“Compost: What is it, what it does or doesn’t do and how to use it”

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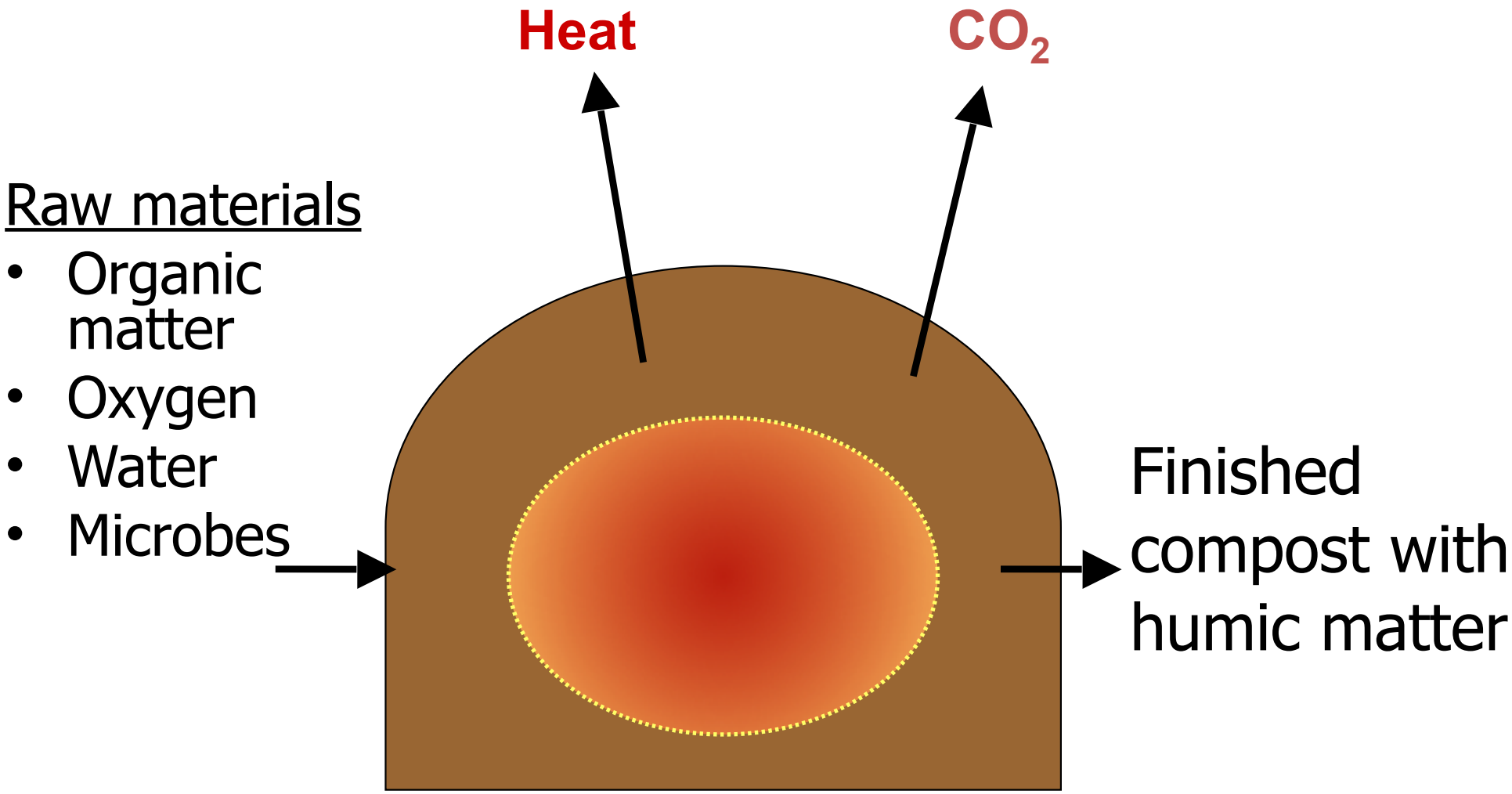
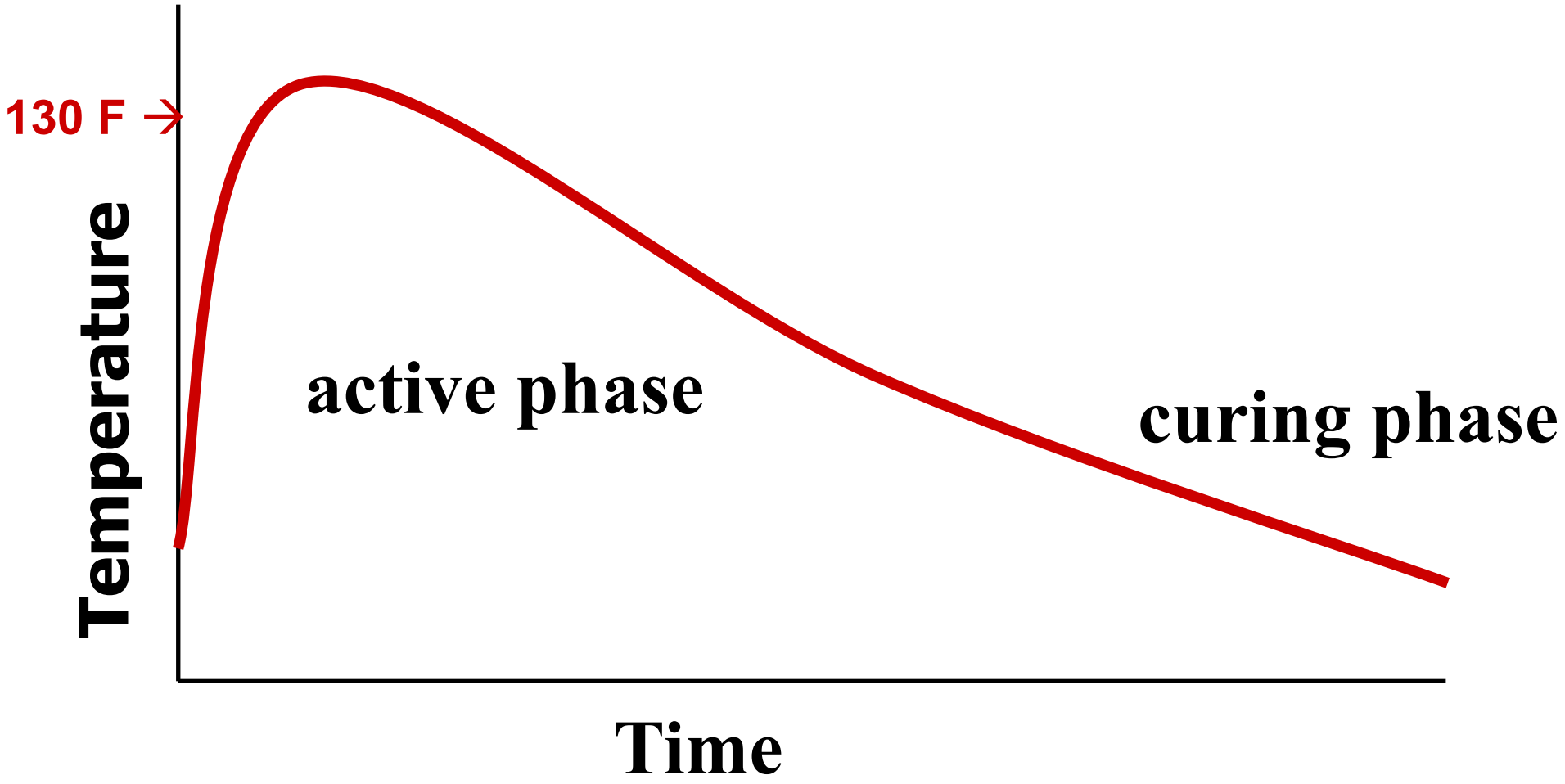
What is composting?

- Decomposition *en masse*
- Transformation of raw materials
  - biologically
  - chemically
  - Physically

Composting is a biological process wherein organic raw materials or "feedstocks" are transformed by organism activities into a stabilized soil-like material called compost.



Compost Temperature – Passive or static system



Effects of composting

- Improves fertilizer value of low C:N materials
  - Lose ~ ½ of C, preserve other nutrients
  - Less sloppy, more consistent
  - Unlikely to immobilize N
  - Produces soil conditioner
- Kills pathogenic organisms
- Kills weed seeds

- Reduces mineralization rate of N, esp in high-N material.
  - Unlikely to “burn” crops or leach
- Does not remove heavy metals, concentrates them.

Create a Composting Environment

Factor	OK range	Optimum
C:N	20:1 – 50:1	25-30:1
Moisture	40 – 65%	50 – 60%
Oxygen	>5%	>>5%
pH	5.5 – 9.0	6.5 – 8
Particle size	1/8 – ½”	varies

Compost for certified organic agriculture

- Moderate-to-high quality compost
- Must follow special NOP regs:
  - Feedstock mix C:N must be 15 – 60:1
  - Temperature must reach 131 F at least 3 days
  - Turn or ensure that all parts of pile reach temp
- Test for E. coli, Salmonella
- No biosolids, no prohibited materials used
- If requirements not met, use as if it's manure

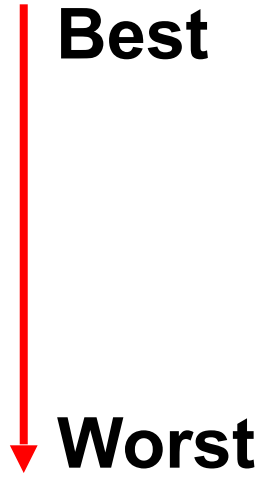
Good compost builds rich topsoil

- **Complex humic acids (humus) form.**
- **Fine texture like good topsoil.**
- **Good compost is often unrecognizably different from its feedstocks.**
- **No unpleasant odor, no undecomposed material, and relatively stable in long-term storage.**

Now you have compost…

- Compost quality determines its best use.

- 5 uses for best to worst compost:
  - potting soil
  - soil amendment
  - turf topdressing
  - agricultural/garden amendment
  - mulch (esp. for compost with C:N>25)



***The closer the plant contact (in space and time), the greater the quality and maturity must be.

Lower quality composts may still be used as mulch, or less mature compost may be incorporated in soil several months prior to planting.

Sources of OM amendments

- Manure, sludge, biosolids
  - Variable longevity in soil
  - Watch out for salts, metals, N ‘burning’
  - Biosolids not allowed in organic agriculture
- Peat, humic acids
  - very low nutritive value
  - may/may not be stable
  - less chemical or biological benefit
- Compost
  - slow-release fertilizer, partially humified
  - more likely to BUILD OM
  - may decrease diseases

Benefits of compost to soil

- Slow-release source of plant nutrients
  - N, P, K, S, micronutrients
- May improve soil pH
- Increases soil moisture-holding ability
- Improves soil tilth & structure
- As mulch, protects plant surface roots
- Provides biotic food and habitat

- Many others

Compost as fertilizer

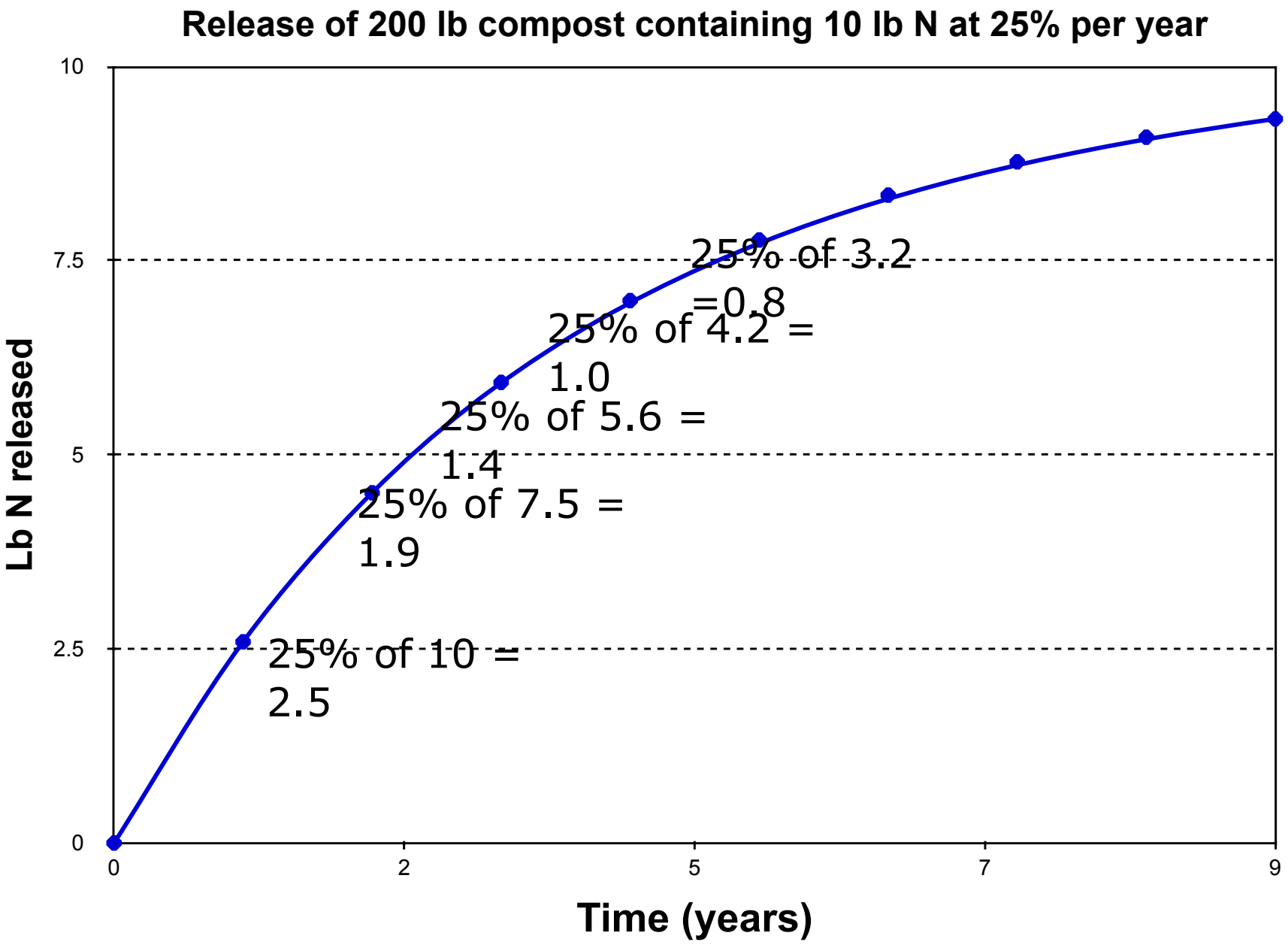
- Concentrates nutrients in initial organic materials
- Releases sssllllooooowwwwlllllyyyyy, usually **10-15%/yr**

- Add mineral fertilizers to increase their bioavailability
  - Greensand (K)
  - Rock Phosphate (P)
  - Azomite (micronutrients)
  - Other rock powders
  - Lime

Compost teas

- Simple extraction
- Soluble nutrients, humic acids, and microbial inoculant

Allow time for nutrient release from compost



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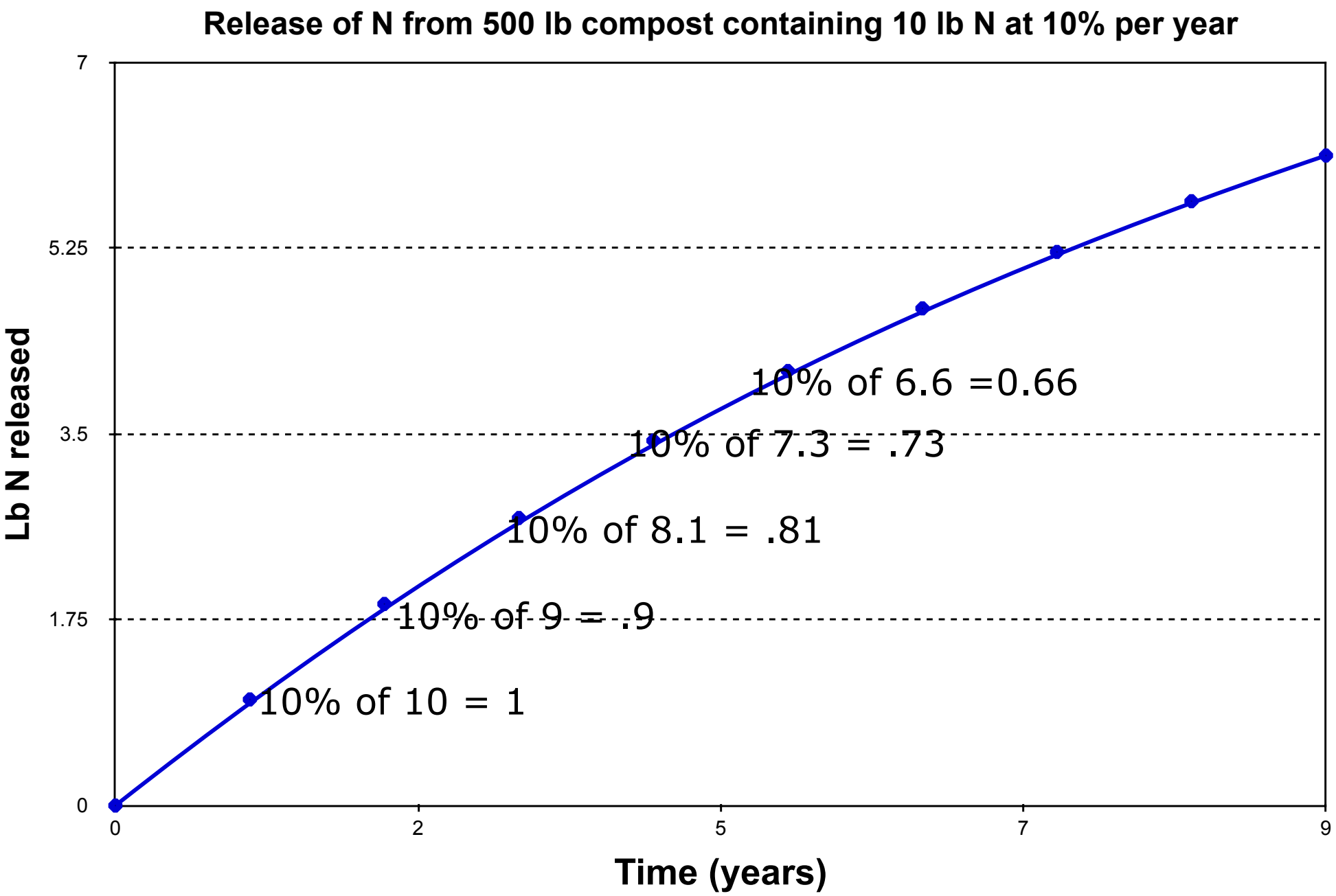

Application rate			Percent N in compost* and lb available N /1000				
inch tons/ac	yards/ac		0.5 %	1 %	1.5 %	2 %	2.5 %
1/8	16.9	6.8	0.3	0.5	0.8	1.1	1.3
1/4	33.8	13.5	0.5	1.1	1.8	2.2	2.7
1/2	67.5	27	1.1	2.2	3.5	4.4	5.4
1	135	54	2.2	4.4	7.0	8.8	10.9
2	270	108	4.4	8.8	14.1	17.6	21.8

http://soilplantlab.missouri.edu/soil/compost.aspx†

Adapted from the Composting Council

*Based on an average compost weight of 800 lb/cubic yard (wet weight)

Application rates

- Annual or occasional applications of 1.5 – 10 dry tons / acre common
- Single or occasional applications 10- 50 dry tons/ acre
- Onto living plants such as pasture, <4 dry tons/acre

- Peak of nutrient release in early – mid summer correlates to nutrient uptake peak of many plants.

Composting – It's hot!