Efficiency and feasibility of biological grey wastewater treatment facilities in Virklund, Denmark

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ABSTRACT

Reuse of water from households is uncommon in Denmark, but in arid countries reuse of water have taken place for decades. The ways of reusing the water is many depending on the need. Denmark has some experiences with reusing grey wastewater from the baths to flushing the toilets after a simple biological treatment. Even with that experience many grey wastewater treatment facilities had so extensive problems that the facilities had to shut down. In the last 8 years two third of the treatment facilities have shut down mostly because of microbial growth in the toilet cistern.

Experiments have been made on two grey wastewater treatment facilities in Virklund near Silkeborg in Denmark. The treatment facilities are situated in two blocks of flats with 30-35 occupants each. This experiment has been made in order to find out if those facilities have similar problems and how these problems can be solved. Also the economic benefits by saving water and reducing the volume discharged to the sewage system are evaluated.

The bacteria indicators *E.* coli were found in concentrations much higher than the Danish law authorise in both grey wastewater treatment facilities. A lot of sludge can be seen in one of the toilet cisterns. Further, high amounts of particles can cause formation of sludge in the toilet.

In the current design the treatment facilities are not ideal. Not enough water is cleaned in order to cover the water use for toilet flushes and a lot of drinking water must therefore be added to the clear water tank. Due to this high input of drinking water it seems that the facilities running not is economical favourable, but needs to be examined more before taking a final stand.

Ways of assuring acceptable clean water to the toilets could be to make sure the disinfection in the end of the treatment facilities is maintained frequently in order to optimise removal of bacteria and to add a filter before the clean water tank to increase removal of particles.

The technology is clearly most feasible if water prices are high, because then the facilities treat the grey wastewater cheaper than it is to buy drinking water. With the continuing raise of water and wastewater disposal prices the technology does have a future feasibility in Denmark.