NERC NORTHEAST RECYCLING COUNCIL

COMMUNITY COMPOSTING TIPS

The Science of Composting

Composting is a controlled, aerobic (requiring oxygen) biological process. Composting converts organic material (or feedstocks) into a humus-like product that is rich in organic matter and organisms.

Microorganisms (bacteria, fungi, other organisms) are the key "decomposers" instrumental in the composting process. Whether at home, a community compost site, a farm, or a commercial or industrial compost site, the science is essentially the same – **success comes from creating the right habitat for these microorganisms to do their work!**

What is (Finished) Compost?

- A value-added product
- Free of unpleasant odors
- Easy to handle
- Can be stored for long periods
- Soil & potting media amendment

Key components for creating the best habitat for microorganisms in composting systems:

- **Combine feedstocks to get the optimum Carbon to Nitrogen (C:N) Ratio**:

  ✓ 20:1 – 60:1; preferred 30:1-50:1

- **Aeration** provides oxygen and stimulates the removal of heat, water vapor, and gasses during the active composting phase. But too much air slows the composting process.

  ✓ Ideal oxygen concentrations: 10-14%

  While there are oximeters that measure oxygen concentrations, you can also develop a more intuitive "feel" for this. The mixed material should be "fluffy", with plenty of pore space for air as well as water. If materials are "matted" down, (unwanted) anaerobic conditions may occur.

- **Moisture** makes the nutrients in organic material available for the microorganisms**.**

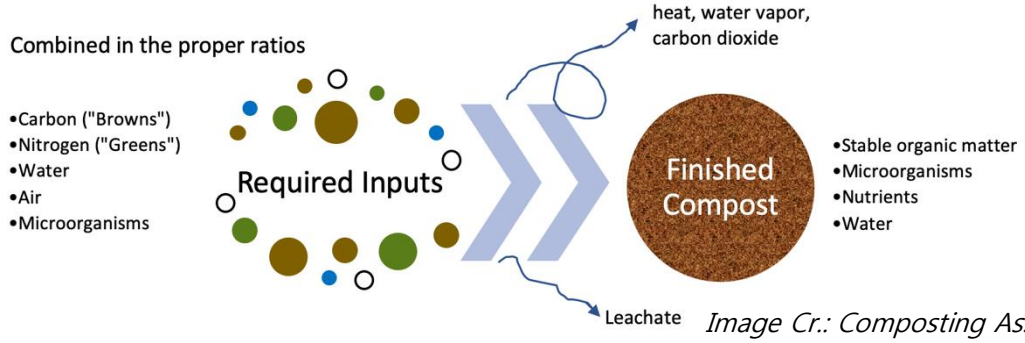
  ✓ 40 to 65% (like a damp sponge).

  Too much water kills the microorganisms, reduces oxygen, and causes anaerobic conditions; too little water slows or stops the process.

- **Temperature:** If the compost habitat properly established and maintained, the decomposers will raise the temperature of compost to above 100°F.

  ✓ 120°-160°F.

  Note that the Process to Further Reduce Pathogens (PFRP) requires maintaining a temperature of at least 131°F for 3-15 days, depending on the compost system used.



Healthy biological activity is essential to successful composting; setting up the right environment and conditions is fundamental to the process.

Image Cr.: Composting Association of Vermont

FIND MORE RESOURCES ONLINE AT nerc.org/nerc-resources

PROJECT PARTNERS: CAV Composting Association of Vermont; Vermont Community Garden Network; Vermont Master Composter, Sponsored by UVM Extension Master Gardener and Vermont Agency of Natural Resources; Cornell University; UConn College of Agriculture, Health and Natural Resources, Plant Science and Landscape Architecture

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Additional components to consider for larger community compost systems

- **Bulking agents** ensure that the pile isn't too dense, which reduces the pore space for oxygen and water.
  - ✓ Examples: wood shavings or wood chips, plant stalks, and shredded cardboard or newspaper)

  Note: larger wood chips and stalks will need to be screened out of finished compost because they take longer to decompose, they can be returned to an active compost bin or pile.
- **Optimum pH range:** Compost microorganisms are most productive under neutral to acidic conditions.
  - ✓ Ideal range 5.5 to 8

  During the initial stages of decomposition, organic acids are formed. The acidic conditions promote the growth of fungi and breakdown of lignin and cellulose. The organic acids become neutralized as the composting process continues; mature compost generally has a pH between 6 and 8.

★ **A note about particle size:** Smaller particles increase the surface area on which microorganisms can do their work, which speeds up decomposition rates.

The Benefits of Using Compost in Soil

Healthy soil is crucial for the wellbeing of the planet—it supports growing plants, helps create clean air and water, and sustains productive forests, rangelands, and other ecosystems, ultimately supporting a diversity of animal and plant life.

Compost provides essential organic matter needed for healthy soil, which supports the cycling of nutrients and other elements throughout the soil food web.

Healthy soil:

✓ **Improves Soil Physical Properties:** Increases water retention; improves soil aeration and structural stability; increases resistance to water and wind erosion; allows for deeper root penetration; stabilizes soil temperature.

✓ **Enhances Chemical Properties:** Increases macro- and micro-nutrient content; stabilizes pH; converts nutrients to a more stable form, reducing fertilizer requirements.

✓ **Improves Biological Properties:** Increases activity of beneficial microorganisms; promotes root development; can increase agricultural crop yields; suppresses certain plant diseases; acts as biofilter; bonds with heavy metals.

Porosity and Bulk Density

The term "porosity" refers to the gaps between solid particles. "Bulk density" refers to ratio of the total weight (mass) of compost to its volume.

✓ The optimal compost bulk density range is 800-1,200 pounds/cubic yard.

✓ Optimal porosity is in the 35-60% range.

➢ ***While it's good to be familiar with these terms, focusing on aeration and moisture is often enough for community composting systems.***

Other Community Composting Tip Sheets to consult: *Compost Recipe Overview*; *Systems & Operations*.

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