

10 Future research

For the assessment of the toxicity of contaminated soils much more knowledge about the effects of the clay content, the organic carbon content and ageing is necessary. So far a proper assessment is only possible if the comparison with a appropriate reference soil material is given, as the soil texture itself may affect the mortality and the reproduction of the test organisms. These effects should also be further investigated to make comparisons of soils more feasible. The method for the risk assessment of metals commonly applied in the Netherlands and also used in this work for the evaluation of the toxicity of the metals in the contaminated soils, is just an approximation. In addition, it is too sensitive as a comparison of the calculated EC(50)-values for some metals in Lufa 2.2 with the ones derived from experiments in this soil material shows. For organic compounds this model does not take into account the clay content of the soil materials, which would falsify the calculation for TNT, as TNT is known to adsorb to these soil particles.

The influence of heavy metals on the toxicity of TNT should be evaluated, as many munitions contaminated soils also contain high concentrations of heavy metals.

In the case of the microbial remediation of TNT it is necessary to investigate the long term effects of the soil-binding of TAT, to ensure a satisfying success of the remediation. So far nothing is known about the long term effect of TAT-binding to the soil and whether TAT might become mobilised and bioavailable again. Thus the uptake of TNT and its degradation products by the test organisms offers another interesting field of research. Until these questions are not solved to complete satisfaction a potential risk of such remediated soils cannot be definitely excluded, as TAT is much more soluble than TNT and considered to be cancerogenic and mutagenic, thus causing a threat to the groundwater.