Effects of Treated and Untreated Sludge Applications on Human Health, the Environment and Other Ecological Factors

Chapter | First Online: 09 June 2023
pp 23–42 | Cite this chapter

Microbial Fuel Cell (MFC) Applications for Sludge Valorization

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Part of the book series: Green Energy and Technology ((GREEN))

Abstract

The use of treated and untreated sewage sludge in agriculture has been a widespread practice due to its potential benefits. However, the presence of different contaminants in the composition of sludge such as microplastics, pharmaceutical active substances, heavy metals, organic pollutants and pathogens are eliciting various hazards. In relation to short-term and long-term impact on human health, there are reported adverse events which included toxicity, genotoxicity, mutagenicity and carcinogenicity. In addition, the environment is implicated by events of marine and freshwater eutrophication, potentially harmful nutrient leaching and emission of greenhouse gases which leads to climate change. Animals and marine life are also affected negatively by this practice such as abnormal growth, reproductive anomaly and accumulation of heavy metals and toxins, all of which ultimately affect mortality. Contradictory to its negative effects, sewage application is practised to improve soil productivity and fertility due to its high concentrations of organic matter and plant nutrients. This will increase plant yield, especially in fruit and vegetable production as well as dairy pasture and forestry. It is important to understand that despite the negative implications of sludge treatment in agriculture, it is still considered an excellent fertilizer and a soil conditioner to sustain an optimized growth. Therefore, appropriate sludge treatment is imperative to ensure its safe application to the land.