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Fate of pharmaceutical residues in sewage sludge and proposal of indicator substances for monitoring

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ABSTRACT:

The benefits and environmental risks of sewage sludge usage in agriculture have been under debate in the past. The german law on sewage sludge usage (Klärschlamm-Verordnung) is currently under revision. A new assessment of quality standards of sewage sludge based on content of heavy metals and organic pollutants is planned to be established. However, the occurrence of pharmaceutical residues in sewage sludge is so far not considered. This study aims to identify candidate pharmaceuticals for monitoring in sewage sludge. In a first step, national monitoring data are used to identify pharmaceuticals that occur in high concentrations in sewage sludge. A literature review is performed to reveal the fate of these pharmaceuticals in sewage sludge and collect parameters for sorption, biodegradation and eco-toxicological potential preferable to soil organisms. These parameters are classified and ranked in order to identify pharmaceuticals with a high potential to persist and cause eco-toxicity in soil. Monitoring of pharmaceuticals with such high risk will be suggested as further quality criteria of sewage sludge according to the new law on sewage sludge usage. A preliminary summary of these results is presented.