.5	>15
Poultry manure	7.5-10	15-80	1.5-4	0.7-3	1-4	7-10
Biosolids	7-12	6-99	1-6	0.5-4	0.1	7-13

What about Metals?

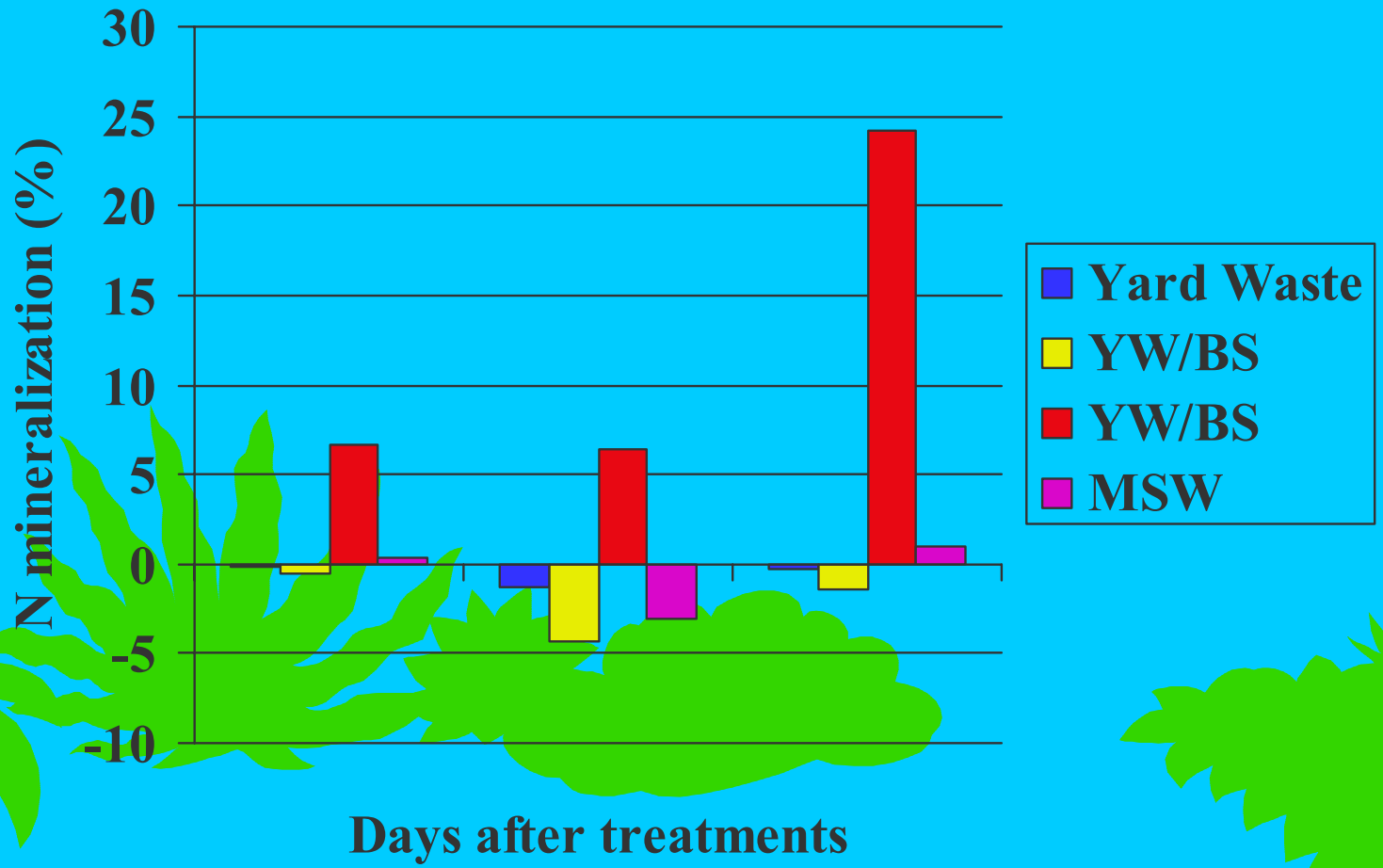
Pepper Fruit





Compost must meet U.S. EPA 503 Regulations

How Fast do They Decompose?
Compost Mineralization Rate



Are They Toxic to Plants?

	MSW Compost age			
	4-weeks		8-weeks	
Fatty acid	1995	1996	1995	1996
	----------(mg·kg^{-1})^{z}----------			
Acetic	1221	4128	1118	3113
Propionic	34	175	132	64
Isobutyric	<10	<10	34	<10
Butyric	22	353	516	120
Isovaleric	<20	<20	<20	<20
Valeric	<40	<40	<40	<40

^{z} Extracts were prepared from 20 g compost (dry weight) and 50 mL distilled water prior to analysis with 3 replications per treatment.

Principles of Composting

Characteristic	Reasonable range	Preferred range
(C:N) ratio	20:1 – 40:1	25:1 – 30:1
Moisture content	40 – 65%	50 – 60%
Oxygen content	>6%	~16 – 18.5%
pH	5.5 – 9	6.5 – 8.5
Bulk density	400 -800 (lb per yd^3)	-
Temperature	110 – 140^0 F	130 – 140^0 F
Particle size	1/8 – 2 inches diameter	Varies*

Compost Potting Soil Specifications USCC (U.S. Composting Council)

Characteristic	Optimal Range
pH	5.5 – 8.0
Moisture (%)	35 – 55
Bulk density (lb per yd^3)	800 – 1000
Organic matter content (%)	50 – 60
Water holding capacity (%)	100 or above
Particle size	½’ or less
Stability or maturity index	Stable to highly stable
Maturity growth	Must pass maturity screening test
Soluble salts	Less than 3 dS
C/N ratio	15-25:1
Nitrogen	1 % or above
Weed free	None

Ornamental Potting Soils……..

- Peat moss is the major soilless media.
- Plant growth was similar to traditional peat-vermiculite when peat was partially replaced with compost.
- **Negative effects**: immature compost, high salts.

Vegetable Compost Specifications USCC (U.S. Composting Council)

Characteristic	Optimal Range
pH	5.5 – 8.0
Moisture (%)	35 – 55
Particle size	1’ or less
Stability or maturity index	Stable to highly stable
Maturity growth	Must pass maturity screening test
Soluble salts	Less than 6 dS
C/N ratio	15-25:1
Nitrogen	1 % or above
Weed free	None

Application Rates……..

Vegetables 3 to 20 ton/acres

My recommendation:
In problems areas apply as much as you can afford.

Fruit Crop Compost Specifications
USCC (U.S. Composting Council)

Characteristic	Optimal Range
pH	5.5 – 8.0
Moisture (%)	35 – 55
Particle size	Must report
Stability or maturity index	Moderate to highly stable
Maturity growth	Must pass maturity screening test
Soluble salts	Must report
C/N ratio	Must report
Nitrogen	Must report
Weed free	None

Application Rates.....

Citrus 3 to 6 ton/acres

My recommendation:
In problems areas apply as much as you can afford.

For more Info…..

Monica Ozores-Hampton Website

http//www.imok.ufl.edu/compost