Ingenieurbüro Blumberg

Sewage sludge dewatering and mineralization by reed beds

Reed bed systems can be easily adapted for treating sludges as well as water borne pollutants.

Sludge dewatering and mineralisation is achieved by applying sludge to the surface of specially designed vertical flow systems. The reeds absorb particularly high rates of water which they transpire into the air through their leaves. This process, in combination with an enhanced drainage function and the aerating action of the plants, results in an efficient low cost dewatering of the applied sludges. The dewatered sludge is incorporated into the micro-biologically active top layers of the root zone of reeds where it is mineralised and turned into soil.

Depending on climate, sludge is usually dewatered to a dry matter content of 40 per cent and is reduced to a 5 per cent of its original applied volume over a longer period. Because of the extent of these volume reductions build up of mineralised sludge need only be removed every 10 years. This residue can be transformed into compost, and used for horticultural, agricultural or landscaping purposes without the need for incineration or landfill.

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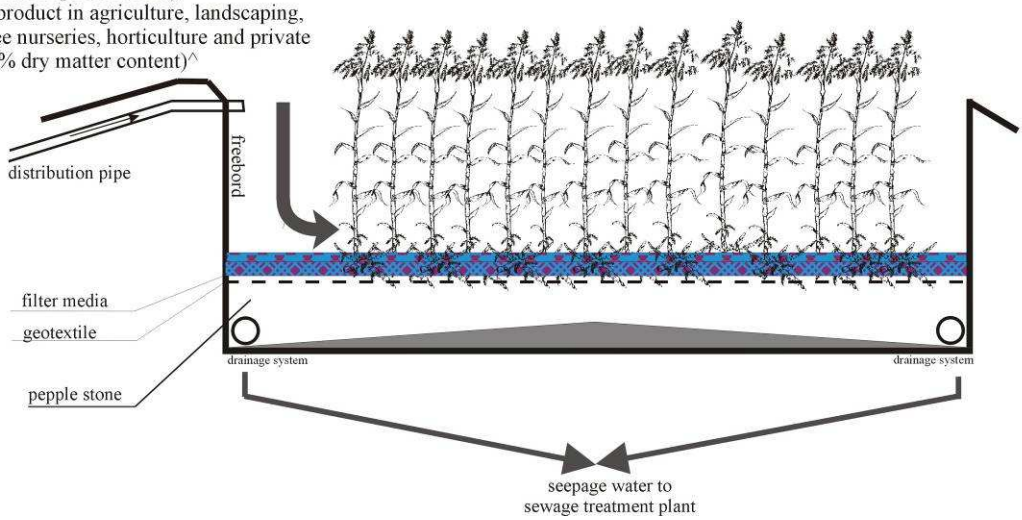
Sewage sludge treatment by reed planted dry beds

A. Starting position of the natural sludge processing

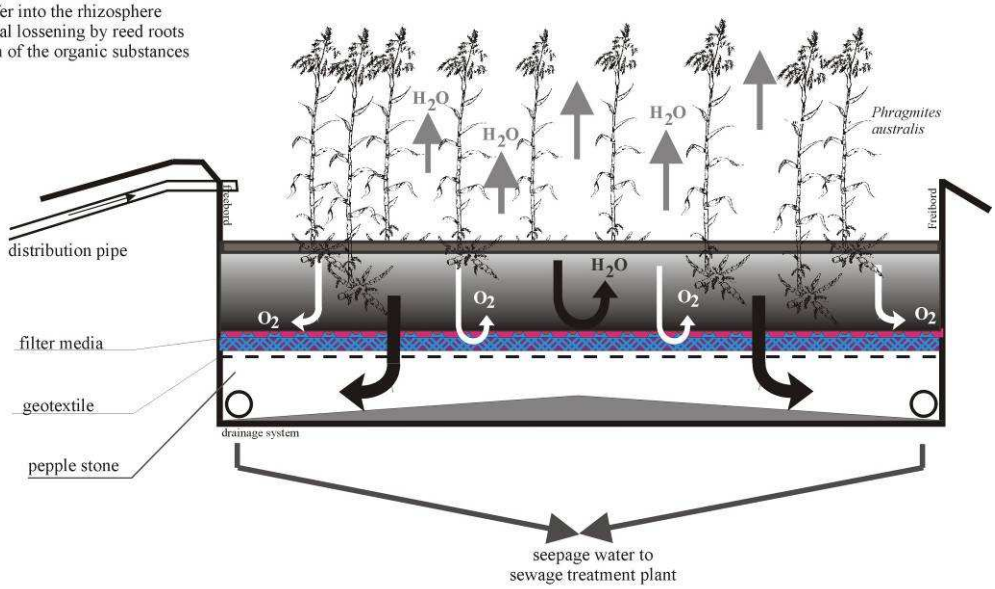
-sewage sludge dewatering and mineralization in reed beds
-intermittent loading
-loading rate dependent on dry matter content of raw sludge
-volume reduction of > 90 %
-removal (excavator) after about 8-12 years of operation and subsequent refilling
-use of the final product in agriculture, landscaping, recultivation, tree nurseries, horticulture and private gardening (> 40% dry matter content)^



Sewage sludge treatment by reed planted dry beds

B. Situation after several years of operation

- Infiltration
- Percolation
- Evapotranspiration
- Oxygen transfer into the rhizosphere and mechanical lossening by reed roots
- Mineralization of the organic substances



Goals of reed bed sewage sludge dewatering and mineralisation

1. Dewatering of wet sludge to a dry matter content of more than 40 %, while the volume is reduced to 5 %.
2. Reduction of costs for electricity, maintenance, repairing, personnel, and operation
3. Sanitising of the sludge humus by composting it for another year after an operation period of 8 to 12 years.
4. Producing a dewatered material, which has a great variety of applications and recycling alternatives.
5. Formation of a secondary biotope consistent of marsh plants (helophytes) and its associated wildlife.

Rhizosphere of *Phragmites communis (reed)*

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Naumburg (Germany)

Reed bed dewatering in Naumburg, beds 1 and 2, activated sludge treatment plant in the background

Bad Emstal (Germany)

One of four reed beds at sewage treatment plant Bad Emstal (6,000 m^2 in total)

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Summary

The reed bed dewatering sewage sludge technology leads after 8 to 12 years operation to a sludge humus, which offers many applications for an economically resonable recycling of the earthy material.
The reed bed dewatering contributes new ways of medium and long-term disposal possibilities giving the municipalities or industrial operators certainty for agricultural utilization.

This natural sludge processing method offers ecological advantages like gravity dewatering, reed induced mineralization and evapotranspiration, which positively influence the energy balance.

The method works without chemical additives like polymers as conditioner.

The reed bed treatment is economically efficient compared to conventional mechanical technologies.

Wildlife enhancement is an important secondary goal of reed bed treatment systems, which create habitats for birds, amphibians and invertebrates.

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