

Composting & Compost Uses

Great Plains Vegetable Growers Conference
January 9, 2015

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Composting Questions and Concerns

- Does it work? How to compost?
- What can be composted (do's and don'ts)?
- Stinks?
- Bugs in compost
- Where to place my compost bin?
- How long does it take to make compost?
- When and how often to turn piles?
- How to use compost? Organic compost?
- Pet waste
- Worms leave worm bin
- EM Bokashi composting, waste to energy, ...etc.

Why do we compost?





http://www.waterencyclopedia.com/sci_03_img0428.jpg

<http://hannahmauk14.pbworks.com/f/1298646359/Science-Bird.jpg>

[http://www.bing.com/images/search?q=ocean
+polluted+with+trash+and+hurting+wildlife&vi](http://www.bing.com/images/search?q=ocean+polluted+with+trash+and+hurting+wildlife&vi)







Composting as EASY as 1, 2, & 3

- **1** ecosystem (**m**icrobes dominant)
- **2** (half) : 50% moisture
- **3** essentials: air, water, & food

Air (temperature, porosity, particle sizes, location)

Compost feedstock mixing ratio

Woody (**c**arbon) : **Organic** (**N**itrogen)

2 (or 3) parts : **1 part**

**Key: Prepare and maintain a suitable environment
for microbes**

Lincoln University Composting Facility

Jefferson City, Missouri

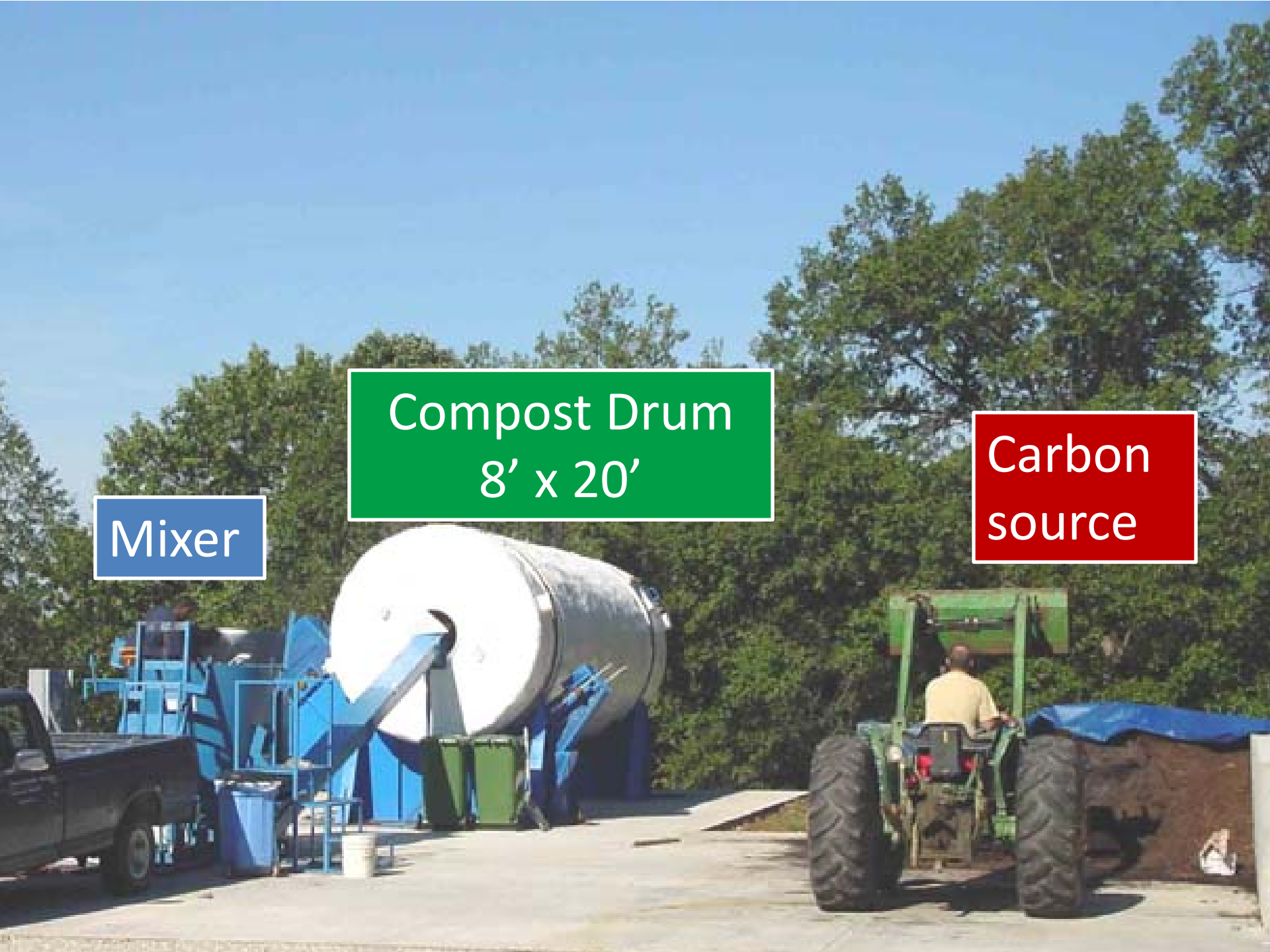


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Mixer

Compost Drum
8' x 20'

Carbon
source



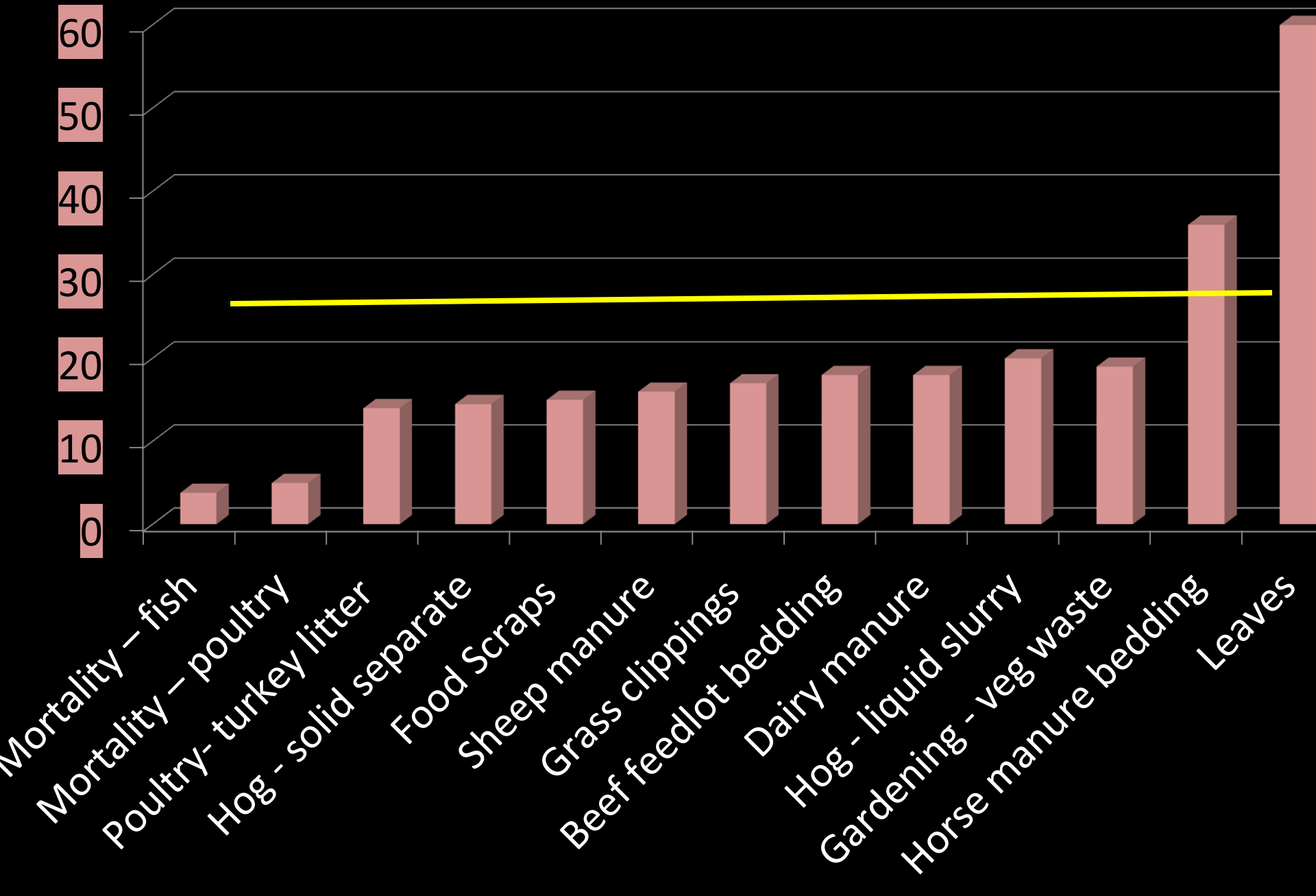
Contaminants?



1 part cafeteria food waste

2 -3 parts woody materials
(various sizes preferred)
Carbon Source

C:N Ratios of Organic Waste Sources



Monitoring Composting Process

Samples taken at various stages of composting



	C source	Fresh mix	1 week	2 ½ week
H ₂ O	63%	61%	60%	54%
pH	8.3	5.1	7.5	8.3



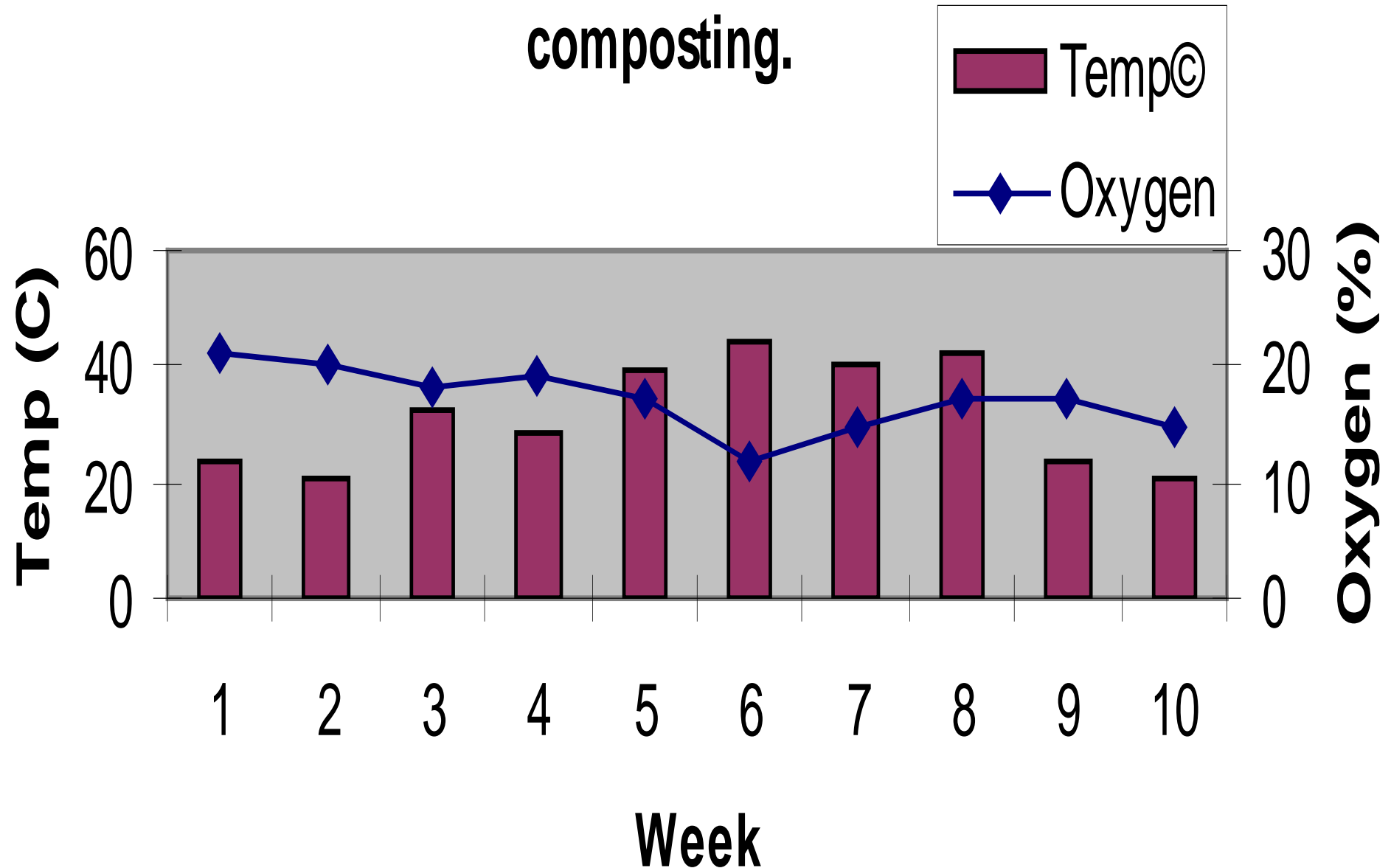


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Figure 2. Temperature and oxygen monitored during composting.





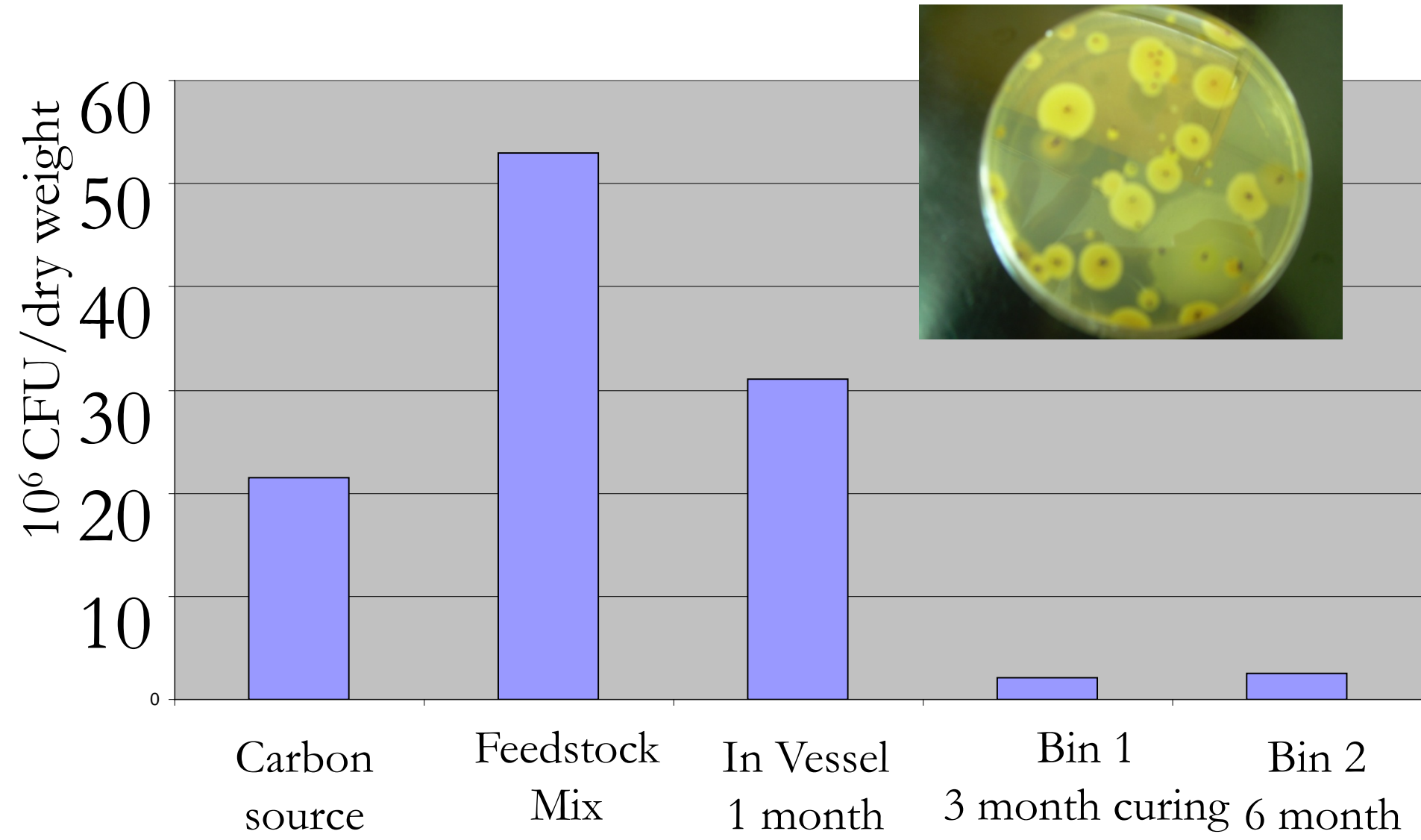
Microbes in Compost

	<u>Aerobic</u>
O_2	Yes
Diet	Hi Carb, Low N
Moisture	50 - 60 %
Odor	Not offensive
Heat	Yes

Microbes in Compost

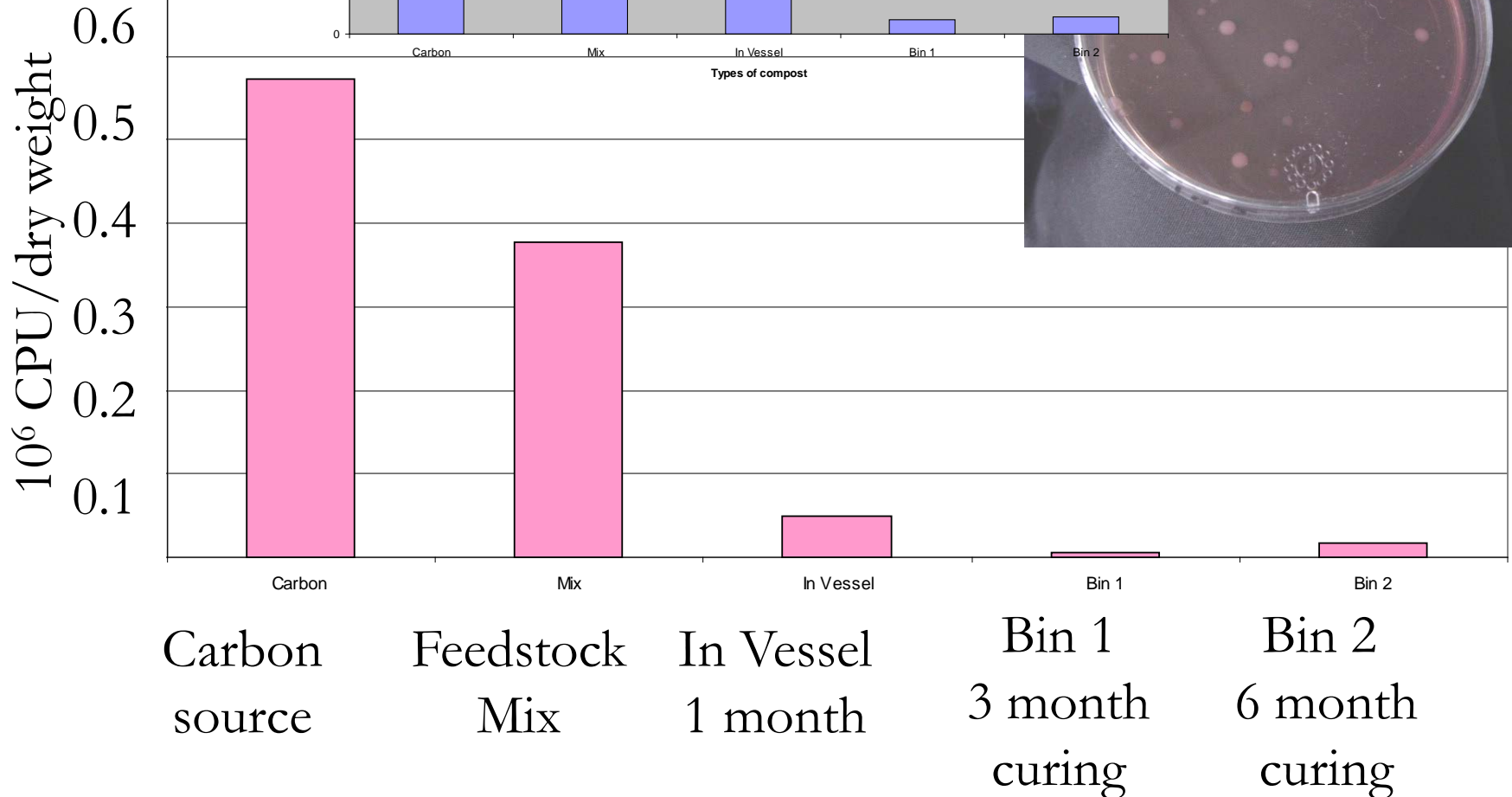
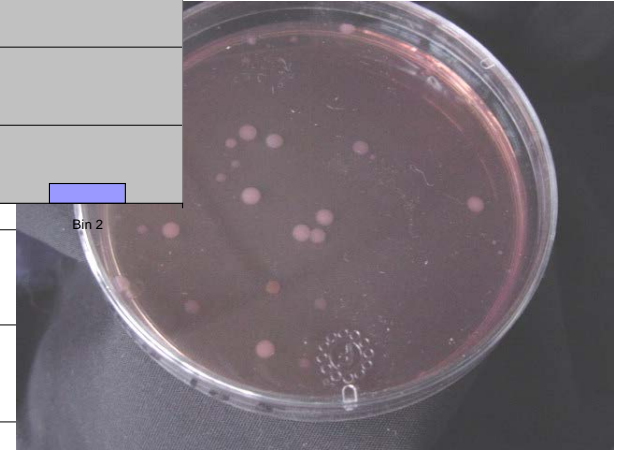
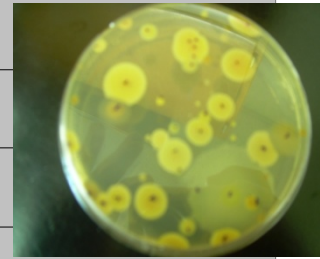
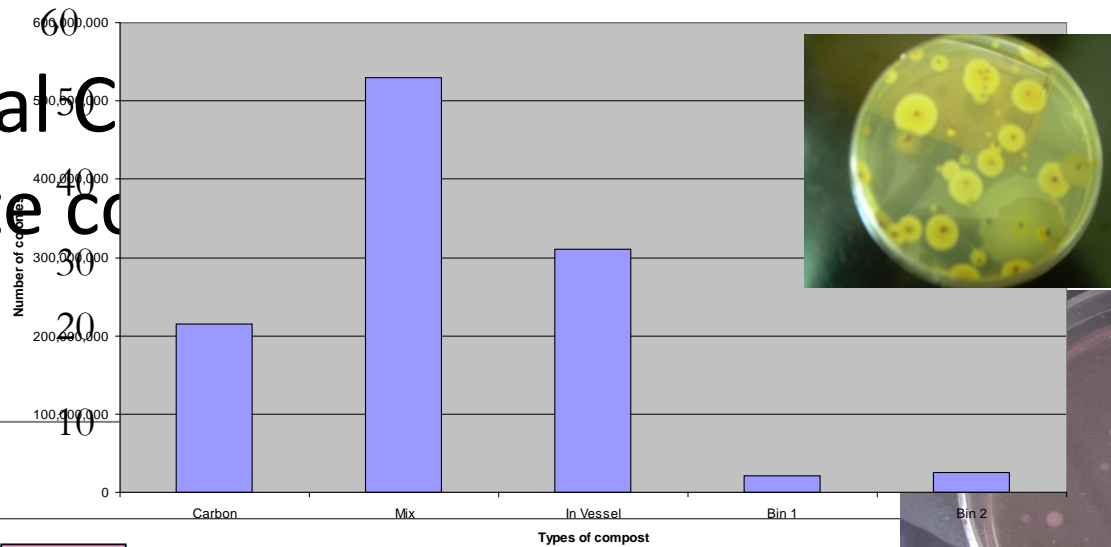
	<u>Aerobic</u>	<u>Anaerobic</u>
O₂	Yes	No
Diet	Hi Carb, Low N	Hi N
Moisture	50 - 60 %	Excessive
Odor	Not offensive	Yes
Heat	Yes	No

TSA Microbial Counts of LU Food Waste Compost at Various Composting Stages



Microbial waste co

of LU food
g stages



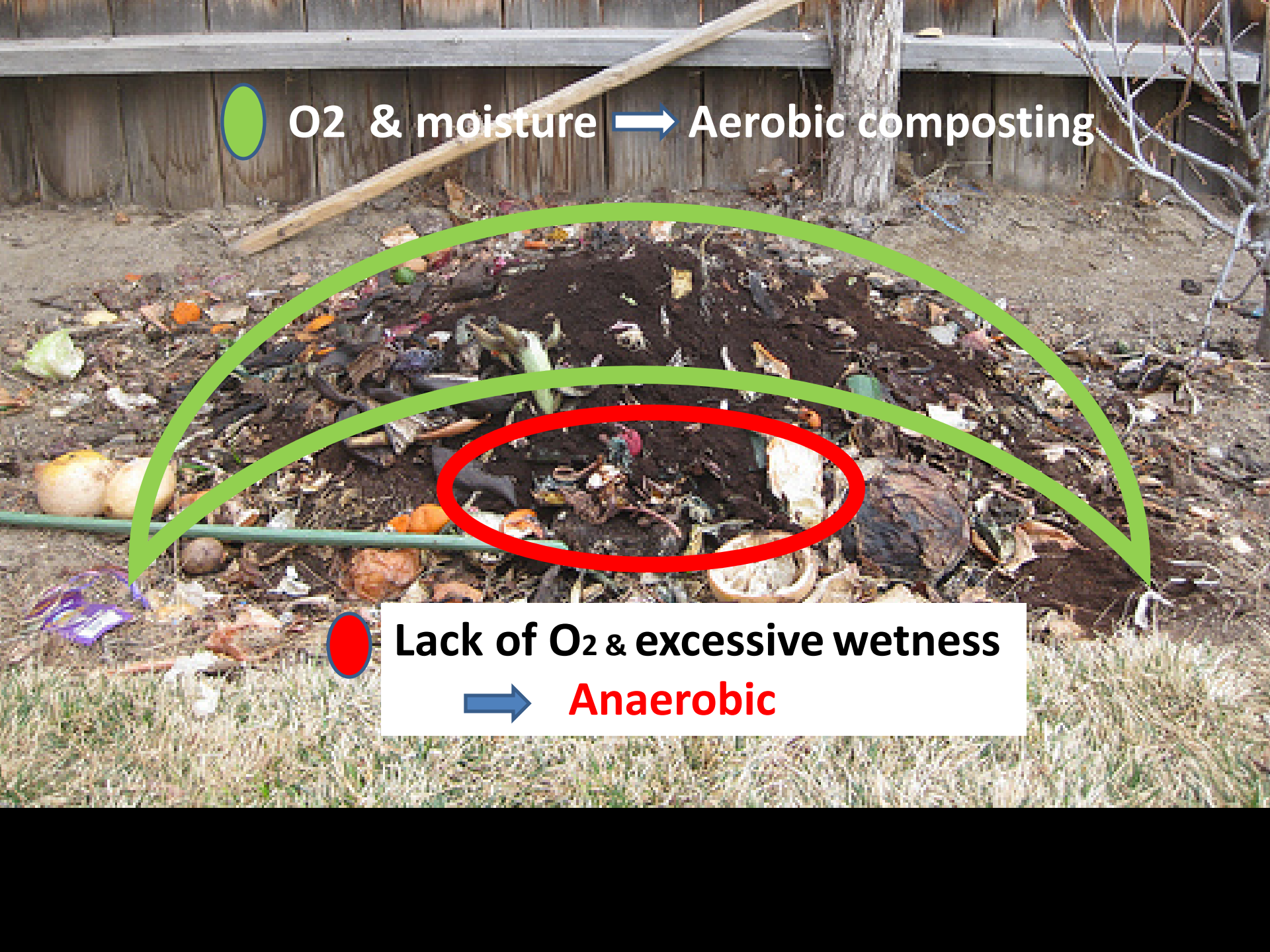
Carbon
source


Feedstock
Mix

In Vessel
1 month

Bin 1
3 month
curing

Bin 2
6 month
curing



 **O₂ & moisture** → **Aerobic composting**

 **Lack of O₂ & excessive wetness**
→ **Anaerobic**



Improvements

1. Build a structure to hold waste, heat & moisture
2. Add more carbon source – cover and mix food scraps
3. Add & maintain moisture
4. Add a lid or cover to reduce evaporation and insects
5. Turn the pile (aeration)



<http://phelans1.files.wordpress.com/2009/04/compost-pile.jpg>



<http://www.spikessanctuary.co.uk/images/fr compost-large.jpg>





<http://www.ecorazzi.com/2009/06/23/white-house-building-three-kitchen-waste-compost-bins>

3 compost bin system was installed for White House vegetable garden. Compost sent by NY celebrity chef Dan Barber attributed to the 2009 gardening success









<http://ajesuschick.files.wordpress.com/2008/09/chickens-and-compost-100.jpg>



<http://micro.arielandsimon.com/wp-content/uploads/2009/02/compost-upclose.jpg>





<http://weekndr.files.wordpress.com/2009/04/compost-complete.jpg>



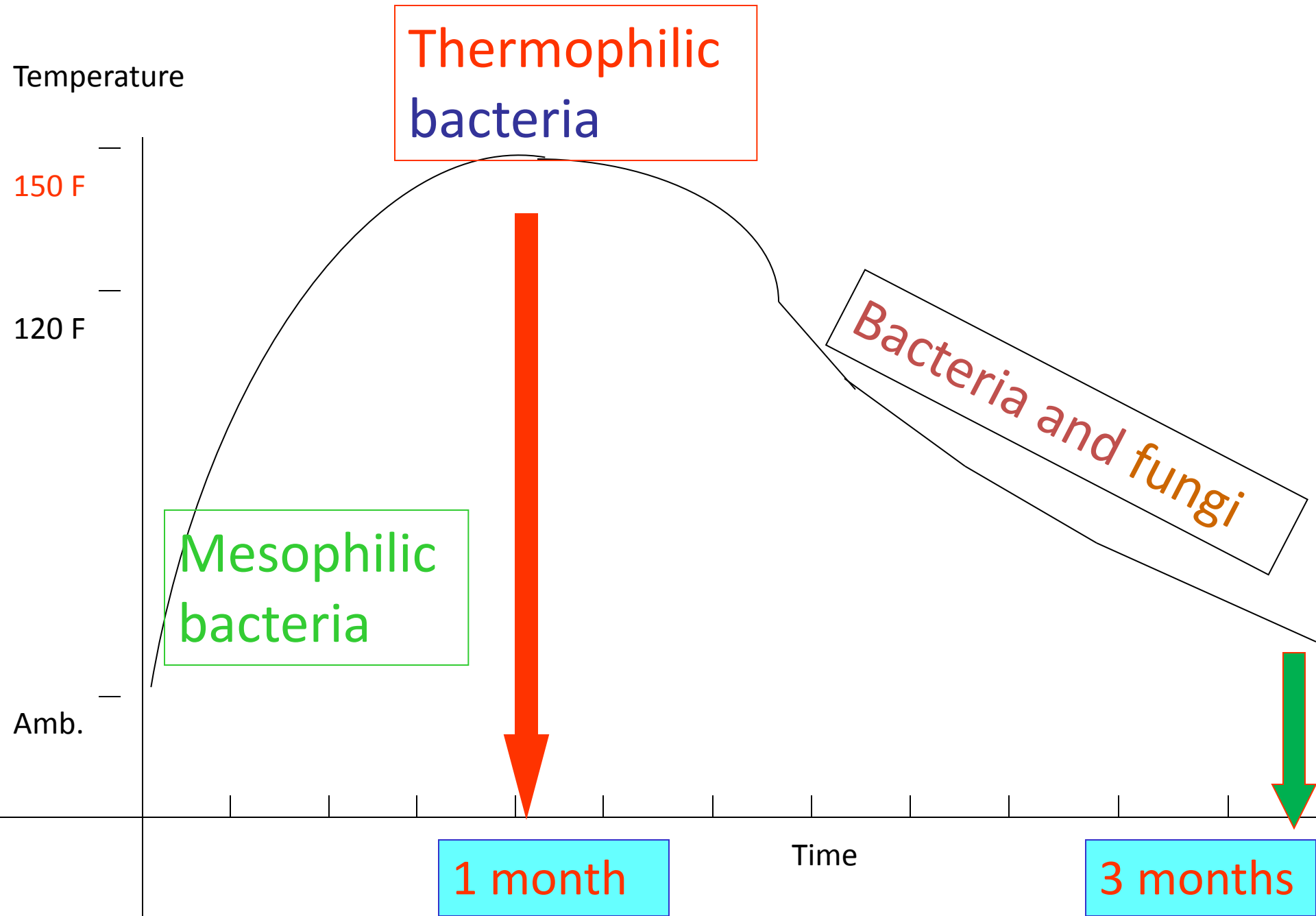
<http://localfoodsandusky.files.wordpress.com/2009/01/compostbinopen.jpg>

<http://supermomnocape.files.wordpress.com/2009/03/finished-compost-bin.jpg>

Factors Affecting Composting Rate

- Diet (Feedstock): C:N ratios 20-99 : 1
Optimal 20-29 : 1
- Moisture: 50 – 60 % Optimal (aerobic)
- Temperature: 25 – 30 C (optimal)
- Light (UV) – partial shade preferred
- O₂ required by aerobic and inhibitory to anaerobic microbes
- Bulk - large piles (5-6 ft across) hold heat and moisture well – keep bins full, good aeration & moisture

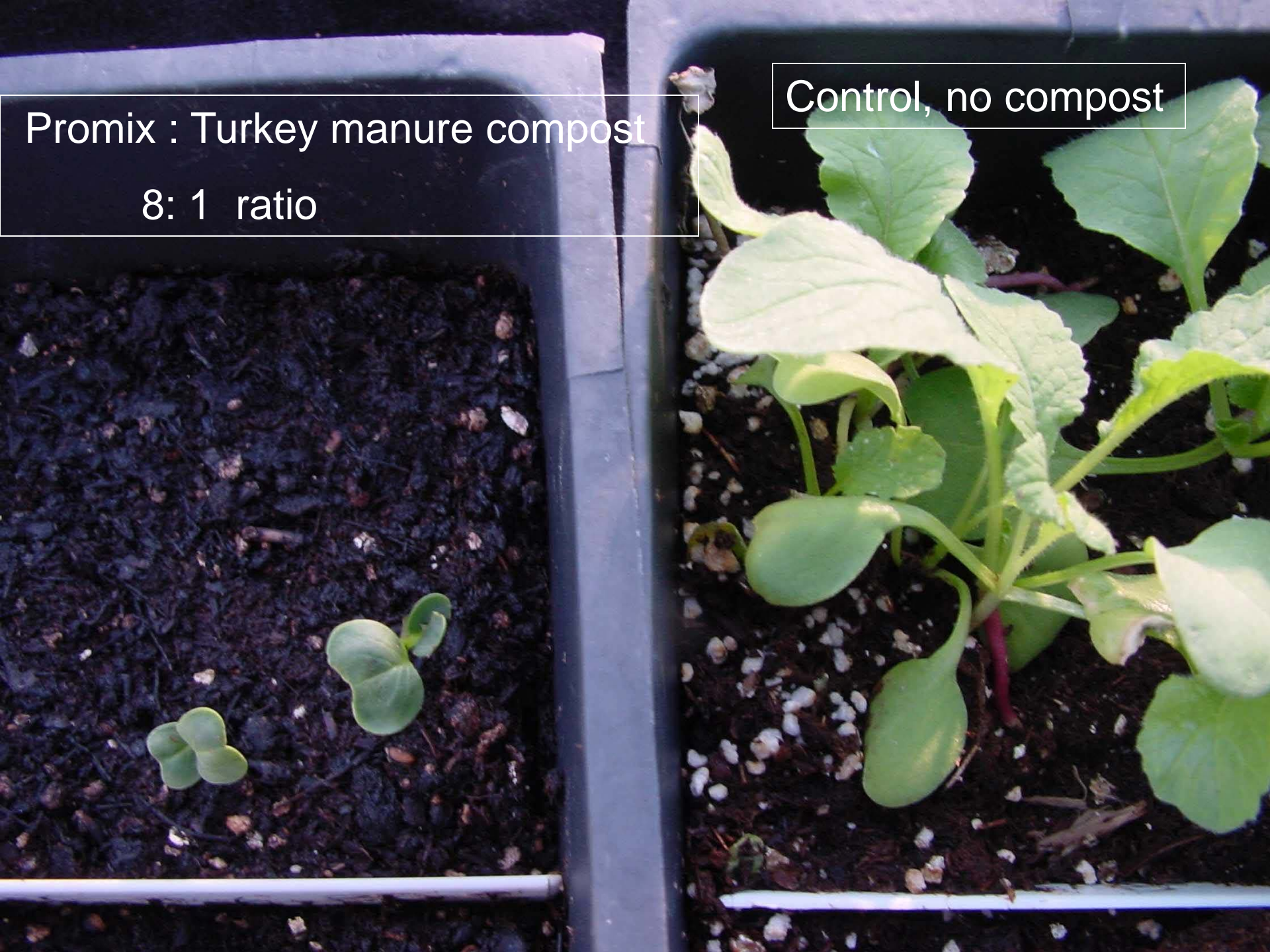
Predominant Microbes during Composting Process



Promix : Turkey manure compost

8: 1 ratio

Control, no compost



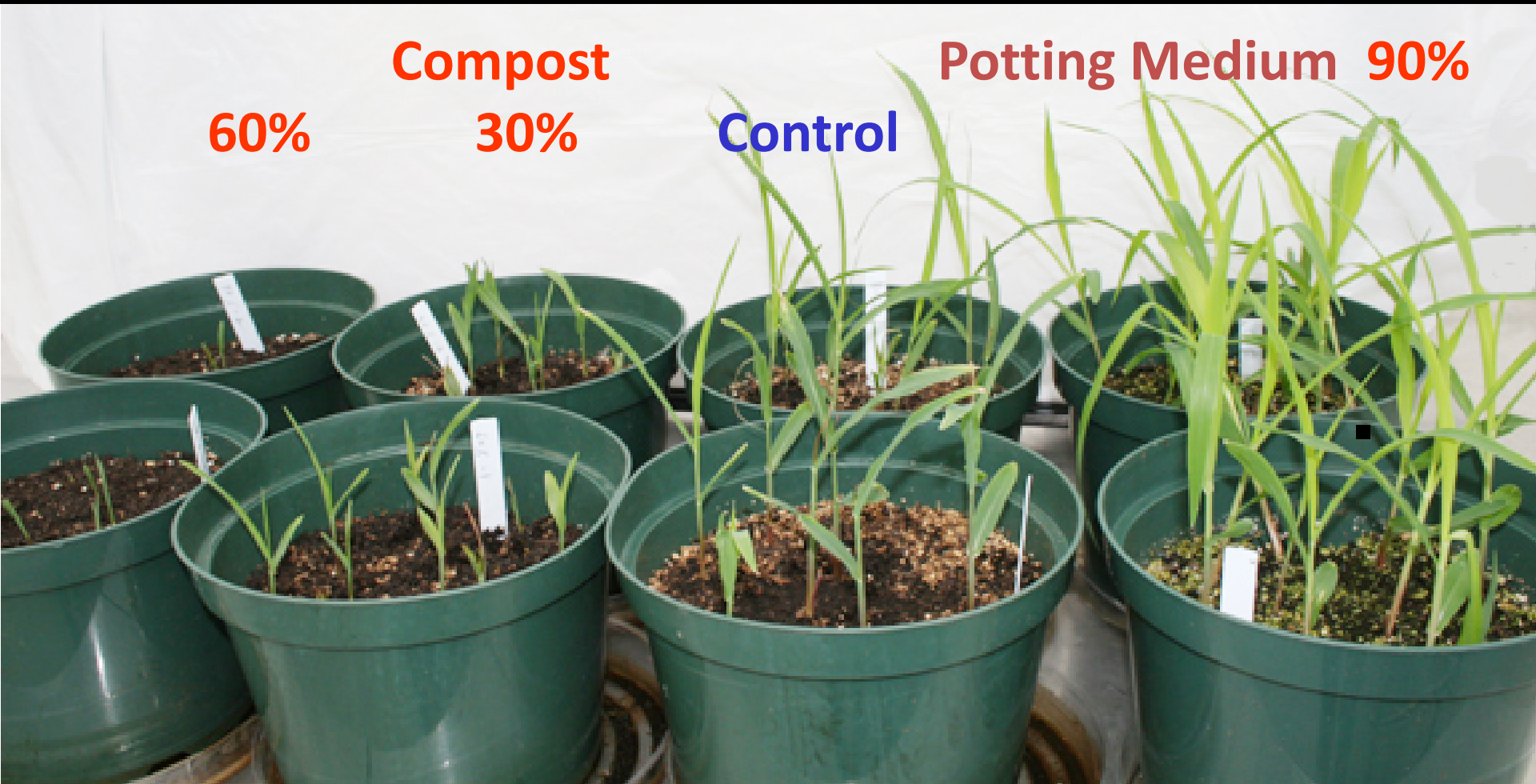
**3 month composting & 3
month curing**



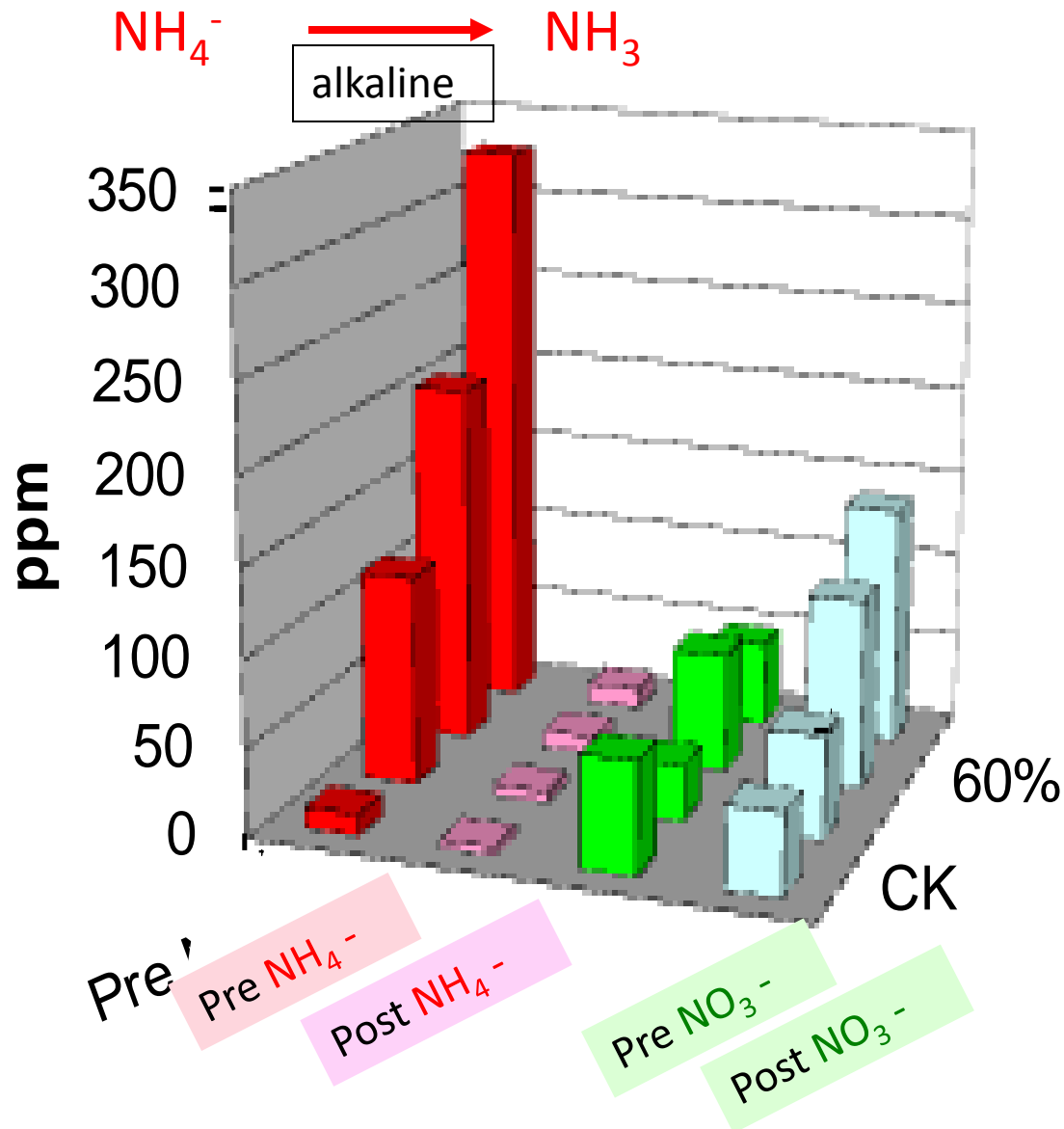
**1 month
composting**



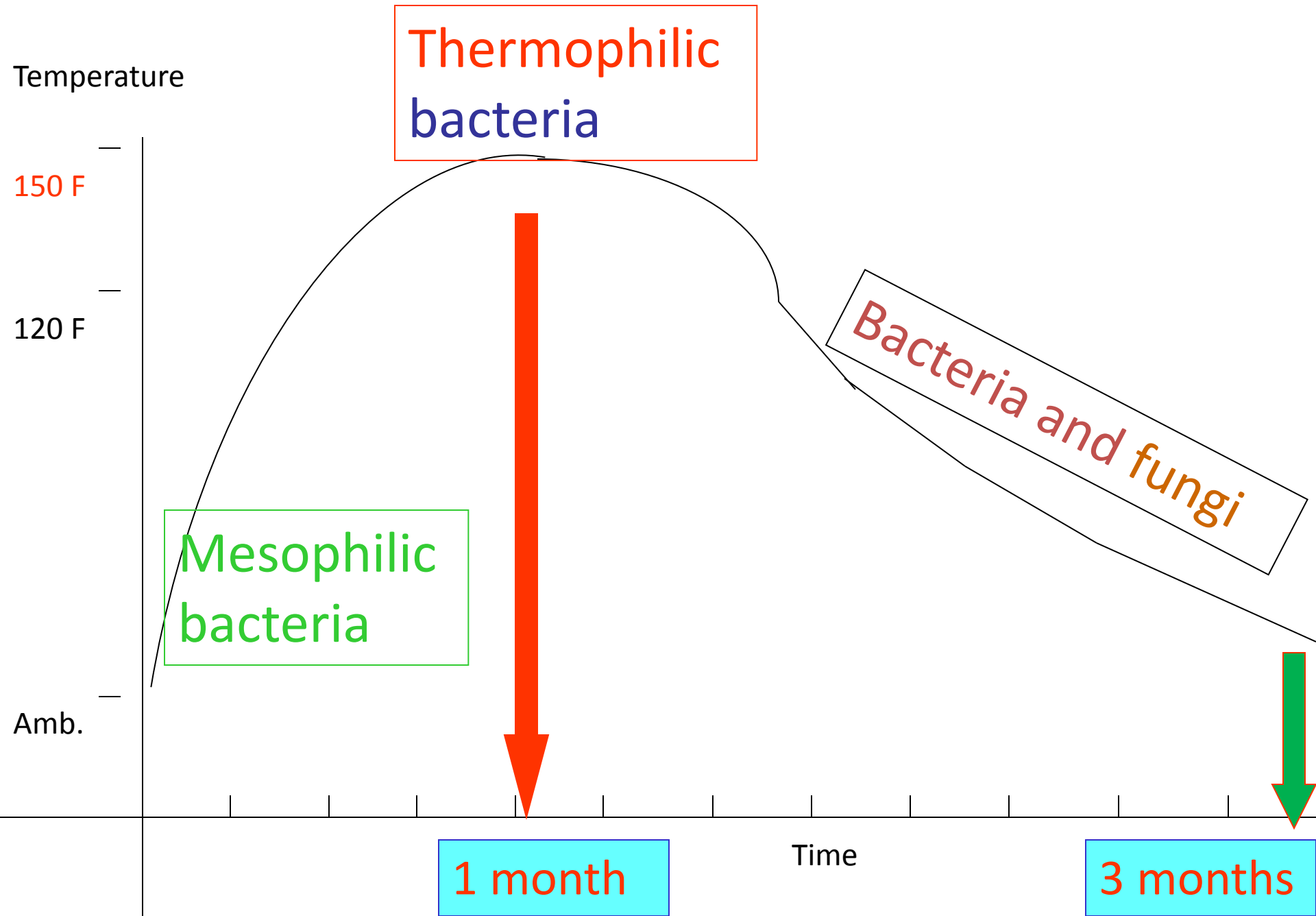
Sweet Corn Growth Responses to Immature Compost Incorporated Potting Medium



NH_4^- & NO_3^- in Compost Amended Potting Media



Predominant Microbes during Composting Process



Effects of Turkey Manure Compost on Growth of American Beauty Berry - A greenhouse Study (*Callicarpa americana*) Top Dressing



Effects of turkey manure compost on root biomass of American Beauty Berry (*Callicarpa americana*)





Composting on Farm as a Small Business





<http://conservationtutorials.org/wp-content/uploads/compost-bin-pallets.jpg>



<http://gardendesk.blogspot.com/2007/11/when-do-you-put-your-compost-piles.html>



5ORXBmWtXLvnlH8hED9cPnL60jqzcC/Compost_Heap.jpg



<http://www.trefgroup.com/home.php?language=eng§ion=RandD&showpage=46>



<http://members.iinet.net.au/~msheaton/Organic%20Gardening%20Down%20Under/compost2.jpg>

LU



T



W



Evaluation

- Visual
- Texture
- Smell

Compost Chemical & Physical Property Comparisons

	LU Food Waste	Turkey Manure	Worm Casting
Moisture (%)	23	13	69
pH	7.9	8.3	5.6
EC	16	25	15

Comparison of Compost **Chemical** Properties

Sources	LU Food Waste	Turkey manure	Worm casting
Total C %	39	27	33
Total N %	1.8	2.8	0.9
P %	0.4	1.7	0.08
K %	1.3	1.3	0.06
NH₄⁺	36	3407	5
NO ₃ ⁻	611	317	460



anure
st



Worm casting

40 %

LU Food W
Compost

5 %

10 %

20 %

100 %

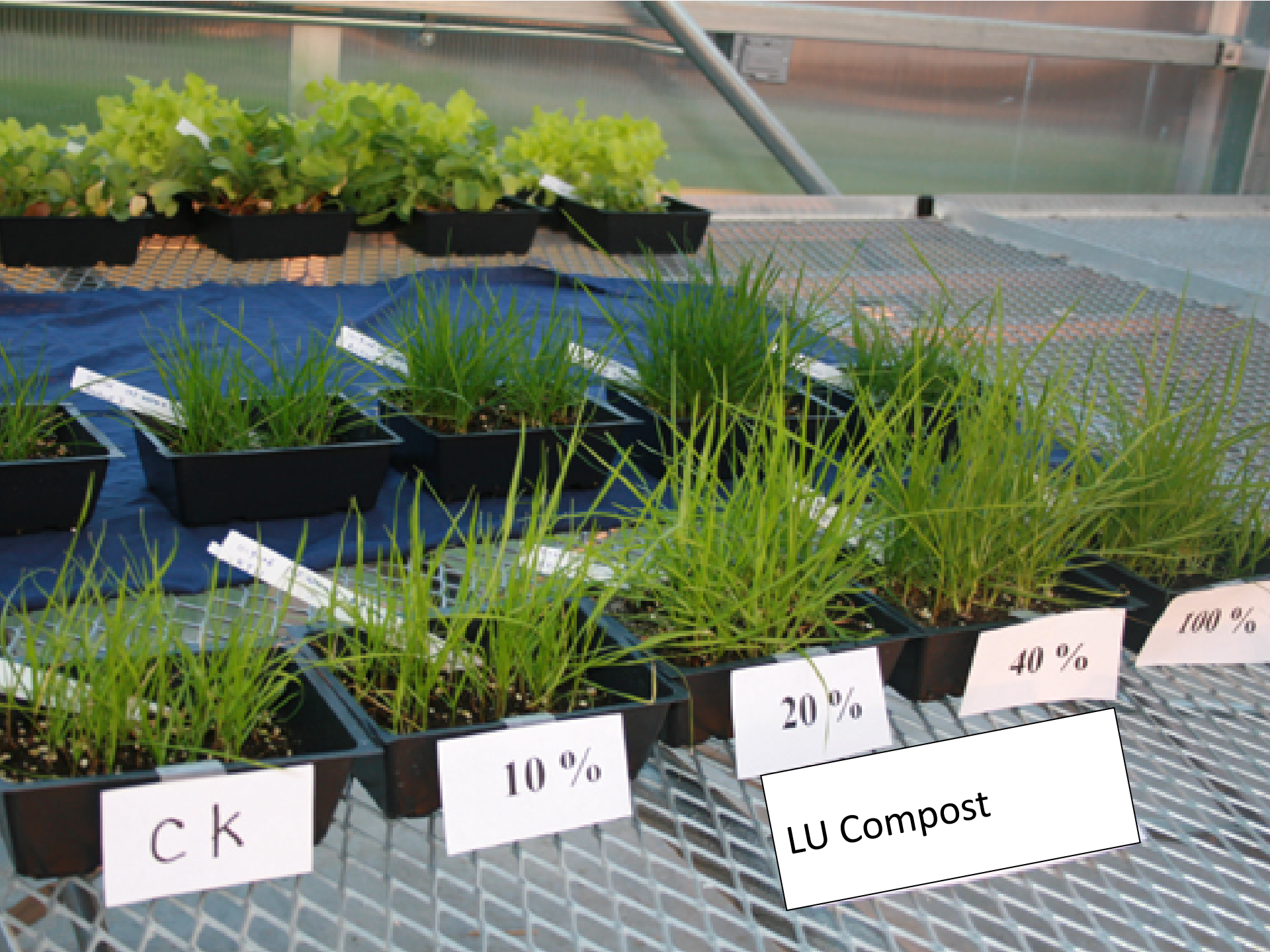
Turkey Manure
Compost



9-6
sk 1
100%
prim

Ck

40 %
Worm casting



C K

10 %

20 %

40 %

100 %

LU Compost



http://archive.energyfarms.net/files/user32/turning_compost_pile.jpg

Bin Compost



Bin Compost



18 3:18 PM

Aerobic composting



Composting on Farm



Windrow Composting







<http://www.noozhawk.com/images/uploads/0204-Compost-540.jpg>



<http://www.brentwood.com.au/images/content/Backhus%2014.28.jpg>



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Positive or negative

aerated static pile compositng



Gore System Compost technology continue



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Silver Springs Organics, LLC, Tenino, WA.

Phase I (at half full) 60,000 ton/year food and yard waste processing capacity.



APS Digester System at UC Davis

Photo courtesy of Dr. Ruihong Zhang

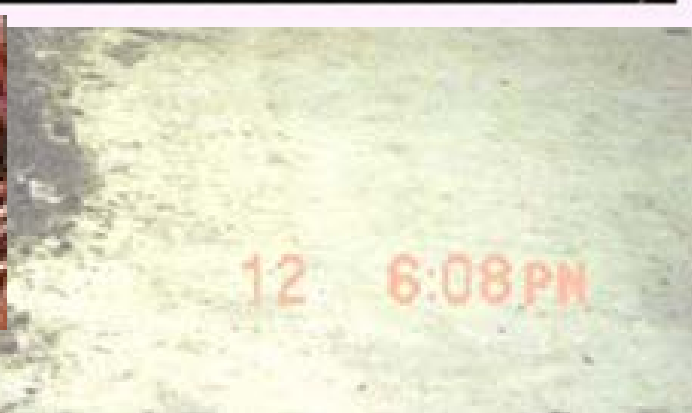
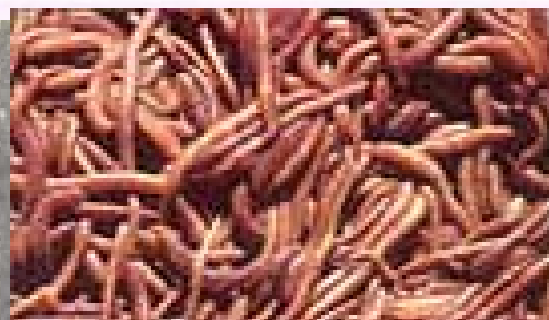
An anaerobic technology utilizes **high N** feedstock to produce **CH₄** for heating & electricity generation





<http://www.compostguy.com/images/winter-composting.jpg>





A worm farm at NC



Effective Microbes (EM)

Effective for odor control and composting organic (food) waste

































HOW BLUEBIRD COMPOST IS MADE

OMRI listed Bluebird Premium Blend Compost is made up of organic material including:

Chicken Litter, Horse Bedding, Food Waste, Wood Chips and Sawdust.





HOW BLUEBIRD COMPOST IS MADE

- ▶ Bluebird Composting takes the first step in making compost by monitoring all feedstock's and sending each individual to lab for a analysis. On the basis of the lab results we create a recipe, which helps microorganisms to do their jobs more efficiently in order to make a high quality compost.





HOW BLUEBIRD COMPOST IS MADE



- ▶ All the piles are monitored, for right moisture, and temperature. Here at Bluebird we want our piles to maintain above 130 degree temperature for at least three days, to be sure to kill harmful pathogens(E. coli, Salmonella) and weed seed. We also don't allow temperatures to go above 160 degrees to ensure the beneficial microorganisms are intact.



HOW BLUEBIRD COMPOST IS MADE



We then do bioassay testing and lab testing on the final product to confirm the quality.



HOW BLUEBIRD COMPOST IS MADE

- ▶ Lastly, our compost run through a 1/2 inch screener and bagged or prepared for bulk deliveries







WHAT CAN COMPOST BE USED ON?

Bluebird **Premium Blend** Compost can be used in a variety of settings from backyard gardens to residential lawns to your full scale commercial growers and landscapers.

It can be used as a top dressing for lawns, to soil enhancers in vegetable gardens, in orchards, or newly seeded lawns.





HOURS OF OPERATION

Bluebird Composting & Farms is open
Mon-Fri 8am-5pm.

Please feel free to contact us at anytime with
your questions or to schedule a visit.

We would love to have you on the farm!

Bluebird Composting & Farms attends both
Fulton and Columbia Farmers Markets so
watch for us there!



Thank you

