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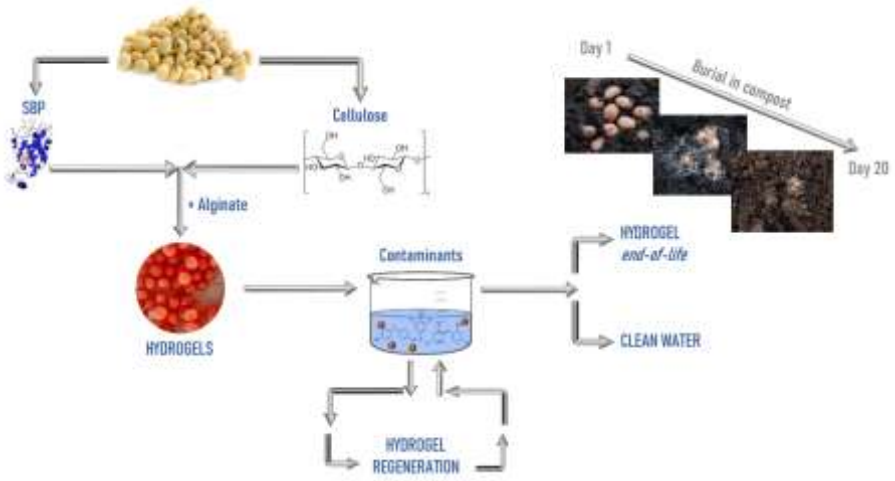
Bioremediation is a very attractive approach for water treatment, especially enzyme-based strategies, since they offer good catalytic activity with milder reaction conditions, production of non-toxic compounds, and environmental friendliness. These aspects, together with the increasing attention toward the circular economy, promote the development of new materials with high added value from biomass waste. In this work [1], we focused our attention on Soybean hulls, an abundant soy processing residue (estimated around 25-28 million tons/year), rich in cellulose and also containing soybean peroxidase (SBP) [2], two interesting and versatile components exploitable for environmental treatments. Alginate and chemically modified cellulose functionalized with SBP were used to prepare fully bio-based hybrid hydrogels that we tested for the removal of Bisphenol A, 2,4,6-trichlorophenol and Triclosan from both ultrapure and real water spiked solutions. Through both adsorption and enzymatic catalysis, in 5 hours, all contaminants are successfully removed from the solution, with a corresponding significant reduction in acute toxicity. These materials show good efficiency retention for eight cycles of reuse and it is also confirmed in real water samples. Finally, the burial test in compost soil shows the biodegradability of the hydrogels proving the high eco-compatibility of the whole process.



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References
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