Effect of Ash and Sawdust on Pathogen die-off in faecal matter during storage

ABSTRACT

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Ecological sanitation (Ecosan), as one of its major objectives, is aimed at solving the problem of a large one-way flow of nutrients contained in excreta, by recycling them in agriculture as fertilizer. However, since excreta contain pathogens, sanitization is necessary before it can be used as fertilizer. Some guidelines on sanitization of faecal matter have been developed in some temperate regions of the world, but none for tropical regions in which, our country, Uganda lies. In view of the above, this research project investigated the effect of additives used in toilets and chamber conditions in faecal buckets on pathogen die-off rates, determine the levels of different physical chemical conditions in ecosan toilet, determine the die-off rates of selected faecal pollution indicators and pathogens under different conditions of temperature, pH, moisture, ash and sawdust, the locally available materials were selected as additives for the study.

Selected additives of ash and sawdust were taken to Kalungu Girls Training Centre (GTC) in Masaka and added in the ecosan toilets from which bio-solid samples were collected in buckets. These samples were then transported to Makerere University College of Engineering Design Art and Technology ecosan toilet and placed in chambers. These buckets were stored in the vault so as to undergo the same conditions that prevail in the chambers. Samples were taken bi weekly for a period of six months (May – November 2016). Faecal samples were analyzed for pH, moisture content, *in-situ* temperature and number of *E. coli*, and *Enterococci*.

The results show that ash had a high pH, with an average value of 10.4, which favoured pathogen die-off as compared to sawdust, which had a pH of 8.6. *E. coli* in the ash bucket was eliminated completely by day 28, while in the sawdust bucket complete die off was achieved at the end of day 195. Average temperature in the ash bucket was 26.4^0C while that in sawdust bucket was 27.1^0C. The average moisture content in the ash bucket was 26.83%, while that of sawdust was found to 23.83%.

In conclusion, the research showed that ash is a better additive for faecal sanitization than sawdust. It was therefore recommended as an additive to be used compared to sawdust. There is need for further investigation on storage time necessary for total sanitization when using additives under tropical climate, the effect of the amount and particle size of additive used on pathogen die-off rate in faecal matter.