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BIOCHAR-BASED TECHNOSOLS : EVALUATION OF THEIR POTENTIAL FOR DIFFERENT EFFLUENT DEPURATION APPLICATIONS

The use of soils in depurating systems called Biobeds is of growing interest for the depuration of pesticide-contaminated effluents, is now envisioned for extended applications: industrial cooling water effluents, road runoff waters. Biobeds are made of a mixing of soil and organic substrate. The development of Biobeds is facing several limitations with respect to: the use of renewable material sources; the stability of the organic material; the recycling potential of the substrate; and the hydrodynamics and biogeochemical properties of the substrate. Moreover, while the depuration of some solute contaminated effluents emphasizes the need for large reactivity and appropriate contact time between effluent and substrate, the depuration of effluents contaminated with colloid size micro-particles requires appropriate filtration properties based on silt size porosity and negligible preferential flows. Finally, the new generation of Biobeds tends to be greened, which allows enhancing the depuration properties and/or increase the lifetime of the substrate. Biochar from wood waste produced in Lausanne show a good potential to tackle these issues by creating technosols substrates. This was tested with respect to: the build up of horticultural substrate with increasing biochars rates together with; the design of substrate porosity combining the targeted air/water, permeability and contact time properties; their ability to support the growth of different ornamental vegetation; and the efficiency of the corresponding technosols to depurate solute or colloid-particles contaminated waters. Our results show that biochar-based substrates may find a large range of applications in vegetalised structures dedicated to the depuration of different effluents.