

Firm: Non-Proprietary

System: Urine separation at its source

Category:



**URINE SEPARATION +
PASTEURIZATION**



Separation Insert + Composting



European Separation Toilet

Process: Urine is separated at its source. It is then stored separately and pumped or delivered for treatment and reuse as fertilizer.

System: Urine separation requires either a special toilet that separates urine from solid wastes, or a waterless /foam urinal. The solids can either go to a composting tank (preferred) or the central plumbing system. The urine is diverted to a holding tank, which needs to get pumped. The urine is then pasteurized, after which it can be used as fertilizer.

Energy: Energy is needed for pasteurization.

Costs: Toilets are imported, so currently expensive \$1200. Overall costs should be low, less than \$5,000.

Costs for removing nitrogen using enhanced wastewater technology range from \$285 to \$820 per pound.¹ This equates to roughly \$17 - \$50/gallon. Urine separation may be able to reduce this cost dramatically. This process can also support farming and landscaping companies by reducing costs for fertilizer and potentially increasing yield. The Rich Earth Institute has demonstrated through field trials that the nutrient uptake from urine fertilizer applications on hay fields has resulted in 3-5 fold increase in hay production (biomass) with no observed impacts to water quality.

¹ Barnstable County Wastewater Cost Task Force, " Comparison of Costs for Wastewater Management Systems Applicable to Cape Cod," April 2010



Outdoor storage tank (urine)



Basement Composting



Low Tech Option

Urine diversion is emerging as a critical solution to water and energy conservation, nutrient flow management in the environment, enhanced decentralized wastewater treatment and sustainable fertilizer sourcing. The urine separation process is receiving increased levels of interest and testing, especially in Europe. In the United States, The Rich Earth Institute in Vermont has devoted its efforts to studies, installations, and promotion of this economical solution to pollution.

Urine contains 80% of the nitrogen in household wastewater, so its diversion from the waste stream represents competitive mitigation. The nutrients in urine are comparable to those normally found in commercial fertilizer, in a ratio of 11 (Nitrogen)- 1 (Phosphorus) and 2.5 K-Potassium. Urine is typically pathogen free (feces), but pasteurization ensures against any contamination. Urine is also free of heavy metals.

The impact of urine separation: for every gallon of urine collected, .058 pounds of nitrogen are removed from the watershed and can replace the use of applied fertilizer.

Advantages:

- Effective removal (80% mitigation)
- Low cost
- No energy use in the home
- No noise
- Reuse
- Reduction of fertilizer use

Disadvantages:

- Needs support infrastructure for removal and treatment
- Behavioral change is needed, especially for women