

# Sewage Sludge Land Application: Benefits, Risks and Changes in Soil Microbial Communities

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## Extended Abstract

Sewage sludge is a by-product of the wastewater treatment process and its land application is a promising and environmentally accepted method in the waste management. Since sewage sludge is rich in organic matter and other plant nutrients it may be a valuable alternative to chemical fertilizers. However, the use of sewage sludge carries risks from the presence of pathogens, heavy metals and organic pollutants, including antibiotics. The majority of widely used antibiotics is not completely metabolised and excreted in feces and urine and may accumulate in soils especially after repeated sewage sludge application [1,2]. Moreover, there is an growing evidence for the horizontal transfer of antibiotic resistance genes from pathogens to the indigenous microflora of aquatic and terrestrial environments [3,4].

The aim of the study was to assess the effect caused by sewage sludge land application on soil indigenous microbial communities. Therefore, the activity, biomass and functional diversity of microbial communities in soil amended with sewage sludge was determined. Special focus was given to the isolation of plasmid DNA, its characterization and the estimation of the potential mobility of antibiotic resistance genes. The study was carried out on an experimental field with the sewage sludge application at a dose 10 t d. m. ha<sup>-1</sup> and as a control field without amendment was used. Soil samples were collected on day 1 and subsequent 1 and 6 months after the application of the fertilizer.

The effect of the sewage sludge fertilization on soil microbial communities was temporally and almost disappeared after one month. Transfer of antibiotic resistance genes between microorganisms residing in sewage sludge and soil was not observed. Obtained results allow to conclude that the applied dose of sewage sludge may be regarded as safe.

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## References

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