

Technology review „Composting toilets“

This abstract gives a short overview about the technology review „Basic overview about composting toilets (with or without urine diversion)“ written by Wolfgang Berger.

The target group of the technology review are people that want to get an overview on composting toilets, their principles and systems. The focus in the manuscript is laid on design, operation and maintenance (O&M), and the quality of the produced compost. The functional principles of composting toilets such as biological processes, bulking material and pathogen removal (desinfection) are explained and recommended literature is listed. Case studies from around the world show that composting toilets can be applied under different climatic and socio-economic circumstances.

Composting toilets are dry toilets without flushing water. Therefore, they can be applied independently from sewer systems and provide safe, hygienic sanitation and a wide range of possible application. The two basic elements of a toilet are a place to sit or squat and a collection or composting device. In addition to that, a ventilation system helps to avoid malodours and reduce excess moisture. Composting toilets can be either manufactured or owner-built. The emptying frequency depends on the size of the collection device, the feeding rate and the composting conditions. Toilets can be designed with or without urine diversion. Advantages of urine diverting composting toilets are the simplified management of leachate and the potential use of urine as liquid fertiliser. In the technology review 4 types of composting toilets are explained in detail: (1) single vault composting toilets, (2) multiple vault composting toilets, (3) mobile bucket or bin toilets followed by external composting, and (4) composting toilets with mechanical devices. Regular maintenance of private or public toilets is crucial to ensure their safe functioning. Therefore, proper cleaning of the toilet and maintenance of technical components of the facilities is necessary. A strong commitment of the users and operators and the handling of faecal compost are necessary to keep the facilities running.

The composting process includes the degradation of organic matter by thermophilic aerobic bacteria (thermophilic organisms thrive best at temperatures between 40°C and 80 °C). Temperatures of more than 50°C can be reached if conditions are optimal. Then substantial pathogen reduction is possible. Due to its complexity, the composting process is difficult to manage and measurements have shown mesophilic (15°C and 40°C) conditions in the composting vault. Therefore, monitoring of the composting process as well as safe treatment, handling and application of faecal compost and possible leachate is very important. Complete pathogen reduction can rarely be obtained by composting toilets alone. In general long maturation times or secondary composting outside the toilet are often required.

For more information on composting toilets the reader is referred to the full manuscript:
Berger, W. (2010). Composting Toilets. Technology review 3, GTZ, Eschborn, Germany
Available free for download at: www.susana.org. (Main text/Appendix)