Sampling Methods of Biosolids-Recycling Derived Fertilizers

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Abstract:

Biosolids are highly treated solid fractions produced as a central component of wastewater treatment, commonly applied to land as a soil amendment or fertilizing material. In the context of the circular economy, the recycling of biosolids is beneficial as it provides nutrients and organic matter to agricultural and forest soils and degraded mine sites. However, it may also transfer contaminants into these environments. Therefore, monitoring biosolid quality is critical to ensure the safe application per regulatory standards and criteria. This paper reviews the sampling methods and guidelines adopted in different countries for biosolid sampling regarding the number of samples to collect a representative sample, sampling tools, size reduction, packaging, transportation, and storage before analysis. We also review the quality control and quality assurance for microplastic samplings in biosolids with respect to the negative controls, positive controls, replicates, and materials used in the sampling process to minimize background contamination. In addition, we propose a general sampling strategy for biosolids intended for land application following critical limits of regulated contaminants. The results showed that analyzed contaminants are heterogeneously distributed with high relative standard deviations in the sampled biosolids; thus, more investigations are needed to decipher the sources of variation in biosolids over time to obtain representative samples accurately.

Keywords:

Subsampling, Biosolid, Precision, Representativity, Analysis, Microplastics.