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Agricultural Reuse of Sewage Sludge in the Mediterranean Region: A Comparative Review of Current Management Practices

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Abstract

Sludge from wastewater treatment plants is an important by-product that can provide valuable nutrients and organic matter when applied in agriculture. However, it also contains harmful contaminants for soil, water resources, and human health including heavy metals, pharmaceuticals, and persistent organic pollutants. Ongoing legislation on sewage sludge do not account for most of these new pollutants, and therefore its management is subjected to increasing pressures from local environmental regulations, local agricultural needs and national policy priorities. There are strong differences between countries in the Mediterranean Sea regarding the generation, treatment, reuse, and disposal of sewage sludge. Agricultural application to land is still the most common way for recovering the nutrients and organic matter found in sewage sludge and returning them to the soil, but there are considerable differences between countries on national regulations, climate, soil conditions, public opinion, and availability of other methods of treating sewage sludge. The Interreg NEXT MED Sludge2Energy project aim at exploring innovative sewage sludge management practices built upon solar drying, pyrolysis, and overall sludge recovery with energy/ biochar production. The first step of the project is to assess the existing sludge management practices of the various countries involved, and to provide a common baseline for the future environmental, technical, and socio-economic evaluation. The various participating Mediterranean countries include Italy, Greece, Cyprus, Egypt, Jordan, and Turkey, each having their own respective regulatory and operational conditions. This work outlines the overall methodology for collecting and comparing national sewage sludge management practices from the various countries. The study focuses on sludge volume production, treatment technologies, recovery and disposal options; regulatory frameworks, and the significance of applying sludge to agricultural land, with added emphasis on pollutant, limitations. A preliminary review of the information from the countries participating found that the management of sewage sludge across countries varies and has different management practices and laws. Italy has regulations for agricultural uses of treated sewage sludge for specific reuse criteria and application conditions. However, the amount of sludge used directly in agriculture compared to other management practices is very

small when examining the entire population of biosolids in the Italian waste management system. The database that will be developed as the outcome of this work will also provide baseline data for the future environmental, economic and social assessment tasks associated with the project, which will help to assess and evaluate the innovative technologies to convert wastewater sludge to energy and how they can contribute to the Circular Economy and help mitigate climate change.

Keywords: sewage sludge, land application, pyrolysis

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