

Efficiency of different sanitisation methods on nutrient preservation and pathogen destruction in faecal matter: Report on ongoing research in Ghana

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Introduction

Public urine diverting dehydrating toilet systems have clear advantages over individual household flush systems. Building and maintenance cost per user is lower, no fixed pipe connections as well as public sewers are required and the water demand is minimal. The use of the collected sanitary materials (urine and dry faeces) as a nutrient source for agriculture offers an ecologically sustainable disposal solution.

Urine has an inherently low pathogen load and is easily sanitised by storage. Though dehydration of faecal matter in these toilet systems is known to lower the pathogen load, a secondary treatment is needed to reduce the remaining infectious risk to an acceptable level for the use in farming.

In urban areas treatment of faecal matter in central large scale mechanised composting plants has proved to lower the pathogen load efficiently. For rural areas simpler but equally safe methods are needed.



Faecal sludge co-composting trial at Valley View University in Accra, Ghana

Objective To compare the efficiency of different sanitisation methods of faecal matter from dry toilet systems in respect to nutrient conservation and pathogen destruction.

Method In 2007 a co-composting trial of faecal matter with shredded plant material in a multilayer sandwich set-up was conducted at Valley View University with a pseudo-replicate at a nearby orphanage. Variables were the ratio of faecal matter to plant material and the turning frequency. In 2008 the trial has been refined by adding food waste as substrate and using a) insulated and b) uninsulated composting chamber. Further, the treatments c) simple pre-composting plus solarisation, d) drying plus incineration and e) burying are included.

The native faecal bacteria load is monitored and hygienisation efficiency validated by bacteria, virus and ascaris egg deactivation rates.

Conclusion

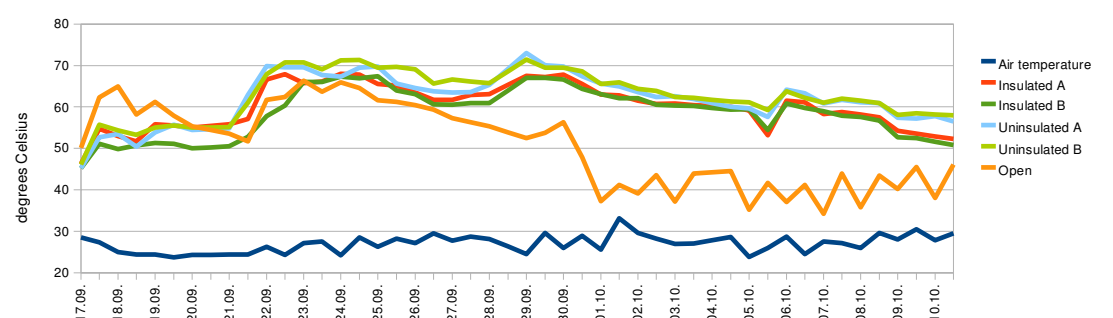
Compost temperatures remained in 2007 below 55°C and no clear treatment or site effect on temperature and bacteria inactivation was detected.

Preliminary data from 2008 reveal that both, easily digestible food waste (comparing 2007 and 2008 open composting) as well as chambers (comparing chambers with open composting), have a strong impact on the temperature. Insulation lowered the temperature by up to 4.3°C ($p < 0.05$) possibly due to reduced gas exchange. Solarisation temperatures remain below 60°C.

Results including micro-organism deactivation rates are forthcoming.



Solarisation trial and compost chambers at Valley View University



Course of temperature in insulated and uninsulated compost chambers and open composting followed by solarisation (30th September onwards)