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Mini Review

A Short Review on Environmental Risks of Using Sewage Sludge as Nutrients Resource in Soil

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Introduction

Soil is the final terminal of heavy metals accumulations resulted from anthropogenic activities that may find their way through the underground waters. Application of sewage sludge to agricultural soil is a common practice because of low costs and recycling of nutrients achieved. Disposal of municipal sewage sludge and effluents has recently received much publicity because of the in-circling amounts of these wastes produced by urban and industrial activities.

Due to growing concern over disposal of sewage sludge in the oceans and the high cost of its incineration, land application and land tilling are becoming more common. Disposal of sewage sludge to land can be beneficial because it contains plant nutrients (especially N and P) and organic matter, which can be of agronomic benefit.

Sewage sludge contains organic matter and nutrients that have the potential to enhance forest productivity and several soil characteristics. Agricultural application has become a common waste treatment alternative for sewage sludge because of practical and economic reasons. Depending on the origin and composition, however, sludge may contain substantial amounts of toxic metals as well as beneficial nutrients.

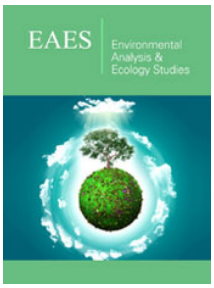
However, the mentioned application can pose a threat to environment and the major concern arises from the fact that sewage sludge, especially those from the heavily urbanized and industrialized areas, contains a relatively high concentration of heavy metals.

Especially on light textured soils, sludges often contain appreciable amounts of metals, e.g. Zn, Cu, Ni, Cd and Pb. Since sewage sludge addition always poses a risk to the environment resulting from nutrient imbalances and toxic element accumulation and leaching. Metal transfer from sewage sludges to soil and subsequently to groundwater and plants represents potential health and environmental risks. Evidences for metal percolation have been reported in numerous long-term sludge application experiments and Evidences for metal percolation have been reported in numerous long-term sludge application experiments. Metals applied with sewage sludge may be retained in the soil as a result of their adsorption on hydrous oxides, clays, and organic matter; the formation of insoluble salts; or the presence of residual sewage sludge particles. Moreover, soil $CaCO_3$ has often been found to increase soil metal retention. Heavy metal accumulation in soils can result in a loss of soil functions leading to concerns about environmental quality protection, maintenance of human health and productivity. Soil pollution can have implications in phytotoxicity at high concentrations and result in the transfer of heavy metals to the human diet from crop uptake or soil ingestion by grazing livestock. The importance of pH in metal solubility is well-known as it influences heavy metal adsorption, retention and movement.

Organic matter is another important soil component that influences metal availability. It has a nutritional function by serving as a source of N, P and S, and has a high binding capacity for cations and organic contaminants. It was showed that heavy metals are accumulated in surface organic layers in agricultural and urban soils. However, the extent to which topsoil heavy metals can be mobilized to labile forms near a cement plant remains uncertain.

Conclusion

Since based on the literature review results it may conclude that using sewage sludge as a low-cost application in farmland can increase the toxic heavy metal accumulation in plants and their ultimate destination, living creatures as well as human. Also, it can increase environmental risks posed to both soil and water that effect on next generation of creatures.



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