Garbage Grinders or Garbage Disposers and Septic Tank Maintenance

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Effects of Garbage Disposer Units on Septic Systems & on Municipal Sewers

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Garbage disposers and septic systems:

Here is the homeowners guide to use of garbage disposers or garbage grinders with septic systems or with municipal sewer systems.

Garbage disposal units, also called garbage grinders, food waste disposal units, or garbage disposers add to the solid load in the septic tank. A garbage grinder is a mechanical grinder which receives food scraps, typically down a kitchen sink drain, and grinds them into a water/debris slurry that can pass down the building drain. Both electric and water-powered garbage grinders are available.

While garbage grinders are a convenience for the homeowner, the added waste they place in the septic tank might mean that the septic tank needs to be pumped more often. Photo courtesy of InSinkErator™. The garbage disposal unit shown is their Evolution Septic Assist(TM) that includes an enzyme injector for use with private septic systems. This article is part of our series: "Septic Tank Maintenance: What Can Be Flushed into a Septic Tank - Septic Tank Maintenance and Cleaning Advice".

This document explains how to extend the life of the septic system by being careful about what goes into it. Use of this information at other websites, in books or pamphlets for sale is reserved to the author.

SEPTIC TANKS & GARBAGE GRINDERS - Garbage Disposal Unit Effects on Private Septic Systems

Some writers estimate that 40% of homes in the U.S. use a garbage disposal unit - but that statistic is not broken down between homes served by a private septic system and homes connected to a municipal sewer. Is a kitchen disposal unit, that is, a garbage disposer harmful to a private septic system? Let's look at what happens when a garbage disposer is used.

Garbage Grinder or Garbage Disposers impact on septic systems: food scraps ground and sent down a drain from a kitchen sink disposal unit increase the solids load in the septic tank. These solids may also be slow to separate and settle into the sludge layer or combine with the floating scum layer in the septic tank.

What is the effect of garbage disposals on septic systems?

Depending on how much use a garbage disposer unit receives, the added solid load it places into the septic tank can mean that the tank needs to be pumped more frequently. Adding to the actual load of ground food waste sent into the septic tank, we've observed that many homeowners are tempted by the presence of the garbage grinder to pour waste household oils and grease into the system. That's a bad idea.

Many septic codes (such as this New York septic code) and other septic authorities state that if a home has a garbage disposal unit installed it should count as an additional bedroom in estimating the load on a septic tank.

Other septic design guides suggest that when a garbage disposal unit is to be installed in a home with a septic tank and drainfield, the average daily wastewater usage level be increased by 250 gallons. To us this seems questionable: the solid load on the septic tank will be increased more significantly than the liquid wastewater load when a garbage disposer is in use.

What can we do to protect septic systems where a garbage disposal unit is installed?

More frequent septic tank inspection and pumping

Significant steps you can take to protect the septic system from the additional solid load from ground food waste produced by a garbage disposer also include:

- **Inspect the condition of the septic tank**, sludge and scum layer to determine if septic tank pumping is needed right now.
- **Pump the septic tank now and check its condition again the next time the septic tank is due to be pumped** on-schedule. If the solid load in the tank (sludge and/or scum layer thickness) is higher than anticipated, pump the tank on a more frequent schedule. Since some research of the effect of garbage disposers on municipal sewer systems did not indicate that there was necessarily a harmful effect (discussed below), you may find that simply continuing normal septic tank maintenance on a normal schedule is all that's needed.
- **Avoid grinding materials that will not break down readily in the septic tank** since such items may add unnecessarily to the sludge load.

Refer to our Septic Tank Pumping Frequency Guide SEPTIC TANK PUMPING SCHEDULE, but when reading that table, increase the number of occupants or bedrooms by one if the building has a garbage disposal unit installed.

Our advice about use of septic tank additives, Septic System Additives & Chemicals for Septic Tank and Drainfield "Maintenance," "Un-Clogging," or "Repair" - Septic Tank Treatments, can be read at: SEPTIC TREATMENTS & CHEMICALS

Use of garbage disposer booster enzymes

Some garbage disposal units intended for use in homes connected to a private septic system include a device that sprays an enzyme treatment whenever the disposer is used (such as the InSinkErator unit shown in the photo at the top of this page - www.insinkerator.com).

The enzymes are contained in a replaceable cartridge. In general we oppose use of *any* septic system additive, and we are looking for research that supports the use of enzymes with garbage disposers which may amend that view.

Enzymes, provided that they do not cause agitation in the septic tank, are among the products less-likely to harm the septic system. We're waiting to review evidence that septic tank enzymes are needed at all, and we want to see evidence that these septic tank additives reduce the need for more frequent tank pumping for a septic system system serving a home with a garbage disposer.

High-Organic-Strength Wastewater (Including Garbage Grinders)- US EPA Information

Onsite Wastewater Treatment Systems Special Issues Fact Sheet 2 EPA 625/R-00/008

Description of the Effect of Garbage Grinders on Septic Systems & Wastewater Pretreatment

Because many onsite treatment alternatives are sensitive to organic loading rate, high-strength wastewaters may require additional treatment steps to ultimately meet environmental discharge or reuse goals. Among the individual home options that increase the organic strength of the wastewater (see chapter 3) are water conservation and use of garbage grinders (disposals). Commercial wastewater may also be high in organic concentration and, thus, organic loading. The database on such wastewaters is extremely limited for use in design of OWTSs.

The major concern caused by high organic loadings in the pretreated wastewater is higher organic loadings (e.g., BOD) to the infiltrative surface of the SWIS, which could result in clogging. A certain degree of clogging at the interface of infiltration trenches and the surrounding soil is expected and helps the soil absorption field function properly. The

clogging layer, or biomat, which forms at this interface, is composed of organic material, trapped colloidal matter, bacteria, and microorganisms and their by-products. The biomat may slow the infiltrative capacity of the SWIS, but it increases effluent treatment time under unsaturated aerobic conditions (in the vadose zone below the trenches).

Physical clogging occurs when solid material such as grit, organic material, and grease is carried in the effluent beyond the septic tank to the soil adsorption field and deposited on the biomat. Biological clogging generally occurs with excessive organic loading to the biomat, which results in excess microbial growth that restricts the passage of effluent into the soil. Slimes, sugars, ferrous sulfide, and the precipitation of metals such as iron and manganese are additional clogging byproducts. Chemical clogging can occur in clayey soils when high concentrations of sodium ions exchange with calcium and magnesium ions in the clay. The soil loses its structure and becomes tighter and more impervious.

Garbage disposals and Their Impact on Septic Systems

Garbage disposals, which have become a standard appliance in many residential kitchens in the United States, contribute excessive organic loadings to the infiltrative field and other system components. Usually installed under the kitchen sink, disposals are basically motorized grinders designed to shred food scraps, vegetable peelings and cuttings, bones, and other food wastes to allow them to flow through drain pipes and into the wastewater treatment system.

Disposing of food waste in this manner eliminates the nuisance of an odor of food wastes decaying in a trashcan by moving this waste to the wastewater stream. Many states accommodate these appliances by prescribing additional septic tank volume, service requirements, or other stipulations (e.g., septic tank effluent filter, multiple tanks, larger infiltration field) that address higher BOD and TSS loadings.

Table 1 contains reported information that illustrates that in-sink garbage disposal units increase septic tank loadings of BOD by 20 to 65 percent, suspended solids by 40 to 90 percent, and fats, oils, and grease by 70 to 150 percent.

For any septic system, the installation of a disposal causes a more rapid buildup of the scum and sludge layers in the septic tank and an increased risk of clogging in the soil adsorption field due to higher concentrations of suspended solids in the effluent.

Also, it means that septic tank volumes should be increased or tanks should be pumped more frequently.

Table 1. Increase in pollutant loading caused by addition of garbage disposal

Parameter	Increase in pollutant loading (%)
Suspended solids	40 - 90
Chemical oxygen demand	20 - 65
Total nitrogen	3 - 10
Total phosphorus	2 - 3
Fats, oils, and grease	70 - 150
Sources: Hazeltine, 1951; Rawn, 1951; Univ. of Wisconsin, 1978; USEPA, 1992.	

Comparison of the biocompatibility of organics in wastewater discharged into soils versus into bodies of ocean or fresh water

Really? We have come across a "Biocompatibility chart" that summarizes the biocompatibility of common wastewater constituents with the four most common disposal environments: arid land soil, tropical and temperate soil, ocean water,

and bodies of fresh water. That nice table asserts that organic compounds are beneficial food for soil microorganisms, but adds that fast biodegradation times are desirable. Some confusion ensued: are we talking about food waste or organic compounds at the molecular level? Certainly as you can read throughout this article, experts opine that ground food waste is a load on onsite wastewater disposal systems such as drainfields, leaching pits, soakaway beds and the like.

The same wastewater biocompatibility chart makes clear that organic compounds must be removed by oxidation in pre-treatment before disposal into either ocean water or into bodies fresh water in order to prevent harmful oxygen depletion of oxygen dissolved in those waters. Fast biodegradation times are essential in these circumstances. Details are at WASTEWATER BIOCOMPATIBILITY.

Arguments for Avoiding or Eliminating the Use of Garbage Disposers for Onsite Wastewater Disposal

Eliminating the use of garbage disposals will significantly reduce the amount of grease, suspended solids, and BOD in wastewater (see table 1). Elimination of garbage disposal use reduces the rate of sludge and scum accumulation in the septic tank, thus reducing the frequency of required pumping. All of these can improve wastewater system performance.

For system owners who choose to use garbage grinders, manufacturers recommend grinding wastes with a moderate flow of cold water. No research data representing claims of enhanced performance of garbage grinders equipped with septic system additive injectors are available. Additives are not required nor recommended for onsite system operation, and some might actually interfere with treatment, damage the drainfield, or contaminate ground water below the drainfield. (See Special Issues Fact Sheet 1.)

The most common unsewered commercial sources that exhibit high organic strength are restaurants, although a variety of commercial sources produce such wastewaters. These include other facilities with food service capability and dairy product/processing plants. The preprocessing required to remove the source of excessive organic strength is a function of

(1) the fractionation of the organic content (settleable, supra-colloidal, colloidal, or soluble);

(2) the site characteristics; and

(3) the final steps in OWTS processing and the environmental introduction method.

Typical Applications of Wastewater Pretreatment Systems

Additional pretreatment is typically required before discharge to a SWIS or surface water. There are some proprietary aerobic units that are designed to accept high organic loads, and greatly increase the potential for odors and, where concrete structures are employed, corrosion.

Therefore, odor protection becomes a major issue for the designer in these situations. These units are usually a combination of suspended growth/fixed growth or enhanced Continuous-Flow, Suspended Growth Aerobic Systems (CFSGAS; see Technology Fact Sheet 1). Alternatively, anaerobic upflow filters (UAFs) and other anaerobic proprietary and nonproprietary systems can also "thin" excess organics to permit normal loading to these final processing steps.

The Safe Drinking Water Act (SDWA) underground injection systems (UIC) Title V Rule, which is discussed in chapter 1, is designed to eliminate some of these problem wastewater sources of potential ground water contamination (e.g., auto repair facilities) from further consideration for SWIS disposal.

Design of Wastewater Pretreatment Systems

For domestic systems the additional organic and oil/grease concentrations resulting from use of a garbage grinder usually does not in itself cause the wastewater to require additional processing as described above, but the designer should at least calculate any potential design changes that might be required by the increased strength. For example, for a sandy soil, the bottom area hydraulic loading rate could be cross checked against the limiting organic loading rate limits cited in table 4-2. Most state codes require a septic tank size increase to account for the additional volume of sludge and scum accumulating in a septic tank but offer no advice as to any increasing field size.

For restaurants, facilities with food preparation, and other producers of high-organic wastewaters, the designer must evaluate alternative pretreatment schemes that can reduce the excess organics (and sometimes other constituents) to levels that allow subsequent processes to function normally and achieve surface water effluent discharge or reuse standards, if applicable.

An analysis of organic waste sources and waste characteristics (particulate/soluble fractions) is required to determine the best pretreatment approach. On the latter issue, if the majority was coming from a highly concentrated, low-volume source in the facility, a holding tank/hauling solution may be most cost-effective choice. The fraction that contains the majority of the excess contaminants might be readily removable by a specific process (e.g., soluble and biodegradable (aerobic unit) versus supracolloidal and removable by flocculation/sedimentation (vegetated submerged bed or anaerobic upflow filter).

Performance of Wastewater Pretreatment Systems

The performance of these pretreatment devices is discussed in other fact sheets. Influent concentrations which still exceed normal loading rates can be accommodated by increasing the size or other key basis of computing loading rate or by investigating and implementing pollution prevention measures to reduce the source concentration of the constituent of concern (e.g., BOD).

The reliability of anaerobic processes is highly temperature-dependent, thus requiring heating in northern climates. However short-term anaerobic upflow filters and vegetated submerged beds are less sensitive because of their primary reliance on physical processes. Aerobic treatment processes are also temperature-sensitive, but less so than anaerobic processes.

There is little documented, quality-assured information on the performance of small alternative systems that treat high organic strength wastewater. However, well-managed aerobic units, upflow filters, and vegetated submerged beds are known to perform reliably.

Management needs of Wastewater Pretreatment Systems

Management needs are the same as those noted in the unit process fact sheets.

Risk management issues of Wastewater Pretreatment Systems

Depending on the sequence of processes chosen, the impacts of flow variation, toxic shocks, extreme temperatures, and power outages may cause significant variations from expected treatment performance. However, high-strength wastewaters greatly increase the potential for odors and, where concrete structures are employed, corrosion. Therefore, protection from odor becomes a major issue for the designer in these situations.

Costs of Wastewater Pretreatment Systems

Costs of treatment trains for high-organic-strength wastewaters can be estimated from the costs of the unit process components.

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