

6. A question of health

The handling the humus withdrawn from the *Fossa alterna*, will always cause a dilemma concerned with health and safety. It must be accepted that handling these products may pose a potential health risk, especially if the facilities have not been managed properly. Only where the *Arborloo* is used, are the risks of handling almost non existent – simply because the processed human excreta lies below a generous layer of topsoil in which the young tree is planted is never handled. In fact the actual health risk of handling well composted *Fossa alterna* humus is small indeed, especially when compared to faecal contamination of hands during anal cleansing. It is only hand washing that can overcome that problem.

In the case of the *Fossa alterna*, the handling of processed excreta is encouraged - more so if the products are introduced into agriculture, which is the recommended practice. The topic of health risks related to handling or coming into contact with excreta is a large and well documented subject (see bibliography: Feachem et al. 1983, Stenström 1999, Stenström 2001). The health risks associated with handling these products can largely be divided into those resulting from the persistence of pathogenic bacteria, and those resulting from the persistence of helminth (worm) eggs.

Health threat from bacteria

Pathogenic bacteria exhibit a natural tendency to die off when outside the human body. Several studies reveal that from a bacteriological perspective the humus derived from human excreta is relatively safe to handle provided that sufficient time is allowed for composting to take place. The 12 month recommended period for composting in the *Fossa alterna* is more than enough time for most health threatening bacteria to perish. Preliminary studies by the writer have confirmed this for periods much shorter than 12 months. Putting the problem in another and far more practical way, the threat of picking up pathogenic bacteria on the hands is significantly greater from the daily routine of anal cleansing practiced by all people compared to the infrequent handling of well composted faeces formed in shallow pits.

The survival of bacteria may be influenced by the type of management procedure undertaken in the toilets. Thus in the *Fossa alterna*, if soil is not added to the shallow pit at all, or in very small amounts, the conversion of the excreta/soil mix into a relatively safe humus will be much slower than with the recommended mix of soil, ash etc being added. However bacteriological die off within the specified 12 month period can be assured if the correct procedures are followed. In promoting the *Fossa alterna*, in particular, every means should be taken to ensure that the simple management procedure of regularly adding soil, ash and leaves to the shallow pit are followed. In those cases cited in this book, the health threat caused by handling humus will be minimal if the simple procedures are followed.

In the real world, there will be few gardeners who do not wash their hands after handling the soil and planting vegetables, and certainly before eating or preparing food. The main problem may lie in the indiscriminate behaviour of very young children who have the habit of consuming many undesirable materials from their immediate living environment.

Health threats from parasitic worms.

On the question of parasitic worms, worm eggs and cysts which will be present in excreta deposited by infected people, may remain viable in the humus for a much longer period than pathogenic bacteria. The risks of hookworm (*Ancylostoma sp.*), roundworm (*Ascaris sp.*), tapeworm (*Taenia sp.*), *Giardia*, and other parasites must therefore form a part of this discussion of the re-use of composted human excreta and health. Thus in areas where parasites like hookworm and round worm are common, there is potentially a much bigger risk in handling the humus. It is certain that worm eggs may survive in the soil for periods longer than 12 months, but this may depend on climate and other factors. Soil is known to be an excellent environment for the maturation of *Ascaris* eggs. Their life is known to be shorter at higher pH and higher temperatures, and the application of lime or ash has been recommended and is widely used in urine diverting toilets in Mexico and elsewhere (Stenström, 1999, 2001). However the widespread application of lime, or even very heavy doses of wood ash, may not be so practical for many areas in Africa where low cost sanitation is used. Certainly this problem is more common in hotter and damper climates and thus at the coast. Existing data shows that most viable worm eggs are eliminated or greatly reduced after 10 - 12 months of composting in tropical conditions (EAWAG/SANDEX information sheet on Pathogen Survival Periods in faecal sludge). For the East and Southern African region, 6 months composting is considered adequate in at least one authoritative account (*Communicable Diseases*. (Eshuis and Manschot 1978. African Medical and Research Foundation). In South Africa, Scott demonstrated a die off of *Ascaris* in 100 days (Richard Holden pers.comm.). So even with worm eggs, the threat is greatly reduced after the recommended 12 month period of composting. *Ascaris* eggs must be ingested before an infection can take place. Infected soil must be taken in by mouth. For this reason *Ascaris* is most common in young children who eat infected soil. According to Eshuis and Manschot, except for the temporary symptoms during the lung passage, infection with *Ascaris* may be symptom-less with vague abdominal discomfort. Complications may occur in very heavy infections.

By far the simplest and most practical way of dealing with this potential problem of worm (helminth) infections, is simply a matter of extending the time of composting the faecal/soil/ash mix in a protected environment. In the case of *Fossa alterna* humus, the material can be transferred from the pit directly into a series of sacks for storage for a further period of 6 months before application to vegetable gardens. The process of “bagging” keeps the humus out of the reach of young children who are the most vulnerable (ref: S. Benenson 1990). After such an extended period of composting the risks of viable worm eggs being present will be very low indeed. However, the greatest potential threat will have been overcome within a 12 month period of composting.

In fact the bagging process will help to improve the humus further as well as making it slightly safer, as the turning of material improves aeration and this helps the composting process. It is also possible at this stage to add more soil and leaves to improve texture. The mix is bagged, watered and left to mature further, with the bag closed off. Earthworms may naturally breed in such composting bags, or can be introduced. The end result will be humus of an improved quality and a potentially safer one. The process of bagging is a simple way of secondary composting of *Fossa alterna* humus.

Where the facility is used as a strictly family unit, such parasites, if present, will be recycled largely within the family itself, and family treatment of worms may reduce the potential of loading the pit with viable eggs considerably. It is wise therefore to assess the potential

parasite risk in any area where eco-san is being promoted. In Zimbabwe, problems associated with parasites have been relatively low over a period of several decades, but as health services deteriorate, the frequency of these and other health related problems is on the increase. Poverty is linked to poor health and the general state and stability of a nation is reflected in the health of its people. Hotter and more humid areas, as may be common in most coastal regions of East and South East Africa, may be associated with higher parasite rates and thus more care is required in such areas. Children may be particularly vulnerable.

It is important to reiterate again, that any risk of handling composted human excreta must be put in its rightful place amid many other risks that toilet users are subjected to. In particular it is important to compare, once again, the risk of handling eco-humus with the risks of spreading disease from hands soiled in the toilet. The potential risk of soiling hands occurs every time we use a toilet for defecation. And without appropriate hand washing facilities being available close by, the risk of passing on the pathogens contained in raw excreta carried on the hands to other people and to food is a very real one. The stark fact remains that in Africa countless millions of people do not have access to any form of improved toilet at all. And even for those fortunate ones that do, a hand washing facility is rarely available. And this situation poses a very real threat which promotes the spread of enteric diseases. It is quite likely that the hands of users may be badly soiled with raw human excreta many times during a single month. One must compare this health threat with the threat of handling well composted eco-humus which may only arise on those infrequent occasions when the humus is actually touched by hand. The humus itself is dug out of the pit and also mixed with other soils with a shovel, which distances it from the hands. But the hands will be involved in planting seedling vegetables directly in the mix of soils. Even when mixed with topsoil again, the health threat is reduced further as the composting process continues.

Thus in any discussion of health in relation to the promotion of ecological sanitation, it is important to see the overall picture. Every step should be taken to make the humus as safe as possible, and every step taken to ensure that hand washing facilities are available and used. In this process of enlightenment, a good educational component is vital. The process of “passing on the message” is not only about how to build and maintain eco-toilet, and how to grow vegetables but also about personal hygiene and how best to practice it.