WATER QUALITY RESEARCH COUNCIL

Water Softeners Pose No Problems for Septic Tanks

RESEARCH REPORT

Septic Tank / Water Softener

"Potential Effects of Water Softener Use on Septic Tanks Soil Absorption On-Site Wastewater Systems"

University of Wisconsin - Madison

"The Effect of Home Water Softener Waste Regeneration Brines on Individual Aerobic Wastewater Treatment Plants."

The National Sanitation Foundation

PURPOSE

The purpose of these studies was to provide documented answers to the following questions:

1. Is the salt-brine discharge from water softener regeneration toxic to the bacteria in the treatment system?
2. Does the flow rate and volume of backwash and regeneration water discharged from a water softener have an effect on the settling and floatation process causing carryover of solids into the drain field?
3. Does water softener regenerational discharge reduce the percolation of water through the soil in seepage fields by causing swelling of soil particles?

FINDINGS

The studies conducted by scientists at the University of Wisconsin - Madison, small scale waste management project and the National Sanitation Foundation confirmed the results earlier but less definitive studies; and were in complete agreement with earlier assumptions and industry conclusions.

1. Water softener waste effluents actually exert a beneficial influence on a septic tank system operation by stimulating biological action in the septic tank and cause no operational problems in the typical anaerobic or aerobic septic tanks.

2. The volume of softener wastes are added to the septic tank slowly and are not of sufficient volume to cause any deleterious hydraulic load problems in septic tank systems. In fact, they are lower in volume and rate of addition than waste from many automatic washers.

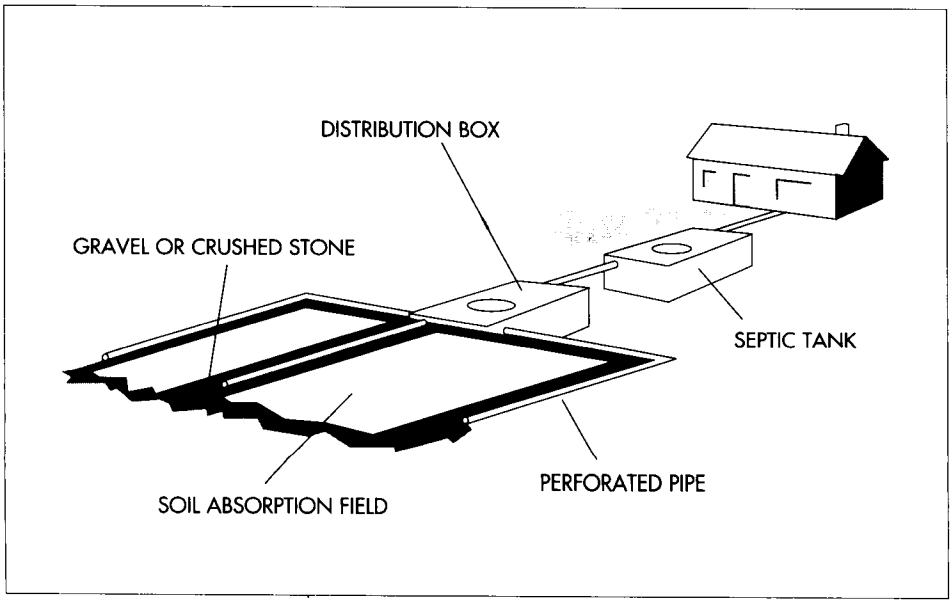
3. Water softener regenerational wastes not only should not interfere with septic tank system drain field soil percolation but actually might improve soil percolation, particularly in fine textured soils.

The results confirmed earlier government tests which had reached the same conclusions, but were questioned because they were interpreted to be in contradiction to the scientific literature on irrigation which demonstrates adverse effects of high sodium water on soil structure and permeability, especially in clay-type soils. It is known that when fresh water was used on irrigated soils with a high proportion of exchangeable sodium, reduced conductivity occurred as the high total salt levels were diluted with the irrigation waters.

The important and beneficial difference is that water softener effluents contain significant amounts of calcium and magnesium, which counteract the effect of sodium and help maintain and sustain soil permeability.

The studies concluded that it is better to discharge water softener wastes to septic tank systems than to separate dry wells or ditches.

FIGURE 1



BACKGROUND

An estimated 20 million on-site household sewage disposal systems are in place in the United States. Many of these systems have operating problems from time to time. It is natural that homeowners, local contractors, installers, and regulatory personnel should look for the reasons for these problems and, perhaps inevitable, that some may blame water conditioning equipment.

The supposition that could be used to eliminate water softeners might be as follows: "Everyone knows that lack of or excessive amounts of salt will kill bacteria, and if a home with a softener has a problem, it could be caused by the softener. Anyways, it is better to advise against softeners, which might cause a problem, than to take a chance."

No matter what the reasoning, the questions concerning the effects of water softener regeneration wastes on these private sewage disposal systems are not new, and the industry has collected a good deal of information on the subject over the years. This information served the industry well, and there were no major restrictions on the use of water softeners for over 25 years.

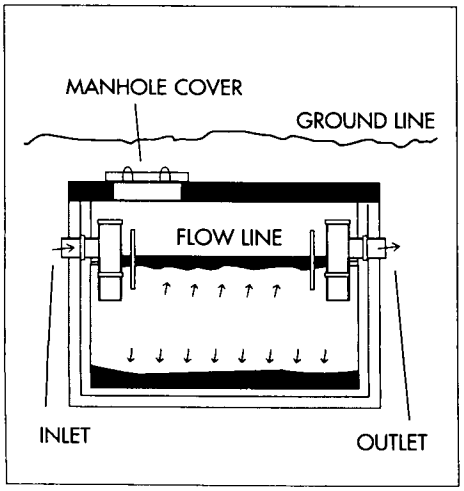
However , in the mid 1970s, first a county in one state, and then another jurisdiction in another state, and then later, entire states enacted regulations prohibiting the discharge from softeners to private sewage disposal systems.

SEPTIC TANKS

The most widely used septic tank system is shown in Figure 1 (front page). The sewage is received from the home into the septic tank where the organic matter present is partially digested and solids are collected. Relatively clear water is discharged from the tank to the soil through a suitable distribution system.

An example of a typical single compartment septic tank is shown in Figure 2, The sewage enters at one end which is properly baffled to prevent bypass flow and reduce turbulence. In the main part of the tank, less buoyant solids settle to the bottom of the tank, and the lighter than water oils, greases, and solids rise to the top as shown in Figure 2. Under ideal conditions, much of the soluble organic matter, heavy solids, and floating greases are digested by the bacteria normally present in the sewage. Since these bacteria operate in the absence of air, this digestive process is called "anaerobic."

FIGURE 2



Ideally, by the time the wastewater passes through the baffled outlet of the septic tank, through the distribution box, and into the disposal field, most of the suspended solids and organic matter have been removed. The water then is passed into the drain field in which perforated pipe or tile with open joints allow the water to trickle out into the trenches. These trenches are commonly bedded with gravel or crushed stone which further distributes the water as it is applied to the soil absorption field.

FIGURE 3

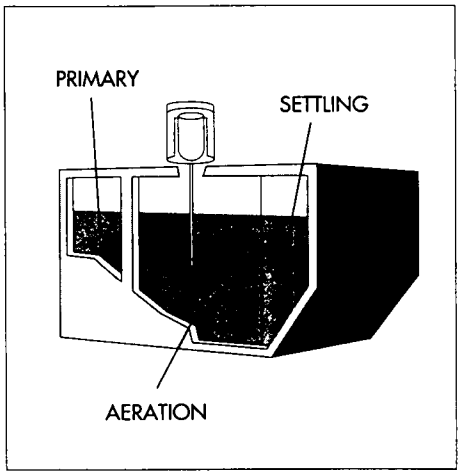


Figure 3 is an example of a concrete home aeration plant with no effluent filtration. These plants can be characterized as utilizing preliminary sedimentation, mechanical aeration, and final sedimentation with surface skimming.

Water softener waste effluents actually cause ...no operational problems in the typical anaerobic or aerobic home treatment plants.

The NSF study operated two aerobic plants for approximately six months with simulated use being a family of five persons at a rate of 50 gallons per person per day. The NSF test demonstrated no adverse plant performance, even when stressed by loading at a rate simulating 10 persons (twice the average use rate).

FOR MORE INFORMATION

The complete 70-page Research Report, Order No. R12 may be purchased from:
Water Quality Association
4151 Naperville Road
Lisle, Illinois 60532

Order No. R12s