EDIBLE GARDENS

Compost Research & Education Foundation

USING COMPOST

Description:

This effort consists of incorporating compost within the planting root zone in order to improve soil quality and plant growth. This specification applies to various types of vegetables, small fruits, herbs, and related items.

Key Benefits/Return on Investment:

- Improved soil structure,
- Nutrient savings – minimum 50%,
- Water savings – 25 - 50% annually,
- Reduction of plant loss, and
- May reduce pesticide usage through compost-induced disease suppression.

Various research papers and practical experience have demonstrated the benefit of amending edible gardens with compost in both conventional and organic production systems.

Construction Requirements:

- Since maximum crop production is the goal when establishing an edible food garden, special care should be given to the soil and location in which you plant. The location should not be low lying (where water can pool), should receive full or partial sun, and the soil should be free draining. Always test soil before establishing a new edible garden.
- Compost should be uniformly applied over the planting area at an average depth of 1– 2 inches.
  - Lower compost application rates may be necessary for salt sensitive crops or where compost possessing higher salt levels are used. An alternative is to heavily water after initial planting to leach potential excess salt from the crop's root zone.
  - May increase application rates (3-inch layer) in sandy soils and where reduced water usage is desired. Increased application rates are also suggested where medium and heavy feeding crops (e.g., tomatoes, broccoli) are established and where deeper soil incorporation (12-inch depth) is possible.
- Incorporate uniformly to a minimum depth of 6 inches using a rotary tiller or other appropriate equipment.
  - Avoid incorporation when soils are excessively wet or dry.
  - Deeper soil incorporation (in sandier and lower bulk density soils) is preferred when growing crops like potatoes and carrots, whose edible parts are grown in the soil.
  - NOTE: if creating a raised planting bed, establish a bed that can hold 12 inches of media depth, and place over soil that can drain. Compost can comprise up to 25 to 33% (by volume) of the media and should contain a similar volume of sand, bark fines, etc. which will allow drainage.
- pH adjusting agents (e.g., lime and sulfur) are important, where necessary, and may be applied in conjunction with compost incorporation. Preferably, do this a week before planting. Pre-plant fertilization may also be completed during this step, but higher nutrient compost may eliminate the need for pre-plant fertilization. Most vegetables require a soil pH of 6.0 to 7.0 and nitrogen requirements of 0.25 to 0.5 pound per 1,000 ft^2 per season. Half of a crop's nutrition is provided pre-planting, and the rest during the growing season.
  - Depending on the crop and the compost, it may be possible to eliminate the addition of supplemental nutrition during crop production. However, this can be tricky, and is most easily accomplished in gardens where compost has been incorporated for 3 years in a row, and crops are not heavy feeders.
- Rake soil surface smooth prior to planting.
- The soil surface should be reasonably free of large clods, roots, stones greater than 2 inches, and other material which will interfere with planting and subsequent site maintenance.
- Water thoroughly after planting. Water and provide additional fertilization, as necessary, until the crop is harvested.

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Using Compost

Compost Parameters:

Parameters[1,5]	Reported as (units of measure)	General Range
pH[2]	pH units	6.0 - 8.5
Soluble Salt Concentration[2] (electrical conductivity)	dS/m (mmhos/cm)	Maximum 10**
Moisture Content	%, wet weight basis	30 – 60%
Organic Matter Content	%, dry weight basis	30 – 65%
Particle Size	% passing a selected mesh size, dry weight basis	95% pass through 3/8" screen or smaller
Stability Carbon Dioxide Evolution Rate	mg CO2-C per g OM per day	< 4
Maturity (Bioassay) Seed Emergence and Seedling Vigor	 %, relative to positive control %, relative to positive control	 Minimum 80% Minimum 80%
Physical Contaminants (man-made inerts)	%, dry weight basis	< 0.5% (0.25% film plastic)
Chemical Contaminants[3]	mg/kg (ppm)	Meet or exceed US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels
Biological Contaminants[4] Indicator Organisms Fecal Coliform Bacteria, and/or Salmonella	 MPN per gram dry weight MPN per 4 grams dry weight	 Meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) levels

General:

Compost Analysis: All compost products have different characteristics. Before selecting a compost product, a compost analysis should be completed by a reputable laboratory* to determine the characteristics of the material, so that the right material can be used for the appropriate purpose. Once determined, the soil should be appropriately amended to a range suitable for the plant species to be established and results desired.

Before any soil preparation procedures ensue, a soil analysis should be completed to determine any nutritional requirements, pH and organic matter adjustments necessary. Once determined, the soil should be appropriately amended to a range suitable for the plant species to be established. Compost inclusion rates depend upon soil conditions and quality, plant tolerances, and manufacturer's recommendations.

**Note: Higher soluble salt concentrations may be allowed where salt tolerant plants are established, or lower application rates are used. If concerned about soluble salt content, heavily water the planting bed after planting, allowing for the salts to leach. NOTE: compost possessing a higher soluble salt content, often also possess a higher amount of plant nutrients.

References:

Alexander, R., Development of Suggested Compost Parameters & Compost Use Guidelines. Florida Department of Agriculture and Consumer Services, final report 5/23/1994.
Maynard, A., Low Rates of Compost Increase Vegetable Yields. BioCycle, November 1995.
Traunfeld, J., Soil to Fill Raised Beds. University of Maryland Extension Technical Document, Spring, 2019.
Tyler, R., personal discussions. Green Horizons Consulting, 5/20/2021.
Maynard, A., Using Yard Trimmings Compost as Fertilizer on Vegetable Crops. BioCycle, May 2004.

***The Seal of Testing Assurance (STA) Certified Compost Program provides a comprehensive history of compost analysis results from proficiency-tested laboratories, list of ingredients, and suggested directions for using that unique product. www.compostingcouncil.org/participants**

[1] Recommended test methodologies are provided in Test Methods for the Examination of Composting and Compost (TMECC, The Compost Research & Education Foundation).

[2] It should be noted that the pH and soluble salt content of the final amended soil is more relevant to the establishment and growth of a particular plant, than is the pH or soluble salt content of the specific compost used to amend the soil. The pH and soluble salt content of the compost is diluted when mixed with the native soil, so testing for these parameters in the amended soil is suggested. Each specific plant species requires a specific pH range. Each plant also has a salinity tolerance rating, and maximum tolerable quantities are known. Most ornamental plants and turf species can tolerate a soil/media soluble salt level of 2.5 dS/m and 4 dS/m, respectively. Seeds, young seedlings and salt sensitive species often prefer soluble salt levels at half the afore mentioned levels. When specifying the establishment of any plant or turf species, it is important to understand their pH and soluble salt requirements, and how they relate to existing soil conditions.

[3] US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels = Arsenic 41ppm, Cadmium 39ppm, Copper 1,500ppm, Lead 300ppm, Mercury 17ppm, Molybdenum 75ppm, Nickel 420ppm, Selenium 100ppm, Zinc 2,800ppm.

[4] US EPA Class A standard, 40 CFR § 503.32(a) levels = Salmonella <3 MPN/4grams of total solids or Fecal Coliform <1000 MPN/gram of total solids.

[5] Landscape architects and project (field) engineers may modify the allowable compost specification ranges based on specific field conditions and plant requirements.

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