



USCC Factsheet: Compost and Its Benefits¹

What is Compost?

Compost is the product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth. Compost bears little physical resemblance to the raw material from which it originated.



Compost is an organic matter resource that has the unique ability to improve the chemical, physical, and biological characteristics of soils or growing media. It contains plant nutrients but is typically not characterized as a fertilizer.

How is Compost Produced?

Compost is produced through the activity of aerobic (oxygen-requiring) microorganisms. These microbes require oxygen, moisture, and food in order to grow and multiply. When these factors are maintained at optimal levels, the natural decomposition process is greatly accelerated. The microbes generate heat, water vapor, and carbon dioxide as they transform raw materials into a stable soil conditioner. Active composting is typically characterized by a high-temperature phase that sanitizes the product and allows a high rate of decomposition, followed by a lower-temperature phase that allows the product to stabilize while still decomposing at a lower rate. Compost can be produced from many "feedstocks" (the raw organic materials, such as leaves, manures or food scraps). State and federal regulations exist to ensure that only safe and environmentally beneficial composts are marketed.

Benefits of Compost and its Effects on Soils and Plants

Thanks to its many attributes, compost is extremely versatile and beneficial in many applications. Compost has the unique ability to improve the properties of soils and growing media physically (structurally), chemically (nutritionally), and biologically. Although some equate the benefit of compost use to lush green growth, caused by plant-available nitrogen, the real benefits of using compost are long-term and related to its organic matter content.

Benefits of Using Compost

- ⑥ Improves the soil structure, porosity, and density, thus creating a better plant root environment.

- ⑥ Increases infiltration and permeability of heavy soils, thus reducing erosion and runoff.
- ⑥ Improves water holding capacity, thus reducing water loss and leaching in sandy soils.
- ⑥ Supplies a variety of macro and micronutrients.
- ⑥ May control or suppress certain soil-borne plant pathogens.
- ⑥ Supplies significant quantities of organic matter.
- ⑥ Improves cation exchange capacity (CEC) of soils and growing media, thus improving their ability to hold nutrients for plant use.
- ⑥ Supplies beneficial microorganisms to soils and growing media.
- ⑥ Improves and stabilizes soil pH.
- ⑥ Can bind and degrade specific pollutants.

Physical Benefits

Improved Structure

Compost can greatly enhance the physical structure of soil. In fine-textured (clay, clay loam) soils, the addition of compost will reduce bulk density, improve friability (workability) and porosity, and increase its gas and water permeability, thus reducing erosion. When used in sufficient quantities, the addition of compost has both an immediate and long-term positive impact on soil structure. It resists compaction in fine-textured soils and increases water holding capacity and improves soil aggregation in coarse-textured (sandy) soils. The soil-binding properties of compost are due to its humus content. Humus is a stable residue resulting from a high degree of organic matter decomposition. The constituents of the humus act as a soil 'glue,' holding soil particles together, making them more resistant to erosion and improving the soil's ability to hold moisture.

Moisture Management

The addition of compost may provide greater drought resistance and more efficient water utilization. Therefore, the frequency and intensity of irrigation may be reduced. Recent research also suggests that the addition of compost in sandy soils can facilitate moisture dispersion by allowing water to more readily move laterally from its point of application.

Chemical Benefits

Modifies and Stabilizes pH

The addition of compost to soil may modify the pH of the final mix. Depending on the pH of the compost and of the native soil, compost addition may raise or lower the soil/compost blend's pH. Therefore, the addition of a neutral to slightly alkaline compost to an acidic soil will increase soil pH if added in appropriate quantities. In specific conditions, compost has been found to affect soil pH even when applied at quantities as low as 10-20 tons per acre. The incorporation of compost also has the ability to buffer or stabilize soil pH, whereby it will more effectively resist pH change.

¹ Excerpted from the Field Guide to Compost Use, ©2001 The United States Composting Council