

Sewage sludge is a residue after wastewater treatment, which consists of both valuable nutrients and toxic contaminants. There are many methods of that kind of waste management and one of them, lately becoming more important, is to use sewage sludge in pyrolysis process. Pyrolysis is a thermochemical conversion of organic substances in high temperature (up to 1000°C) and in an oxygen-limited atmosphere. Next to the gas and biooil, biochar is one of the important products of pyrolysis. Biochar is a kind of char which can be used as a soil amendment improving soil's physico-chemical properties.

Despite the many advantages of biochar, unfortunately it also poses a risk that PAHs formed during pyrolysis, when biochar is added to soil, will enter the soil as well. PAHs are very hazardous substances with toxic, mutagenic and cancerogenic properties. Depending on biochar's type, meaning feedstock used, temperature of pyrolysis and other process' parameters, the contaminants' content in biochar and the strength of their bonds with biochar can vary. Extremely important are then analyses which help to answer whether PAHs present in biochar (especially biochar obtained from sewage sludge) are permanently bonded and do not pose a risk for living organisms. Upon complicated chemical analyses it is possible to evaluate persistency of PAHs in biochar-amended soil depending on biochar's properties and pyrolysis conditions. And the most significant-determination of bioavailable fraction of PAHs which is directly responsible for toxic effect. Ecotoxicological tests will be carried out on organisms from different trophic levels, i.e. plants, bacteria and invertebrates. Time is crucial in case of altering toxicity of biochar-amended soil, therefore running tests after specific periods will be helpful in estimating environmental risk of those systems. Gaining the knowledge on this topic will enable to suggest solutions safe for the environment during application of biochars obtained from sewage sludge.