

Q&A

Composting Toilets

What is a composting toilet?

How does it work?

Should I install one in my house?

Because water is not an unlimited resource, everyone from government agencies to individuals is looking for ways to conserve water and reduce costs associated with water treatment to make it reusable. Alternative toilets, such as composting toilets, require minimal to no water to carry the waste away and require no water as part of the waste treatment process.

Composting toilets eliminate the need for flush toilets, thereby greatly reducing water-use needs and thus reducing the hydraulic load to a septic system. Composting toilets also allow for the recycling of valuable plant nutrients by producing a soil-like supplement. Composting toilets can be used anywhere a flush toilet can be used. A composting toilet is also well suited for seasonal homes, recreation areas, remote areas where water is scarce, or areas with low percolation, high water tables, shallow soil, or rough terrain.

The primary objective of a composting toilet is to collect and destroy pathogens, reducing the risk of human infection and environmental contamination. A composting toilet is a well-ventilated container that provides the optimum environment for unsaturated conditions where aerobic bacteria break down the organic matter and transform it with naturally occurring bacteria and fungi into a soil-like material called humus. These naturally occurring organisms thrive

by aeration, without the need for water or chemicals. Various process controls manage environmental factors such as air, heat, and moisture to optimize the composting process.

The composting unit must be constructed to separate the solid from the liquid wastes and produce a stable, humus material with less than 200 MPN per gram of fecal coliform. The main components of a composting toilet include: a composting reactor connected to a dry or micro flush toilet, a screened air inlet and exhaust system, a means to drain/manage excess liquid,

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Editor's Note:

This column is based on calls received over the National Environmental Services Center (NESC) technical assistance hotline. If you have further questions concerning drainfields, call (800) 624-8301 or (304) 293-4191 and ask to speak with a technical assistant.



Figure 1 A composting toilet

a mechanism to provide necessary ventilation to support the aerobic organisms in the reactor, a heating system to warm the temperature within the reactor if necessary, and access to remove the end product periodically. In cold climates, composting toilets should be well insulated and heated to levels specified by the manufacturer or designer.

Several factors affect the rate of composting and the overall performance of a composting toilet. They include: temperature, moisture, pH, carbon to nitrogen ration (C/N), aeration, microorganism population, time, and maintenance. These factors are only mentioned in this article. For a more detailed look at these factors and how they impact the

composting process, refer to the following NESC products: "Composting Toilet Systems," item #WWF-SOM28 and "Alternative Toilets," item #SFBLTO04.

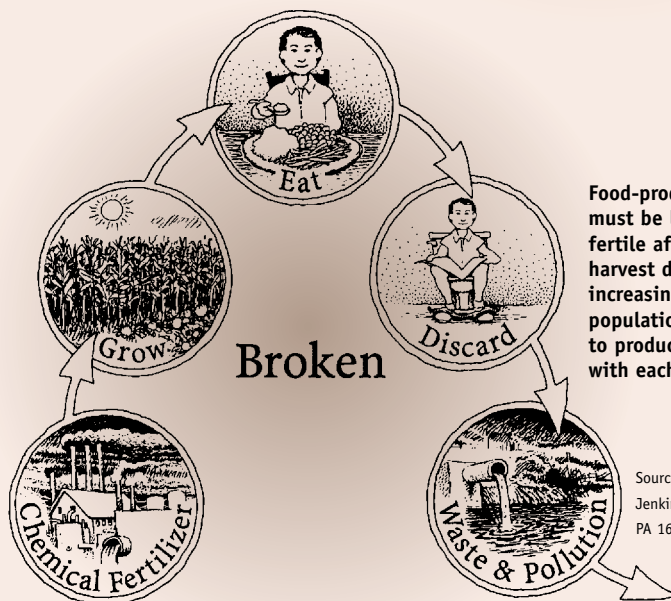
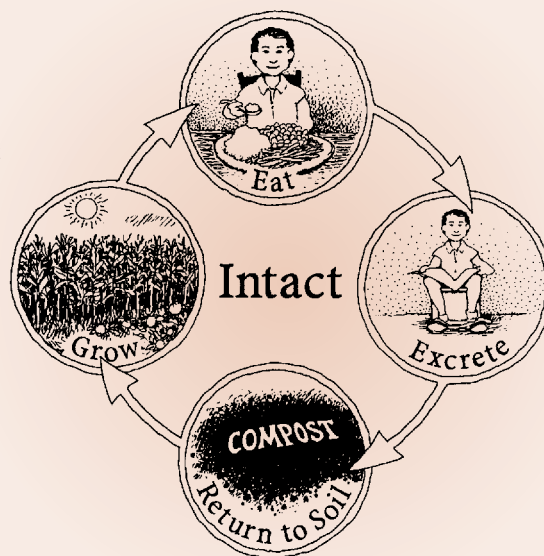
Composting toilets require regular operation and maintenance; thus a serious commitment on the owner and/or user of the composting system is necessary. Once the liquid or leachate has been removed from the system, either by draining or evaporation, the aerobic organisms decompose the solids. Bulking agents such as grass clippings, leaves, sawdust, or finely chopped straw can be added to provide spaces for aeration and an adequate carbon food source for microbial growth. Periodic turning or mixing of the compost

is required, and for some units, this is automated so that the owner or user does not have to perform this task. For other units, it will be the responsibility of the owner or user.

The finished end product, the humus, must be removed periodically. Time frames for removal will vary with each unit. The humus should be inoffensive and safe to handle. Handling and disposal or reuse of the humus should follow in accordance with local and state regulations.

The Human Nutrient Cycle *Intact* and *Broken*

The Human Nutrient Cycle is an endless natural cycle. In order to keep the cycle intact, food for humans must be grown on soil that is enriched by the continuous addition of organic materials recycled by humans, such as humanure, food scraps, and agricultural residues. By respecting this cycle of nature, humans can maintain the fertility of their agricultural soils indefinitely, instead of depleting them of nutrients, as is common today.



Food-producing soils must be left more fertile after each harvest due to the ever-increasing human population and the need to produce more food with each passing year.

Source: The Humanure Handbook.
Jenkins Publishing, PO Box 607, Grove City,
PA 16127. To order, phone: (800) 639-4099.

Advantages of composting toilets include:

- Reduced water consumption
- Reduced quantity and strength of wastewater to be disposed of on-site
- Well suited for new construction at remote sites
- Low power consumption
- Elimination of need to transport wastes for treatment/disposal
- Nutrient-rich end product
- Potential reduction in size of septic system to handle other wastes

Disadvantages of composting toilets include:

- Maintenance requires commitment from owner/user
- Improperly installed or maintained systems may produce odors or an unprocessed end product that may have possible health consequences
- Too much liquid (leachate) in the reactor can disrupt the composting process if not drained or maintained properly
- Removal of end product may be unpleasant if unit is not functioning properly
- Does not eliminate the need for a septic system in many cases to treat other wastes
- Some units require a power source for heat and/or ventilation
- Aesthetics may be a concern since the excrement in some units may be in sight of the user

Ranking the advantages and disadvantages of composting toilets depends on the individual owner. This will determine if a composting toilet is an acceptable option.