Bernalillo County Extension MASTER COMPOSTERS nmcomposters.org

COMPOST HAPPENS. WE CAN HELP!

BERNALILLO COUNTY EXTENSION MASTER COMPOSTER PROGRAM
IS BASED IN ALBUQUERQUE, NEW MEXICO

Composting in the Desert

What Makes Composting in the Desert Unique and Challenging?

Abundant sunshine, intense ultra-violet radiation levels, low humidity, frequent winds, and limited precipitation are defining characteristics of a desert climate, but they contribute to rapid evaporation of any moisture in or on the ground. Drought conditions increase the problem. Moisture is required for the decomposition of organic material. Controlling evaporation in order to keep composting material damp is the biggest challenge in the desert and requires a unique approach.

Why Compost?

Soil amendment improves water absorption, fertility and resilience.

Conserve resources by converting organic waste to compost.

Reduce landfill volume when organic waste is used for compost.

Protect the environment by reducing the amount of methane gas produced when food waste is sent to a landfill.

Recycling by home composting yields a useful product

OVERVIEW

THE FORMULA FOR SUCCESSFUL COMPOST PRODUCTION IS

WATER + AIR + NITROGEN +CARBON + TIME = HUMUS

Moisture: The pile should be maintained at a 50% moisture level, similar to the moisture in a wrung-out sponge, throughout the decomposition process. Leaves should glisten with a film of water, but not drip. A bin with a limited number of air holes, placed in the shade and covered, will reduce evaporation. The contents may be watered as necessary to maintain moisture level.

Aeration: In desert composting it is necessary to modify the pile's exposure to air to prevent rapid evaporation. A dry pile ends the microbial activity that is at the source of decomposition. Regulate air flow by reducing the number of air holes in plastic bins, or by lining wire or wooden bins with plastic, and covering them. Bulking material should be added as the pile is built. Bulking moderates compaction of wet materials and provides spaces for air flow, compensating for the reduction in air holes. Air moves from the base of the pile, flowing upward through the layers. (see figure, page 6)

Examples of bulking materials**:** *corn cobs and stalks, sticks, pine cones, twigs*

Carbon and Nitrogen Ingredients:

In the context of home composting, organic material refers to plant and animal products that were once alive. Most organic materials contain the elements carbon and nitrogen in differing ratios. The term "browns" is used to refer to materials with a high carbon content because they tend to be brown in color. Likewise the term "greens" is used for high nitrogen content materials.

Carbon combined with nitrogen supports proliferation of micro-organisms which break down organic matter. Nitrogen (greens) is necessary for microbial reproduction and carbon (browns) is a food (energy) source.

Variables: *Size:* the smaller the pieces of material, the more rapidly they will decompose.

C*arbon-to-nitrogen mix* varies by the composting method used. An approximate mix guide is to add 2 parts carbon material to 1 part nitrogen material by weight.

Temperature within the composting setup influences microbrial action. "Cold" or static piles with produce humus more slowly than "hot" or thermophyllic piles.

, Carbon Materials (brown)

dried leaves, plants & grass	straw
nut shells	shredded paper
corn cobs	dryer lint
used paper towels, napkins, tissues	pine cones & needles
vacuum contents	untreated wood, bark, chips,sawdust
natural fiber materials: felt, cotton, burlap, wool, rope & string	

Nitrogen Materials (green)

green leaves, grass, & trimmings	alfalfa pellets
coffee grounds	fruit & vegetable scraps
leftover food	tea & tea bags
hair, fur, feathers	vegetarian animal manures
leather	crushed egg shells
blood or bone meal	leftover dry pet food

Avoid: dairy products, meat/fish, fats & oils, pet manures, glossy paper, ash, pig manure, pesticides, herbicides, vermicides, fungicides, glass, plastic, styrofoam, glossy or waxed paper.

Location: The pile or bin should be:

- ✓ conveniently located
- ✓ on the ground,
- ✓ near a water source
- ✓ in an area shaded from summer sun

Composting Methods

Hot/Intensive Composting

It may also be referred to as: dynamic, managed, fast, batch, or thermophilic composting. This is a batch method -- all materials are assembled and combined at once rather than adding materials over time. Microbes consuming and breaking down carbohydrates release energy in the form of heat. This heat is appreciable and sustained. The heat is intrinsic to the pile, not generated from external sources.

Carbon-to-Nitrogen Mix: A workable mixture is 2 parts carbon material to 1 part nitrogen material.

Size & Containment: From 3'x3'x3' - 5'x5'x5' bin with a limited number of air holes. Smaller bins do not sustain the temperature well. Larger piles can result in compaction of materials, leading to anaerobic conditions. Bins can be made of wood, straw bales, concrete blocks, lined plastic or wire mesh.

Hot Pile Construction:

- Place 6-12" of bulking material at the bottom of the bin.
- Chop/shred materials before using.
- Soak the browns in a wheelbarrow, then mix in the greens. (50% moisture level)
- Use about 6” of the mixture, then add 4" of bulking. Continue the layers until the bin is full.
- To limit evaporation, lightly cover the top of the pile with plastic or other non-porous material, cardboard, or old rugs.
- In 24 to 72 hours the pile will heat up as a result of microbial enzymatic activity. A temperature of 150° F is adequate and should be sustained for several days. If a pile fails to heat sufficiently, it may be turned and more nitrogenous material added. Overheating may be controlled by turning and watering the pile.
- When the pile starts to cool down (about 7-14 days) then it should be turned, churned and watered to maintain 50% moisture. Ideally the top becomes the bottom (turning) and the sides become the insides (churning) so that all the material eventually becomes exposed to the high core temperature.
- The turned pile will heat up again. This turning process continues until everything except the bulking material has turned to humus-the end product of microbial decomposition. The rate of decomposition is variable; humus amounting to 1/2 to 1/3 of original pile size will form in 3 - 6 months.
- Screen the humus to remove bulking material. Then allow it to cure for 2-4 weeks. Do not allow the humus to dry out completely.

Cold/Easy Composting

This method uses a process of continuous addition of organic materials over time. It may also be referred to as: dump-and-run, or slow, or static composting. The pile can be mangaged actively or remain static.

Carbon to Nitrogen Mix: An ideal carbon-to-nitrogen ratio is not important. Any organic material on hand may be moisturized and added. It is the choice of, and at the convenience of, the individual composter.

Size & Containment: sizes vary from small up to 5'x5'x5'. Larger piles can become compacted, leading to anaerobic conditions. Containment can be: pit, trench, layered sheet, open pile (covered), container/bin.

Cold Pile Construction:

- Begin the pile with an 6”-12” layer of bulking material.
- Chop/shred materials
- Soak any dry organic material in water to approximate 50% moisture. Mix in any nitrogenous materials, and begin a 6” layer of this organic fill.
- Cover the pile with plastic or other non-porous material, cardboard, or old rugs to limit evaporation.
- Add moisturized organic material as it becomes available.
- Add another layer of bulking material after every 6” of fill.
- Sprinkle with water to maintain moisture level as needed.
- When humus has been created at the bottom of the pile, it should be harvested, then screened to remove bulking and pieces that have not decomposed.
- A cold pile may remain undisturbed as long as it is bulked and moisture is maintained at 50%. Turning and churning is the choice of the individual composter.

Temperature: Cold piles equilibrate with the ambient air temperature. If the pile temperature goes below 55 °F microbial action will slow, but attempts to increase or preserve heat are not necessary.

Microbial Action: The environment of a cold pile often favors decomposers like fungi, molds, actinomycetes and those bacteria that appreciate cooler temperatures. Insects also eat the organic materials. Composting red worms may be added to the pile.

End Product: Humus amounting to 1/2 - 1/3 of original pile size will form in 8 - 12 months.

Hot or Cold Compost Pile Cross-section

Cover pile with materials that will limit evaporation. *plastic, cardboard, old rugs*

6" -8" layers ofOrganic Material: a blend of "greens" (nitrogenous) and "browns" (carbonaceous) *kitchen scraps, green leaves, coffee grounds,*

6" - 8" layers of Bulking Material: promomtes air circulation and prevents compation and anerobic decomposition *pine cones, corn cobs, sticks,*

place pile directly on the ground

Air Flow: Chimney Affect. Air flows up and through the layers of organic material

SUMMARY

The hot, dry, desert climate contributes to rapid evaporation. Decomposition of organic material to form humus requires moisture. Composting techniques for desert living are all directed at decreasing evaporation.

- ✔ Use a containment system that reduces airflow to decrease evaporation. Bins made of wire or widely spaced wooden slats should be lined with plastic or cardboard. Tape over some of the air holes in commercial bins. Lightly cover the top of the pile or bin with plastic or other non-porous material, old rugs or cardboard.
- ✔ Add layers of bulking material between layers of fill material as the operation is built up. Bulking helps maintain spaces in the organic fill so that air can penetrate throughout. Bulk as you build. The bottom layer should be 6 – 12 inches thick and successive layers 4 – 6 inches thick. Bulking materials decompose more slowly and resist compression.
- ✔ Chop, shred and/or tear materials into small pieces before use.
- ✔ Presoak any dry organic material (such as leaves or paper) before adding it to a composting operation. Shred or break up dry materials and allow them to soak in a bucket or wheelbarrow to absorb moisture.
- ✔ Place the compost operation in the shade during hot months.
- ✔ Composting material should be placed directly on the soil; asphalt or concrete will heat up and increase evaporation
- ✔ Add water as necessary.
- ✔ Hot piles need to be completely turned, mixed and watered at 7 – 14 day intervals until contents are completely decomposed.
- ✔ Cold piles may remain static (no turning) as long as bulking material is added regularly and 50% moisture is maintained.

Prepared by
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Free public composting classes are posted at
nmcomposters.org

Questions or requests for additional information should be addressed to
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