In house developed domestic compost-toilet and twenty years experience

Ákos Nemcsics

Research Group for Materials and Envoromental Science, Óbuda University, Budapest, Hungary

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Introduction

The problem

The Solution

Barriers of the dissemination



The biggest challenge of the clean water recovery from waste water is the decomposition and elimination of the human waste, mostly excrement. The chemical compounds based on nitrogen, causing eutrophic effect, are getting almost exclusively through the WC into the waste water.



By using compost or dry toilet, the human waste is not getting into the waste water system, therefore the purification of the waste and the recovery of the clean water is substantially simplified.



Presently the popularity and the general use of the compost toilet is hampered by the internal modifications required to the abode and other minor inconveniences caused by the toilet.

Waste water management



Water is one of the fundamental elements for life and only a small fraction of the water on the surface of the globe is fresh water, suitable for human consumption. This small quantity is used however wastefully, polluting it with nitrogen compounds, causing eutrophic processes. The purification process is a complex, expensive and energy demanding process. The removal of the excrement at source and similar human waste, would simplify the technology of purification substantially, reducing the energy required for the purification process. The question arises; what stopping the use of the dry system?

Waste water management



A) Leakaging system 1: jointed drain, 2: solving basin, 3: sand filter - optional -, 4: leakaging field, 5: ventillation
B) Reeds root system 1: jointed drain, 2: precleaning basin, 3: reeds in isolated pound, 4: controll basin, 5: leakage
C) Separated system 1: compost hill, 2: comost toilet, 3: anaerob reactor, 4: aerob reactor - optional -, 5: garden pound - drinking water quality

The environmental friendly purifications fall into three categories. 1st: Leaking system; 2nd: Reeds root system; The third method offers the most logical solution. Large parts of the nitrogen based pollution in domestic waste water, approximately 98%, is originated from human excrement. By separating the toilet from other domestic waste the household virtually generates no polluted water.

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The elimination or at least the reduction of the human waste from the water cycle can be achieved by the use of the CT, dry or bio-toilet.

Preliminaries



People, living in harmony with nature, generate no waste. In the rustic society the dung heap and latrine were commonly used. Its content was composted and used as fertilizer in agriculture. In the middle ages its content had its monitory value and it was often the subject of auction. The 20th century people rediscovered again .this well tried system, the compost making from human excrement, instead of the energy demanding and polluting water closet.



Against the realization



Its popularity is hampered by the lack of general knowledge or ignorance towards the environmental problems, the appreciation what an individual can do for the environmental hygiene.

The general resistance towards CT is the result of the lack of popularising information on the subject. Most people regard CT as something requiring extra work, a source for intolerable odour and the chain pulling as a more convenient alternative. Very little informative publication is available for the general public on the subject.



With housing redevelopment

СТ

Admittedly the position of the CT in an abode creates some difficulties. Most CT-s can not put simply into the usual cubicle. Some alterations are necessary to the existing dwelling and if this, for some reasons, is not successful more alteration is required to reverse the expensive modifications.

About the CT

The CT started from Sweden, first using a specialized wooden box contraption. Since then a number of variation has been developed going from a "privy" look alike to a two storeyed construction. Most of these CT-s have a common solution for keeping the correct ratio between carbon and nitrogen, also the ventilation, exhaust and rotation. People interested in the subject will find that most of the latest CT-s take up the shape of a small scale industrial product. In case of open air installation the possible systems are cistern, trickling and feedbox variations. For indoors use one can search the internet for more robust constructions.



About the CT



One of the most hideous constructions can be reached on steps occupying the whole bathroom, reminiscent of a royal throne. Others are looking innocent and discreet hiding the complex part under the seat. The composting part of the CT positioned (with its imposing size) occupying a large room under the seat (i.e. cellar). The draw beck of these solutions is that they are only suitable for large buildings, because the space required for the composter, limiting the functionality of the cellar. These difficulties make presently the CT-s unpopular.



Having long experience in the field of composting, we set out to provide an alternative plant, for those having no opportunity of making alterations to their dwelling, due to lack of space or money.

The CT, described here, was developed step by step by a series of experiments. We tested a number of configurations in various combinations during several months. Two CT were tested parallel by a family of six. By experimentation we arrived to one configuration, which seems to be the simplest and probably the optimum construction. This has been used, with good results in the last 17 years.



The essential part of the device is a synthetic barrel of 30 litre capacity, supplied with a lid. The barrel is fitted with a lavatory seat. Part of the system is a waste bucket with lid and also a scoop for sand costing so far approximately 20 Euro. All components are available in a hardware store. The purpose of the he bucket and the scoop is to store and spread sawdust or shavings, available from a joiner or carpenter workshop.

Before use, we cover the bottom of the barrel with sawdust 10 cm deep. After every use of the toilet we spread a layer of sawdust into the barrel, covering the product fully. Then the seat is changed back to the lid, which is perforated with holes of 1.5 mm diameter. The sawdust not only governs the well known optimum carbon nitrogen ratio but also absorbs the liquid, therefore deodorizes the content of the barrel. The sawdust on the bottom of the barrel absorbs the excess liquid.



The barrel will fit easily into the bathroom or in the toilet under the wash basin, therefore there is no need for modification in the dwelling.



In the design we have kept it in view the requirements for minimum time for maintenance and operation as well as the hygiene and lack of odour. At the beginning our biggest concern was the possible smell produced by the CT, considering that the CTs, described in the literature, normally furnished with substantially large exhaust systems. Our experience shows that the described CT is not smellier than the water closet so the same ventilation is completely adequate. When the content of the barrel is not stirred then the CT can stay for weeks without any odour. (The temperature is an important factor and we have only the experience for the moderate continental climate.)





The barrel, in case of 2-3 users, will fill up in 2-3 weeks. The full weight of the barrel is approximately 20 kg, easily movable. The content of the barrel can be emptied on the compost heap, mixed with soil, with the kitchen and garden waste. Our experience with the compost heap is also very positive. Opening the compost after a few weeks, we found it full of earthworm, without any sign of rodents or flies or parasites. The compost heap in one year matures into black compost.

A) Compost toilette with bucket for shawingsB) The equipment is still scentless even if we do not empty it for several weeks



We have noted that during the winter months, when the dwelling is not ventilated so frequently the CT did not smell and the small holes on the lid for ventilation, prevented the flies enter the barrel. When accidentally the lid was not secured correctly and flies got into the barrel, contaminating its content, we got rid of the content. Alternatively we emptied the barrel every week, irrespective of its fullness.

We used the CT while our children were in early age and even our friends got use to its usage. We have no negative experience.





The CT has its usefulness to the environment only when it is widely used. To propagate a new idea is never easy; it is against the old well accustomed mentality, fear of anything new and unusual. The only way to combat this attitude is to educate the general public. The old generation have difficulties to accept any changes but the new generation educated in the usage of CT-s will get use to it, accept it and use it. In education the authenticity and personal experience plays an important role.



In the Obuda University a new optional subject was introduced 15 years ago in the curriculum of the undergraduate engineering course under the name of Technical Ecology. The subject introduces the undergraduates to the renewable energy sources to start with, the introduction of biological processes into engineering activity and more. This subject deals, more of them, with the water purification and the usage of CT-s. The subject is not only theoretical but involves a lot of practical activities involving the participants, with their own ideas in the practical construction of the installations. The subject started with a few undergraduate students only, however it rapidly gained popularity and nowadays the audience is recruited from all disciplines. On the students request site visits and summer eco-school camps have been organized twenty years ago.



During one of our excursions we visited the pumping station of the capital city waste processing work (Budapest Fovaros Csatornazasi Muvek Ltd., Ferencvaros). The machinery of the compost recovery and handling equipment, built in the 19th century, is still a remarkable sight. The waste water purification plant represented the pinnacle of the technology at the time. The original filtering plant and sedimentation tanks are still operating albeit nowadays only a fraction of the waste water is handled by it. In the clinically clean engine-room, old photographs sow the history of the plant. One of the photos pictures large concrete fermentation tanks, built in the early 20th century, for the biological break down process of the sludge. At the time, the gas generated from this process was used for heating and warm water production.





The composition of the waste water however changed since, so was the quantity of the waste. For the fermentation of the changed waste water the capacity of the original tanks were not enough. Unfortunately instead increasing the number of tanks, it was decided in the 1960-s to demolish the old tanks, virtually paralysing the plant. The explanation was, that the existing three tanks were not sufficient to serve the increased demand on the plant. Since of course a number of water purification plant were built in the city.

In another occasion the one of the city composter premises (called Cseri telep) was the subject of our studies. This site started in 1893 in then Szentlorinc, which became part of greater Budapest. The city waste was transferred here on a purpose built railway line. In one of the widely known publication, called Urania published the news, that professionals from a number of countries study the waste processing method in the site. Lajos Cseri-s (the designer) advanced technological approach raised professional interest internationally and experts from Paris, London, New York and Sent Petersburg visited the site to have personal experience of the advanced technological process. Presently the site is covered with large compost heaps and rusting machinery as a memento of the once excellent operation. It is encouraging that according of present planes put forward for the revival of the composting site.







Conclusion

During 20 years experiences

at winter, at summer etc. conditions

different ages of users

Results

no health and no hygiene problems positive opinions from visitors

Barriers

prejudice and fear

Solution

education

In this presentaion we outlined a CT, developed in our household. The 20 years experience proved the applicability of the construction in all circumstances. In spite of these positive experiences its wide application is hampered by human resistance for anything new. To overcome this natural reaction the general public needs to be educated. Our educational experience shows that certain anomalies can cause temporary set back in ecological advancement. Hopefully these are not result in permanent damage.

Perspective



We have to look at the future of CT-s seriously. The experience on CT was collected on dwellings surrounded by gardens, most of the population however live in big cities, therefore the solution should be tailored to suit their conditions. The content of full container can still be used for small scale fertilization (allotments) or the council regular waist collection services can recycle it.

Thank you for your kind attention !

