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Title	Composting human waste from waterless toilets
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Composting human waste from waterless toilets

Sanitation is the principal concern with composting human waste into a nutrient-rich soil amendment. A potential source of excreta comes from waterless toilets.
Composting or dry sanitation provide waterless toilet options. In northern Europe such alternatives are frequently used in cabins and for homes in rural areas. Composting toilets are also widely used in dry areas and poor countries. Such kind of toilets can be designed with or without urine diversion. Investigations have shown that in composting toilets of Scandinavian make it difficult to achieve temperatures above 40 ^{0}C in the composting compartment and it is questionable whether the material is hygienized unless very long resting periods are used before emptying. International research shows that dry sanitation may give an equal or higher reduction of pathogens and a high reduction in risk of exposure. Hence, dry sanitation/composting toilets is not inferior to other types of sanitation provided the right measures are taken in operation and handling. One of the highest potential health risks occur when the toilet is to be emptied. This can be counteracted if the toilet is designed with removable compartments or if the emptying is performed by professionals. In order to assure a proper hygienized material secondary composting should be performed. In Norway a municipality is now pioneering a centralized collection and secondary composting of waste from composting toilets. A local farmer is collecting the toilet waste and treating this in a newly developed composting reactor (in vessel) that renders a hygienized soil-like end product.
This paper describes the concept of professional collection and treatment in a small rural community and the technology involved. Partially composted excreta, mixed with food waste and bark, was sanitized in a bioreactor). The insulated reactor was fitted with a vacuum pump to collect leachate, which was recycled to the compost. The results suggest that secondary composting can produce a safe soil amendment in about two months – in contrast to the generally recommended six months – provided the system is properly managed. Material must be mixed before the compost process starts and weekly after temperatures are recorded.

The objective of the investigation was to test the performance of a secondary reactor that recycles compost leachate to accelerate the destruction of pathogens... Increased efficiency was attributed to better preparation of waste material, which created a more aerobic environment. Results suggest that the system can meet the safety standards of Norway regulatory authorities in about two months provided the system is properly managed.