Table 4.6 Recommended guideline storage times for urine mixture[a] based on estimated pathogen content[b] and recommended crop for larger systems[c]

Storage temperature (°C)	Storage time	Possible pathogens in the urine mixture after storage	Recommended crops
4	≥1 month	Viruses, protozoa	Food and fodder crops that are to be processed
4	≥6 months	Viruses	Food crops that are to be processed, fodder crops[d]
20	≥1 month	Viruses	Food crops that are to be processed, fodder crops[d]
20	≥6 months	Probably none	All crops[e]

[a] Urine or urine and water. When diluted, it is assumed that the urine mixture has at least pH 8.8 and a nitrogen concentration of at least 1 g/l.

[b] Gram-positive bacteria and spore-forming bacteria are not included in the underlying risk assessments, but are not normally recognized as causing any of the infections of concern.

[c] A larger system in this case is a system where the urine mixture is used to fertilize crops that will be consumed by individuals other than members of the household from which the urine was collected.

[d] Not grasslands for production of fodder.

[e] For food crops that are consumed raw, it is recommended that the urine be applied at least one month before harvesting and that it be incorporated into the ground if the edible parts grow above the soil surface.

Sources: Adapted from Jönsson et al. (2000); Höglund (2001).

From: WHO in their guidelines volume 4 "Excreta and greywater use in agriculture" page 70

For faeces the following two tables are given on pages 68 and 69.

Table 4.4 Additional treatments for excreta and faecal sludge off-site, at collection and treatment stations from large-scale systems (municipal level)[a]

Treatment	Criteria	Comment
Alkaline treatment	pH >9 during >6 months	Temperature >35 °C and/or moisture <25%. Lower pH and/or wetter material will prolong the elimination time.
Composting	Temperature >50 °C for >1 week	Minimum requirement. Longer time needed if temperature requirement cannot be ensured.
Incineration	Fully incinerated (<10% carbon in ash)	

[a] Run in batch mode without addition of new material.

Table 4.5 Recommendations for storage treatment of dry excreta and faecal sludge before use at the household and municipal levels[a]

Treatment	Criteria	Comment
Storage; ambient temperature 2–20 °C	1.5–2 years	Will eliminate bacterial pathogens; regrowth of *E. coli* and *Salmonella* may be considered if rewetted; will reduce viruses and parasitic protozoa below risk levels. Some soil-borne ova may persist in low numbers.
Storage; ambient temperature >20–35 °C	>1 year	Substantial to total inactivation of viruses, bacteria and protozoa; inactivation of schistosome eggs (<1 month); inactivation of nematode (roundworm) eggs, e.g. hookworm (*Ancylostoma/Necator*) and whipworm (*Trichuris*); survival of a certain percentage (10–30%) of *Ascaris* eggs (≥4 months), while a more or less complete inactivation of *Ascaris* eggs will occur within 1 year (Strauss, 1985).
Alkaline treatment	pH >9 during >6 months	If temperature >35 °C and moisture <25%, lower pH and/or wetter material will prolong the time for absolute elimination.

[a] No addition of new material.