

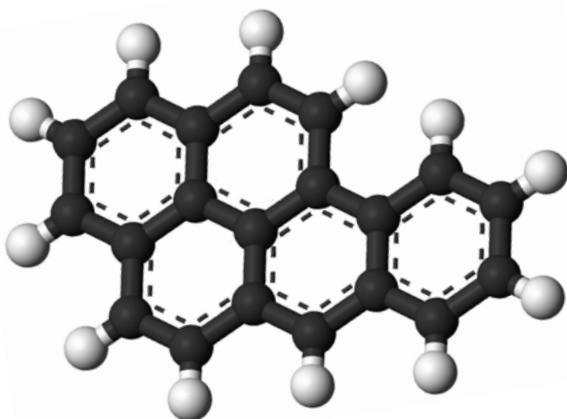
SOIL DECONTAMINATION STIMULATED BY COMPOSTING



PRINCIPLE

Some organic soil contaminants are difficult to treat by classical biodegradation techniques. These include i.e. polycyclic aromatic hydrocarbons (PAHs) - substances typical for soil from the former gasworks, plants for wood preservation and other industrial sources, polychlorinated biphenyls (PCBs) - previously used in technologies bituminous blends plant, and other persistent organic pollutants (POPs).

The presented method is based on mixing the contaminated soil with waste organic material and its subsequent composting. The POPs in soil can be degraded by composting and the formed mixture of decontaminated soil with mature compost use afterwards for the remediated sites rehabilitation.



Benzo(a)pyrene

DESCRIPTION

Soil needs to be excavated, well homogenized and mixed with suitably prepared mixture of organic waste materials. Composting process will naturally occur in the material after mixing. It is necessary to provide the process with the adequate supply of oxygen for the ongoing degradation processes. This can be achieved either by frequent mixing of the compost or by air supply via the aeration system.

The intensive phase of composting usually lasts several months; the compost further gradually matures, whereas the POPs degradation occurs in both phases.



Excavation of contaminated soil

TECHNOLOGY APPLICABILITY

The technology is mainly applied for the ex situ decontamination of contaminated soil. However, in principle it is also possible to use on site. The main advantage of this method is its high efficiency at relatively low cost.

Main advantages of the technology

- Effective for soils contaminated with hard-degradable contaminants
- Relatively affordable method with low operating expenses
- Possibility of using organic waste materials as a substrate
- Applied ex situ or eventually on-site

Potential limitations

- Not suitable for decontamination of construction waste
- Increase in weight and volume of the treated waste
- Long-term process (time-consuming method - months)

Services and products

- Investigation of contaminated sites considering subsequent decontamination stimulated by composting
- Decontamination stimulated by composting remediation project design and approval
- Excavation of contaminated soil and composting operation
- Monitoring and supervision of the remediation project

Data for the technology design

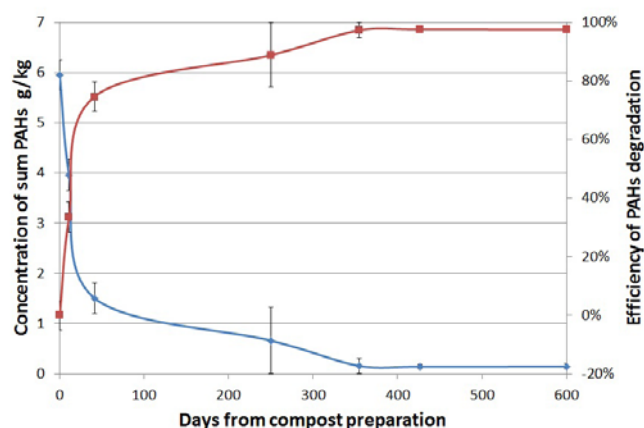
- Extent and level of contamination
- Availability of organic waste substrates
- Required target POPs concentration
- Availability of suitable premises for composting

REFERENCE PROJECT

Soil from two different sites differing in character and content of PAHs was chosen for the demonstration project. Soil from the site of a former gasworks contain 400 to 600 mg/kg PAH, with the prevailing content of pyrene and fluoranthene, soil from wood preservation facilities contain 6,000 to 9,000 mg/kg PAH, with the prevailing content of phenanthrene and anthracene.

The suitability of different organic waste mixtures and the optimal ratio of soil to added organic substrate in the compost mixture were also to determine. Based on the obtained information, technologically and economically optimal weight ratio soil:substrate is 4 : 1.

After one year of application of the composting stimulated biodegradation the PAH content decreased in both types of processed soil by about 90%. Results of the test with the soil from the wood preservation site are shown on the presented graph.



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