Title	**Uptake and translocation of perfluoroalkyl acids by hydroponically grown lettuce and spinach exposed to spiked solution and treated wastewaters**
Author Name	Nicola Dal Ferro, Alessandro Pellizzaro, Massimo Fant, Mirco Zerlottin, Maurizio Borin
Journal Name	Science of the Total Environment
Year	2021
Volume and Issue	772
Pages	145523
Abstracts	Perfluoroalkylated acids (PFAAs) are ubiquitous xenobiotic substances characterized by high persistence, bioaccumulation potential and toxicity, which have attracted global attention due to their widespread presence in both water and biota. In this study, the main objective was to assess PFAAs uptake and accumulation in lettuce (*Lactuca sativa L.*) and spinach (*Spinacia oleracea L.*) when fed with reclaimed wastewaters that are usually discharged onto a surface water body. Lettuce and spinach were grown in hydroponic solutions, exposed to two different municipal wastewater treatment plant (WWTP) effluents and compared with a spiked-PFAAs aqueous solution (nominal concentration of 500 ng L^{-1} for each perfluoroalkyl acid). Eleven perfluoroalkyl carboxylic acids and three perfluoroalkyl sulfonic acids were determined in the hydroponic solution, as well as quantified at the end of the growing cycle in crop roots and shoots. Water and dry plant biomass extracts were analyzed by liquid chromatography-electrospray ionization tandem spectrometry LC-MS/MS technique. The bioconcentration factor of roots (RCF), shoots (LCF), and the root-shoot translocation factor (TF) were quantified. In general, results showed that PFAAs in crop tissues increased at increasing PFAAs water values. Moreover some PFAAs concentrations (especially PFBA, PFBS, PFHxA, PFHpA, PFHxS) were different in both shoots and roots of lettuce and spinach, regardless of the type of water. The long C-chain PFAAs (≥9) were always below the detection threshold in WWTPs effluents. However, when PFAAs were detected, similar bioconcentration parameters were found between crops regardless the type of water. A sigmoidal RCF pattern was found as the perfluorinated chain length increased, plus a linear TF decrease. Comparing bioconcentration factor results with findings of previous studies, lettuce RCF value of PFCAs with perfluorinated chain length ≤ 9 and PFSAs was up to 10 times greater.
Keywords	PFAAs; Perfluoroalkyl carboxylic acids; Perfluoroalkyl sulfonic acids; UptakeTranslocation; Bioaccumulation

Title	**Biochar based nanocomposites for photocatalytic degradation of emerging organic pollutants from water and wastewater**
Author Name	Md. Ahmaruzzaman
Journal Name	Materials Research Bulletin
Year	2021
Volume and Issue	140
Pages	111262
Abstracts	Biochar (BC) is the part of carbon family that acts as an excellent photocatalyst when combined with other nanomaterial catalysts, results in the formation of new hybridised nanomaterial known as Biochar supported photocatalyst (BSPs). These BSPs show amazing physio-chemical properties and are highly efficient for degradation of water pollutants. Comparing with pure nano photocatalyst, Biochar supported catalyst has better surface area, highly porous, better catalysing ability, stability and recoverability. This review throws light on combining cost efficient biochar and catalytic nanoparticles for effective degradation of pollutants. The synthesis and the performance of these BSPs are also discussed. The combined hybridised biochar has significant edge over pure biochar and catalytic nanoparticles. This review also discusses about the photodegradation mechanism of various BSPs. Water contaminants such as phenol, dyes or pharmaceutical compounds are very hazardous and pose a serious threat to the ecosystem. Thus, these pollutants can be degraded effectively and cost-efficiently by various BSPs. Lastly, this review paper shows the limitations and ways to tackle it in future for further research.
Keywords	Biochar; Biochar supported photocatalyst; Catalytic nanoparticles; Degradation; Adsorption; Pyrolysis

Title	**Remediation of emerging environmental pollutants: A review based on advances in the uses of eco-friendly biofabricated nanomaterials**
Author Name	Gurulingaiah Bhavya, Seema Anil Belorkar, Raja Mythili, Nagaraja Geetha, Huntrike Shekar Shetty, Shashikant S.Udikeri, Sudisha Jogaiah
Journal Name	Chemosphere
Year	2021
Volume and Issue	275
Pages	129975
Abstracts	The increased environmental pollutants due to anthropogenic activities are posing an adverse effects and threat on various biotic forms on the planet. Heavy metals and certain organic pollutants by their toxic persistence in the environment are regarded as significant pollutants worldwide. In recent years, pollutants exist in various forms in the environment are difficult to eliminate by traditional technologies due to various drawbacks. This has lead to shifting of research for the development of cost-effective and efficient technologies for the remediation of environmental pollutants. The adaption of adsorption phenomenon from the traditional technologies with the modification of adsorbents at nanoscale is the trended research for mitigating the environmental pollutants with petite environmental concerns. Over the past decade, the hidden potentials of biological sources for the *biofabrication* of *nanomaterials* as bequeathed rapid research for remediating the environmental pollution in a sustainable manner. The *biofabricated nanomaterials* possess an inimitable phenomenon such as photo and enzymatic catalysis, electrostatic interaction, surface active site interactions, etc., contributing for the detoxification of various pollutants. With this background, the current review highlights the *emerging biofabricated* nano-based adsorbent materials and their underlying mechanisms addressing the environmental remediation of persistent organic pollutants, heavy metal (loid)s, phytopathogens, special attention to the reduction of pathogen-derived toxins and air pollutants. Each category is illustrated with suitable examples, fundamental mechanism, and graphical representations, along with societal applications. Finally, the future and sustainable development of eco-friendly *biofabricated* nanomaterial-based adsorbents is discussed.
Keywords	Adsorbents; Biofabricated nanomaterials; Bioremediation; Dyes; Heavy metals; Persistent organic pollutants; Plant pathogen; Pests; Reduction; Toxicity; Toxins

Title	**Phytoremediation as a green biotechnology tool for emerging environmental pollution: A step forward towards sustainable rehabilitation of the environment**
Author Name	Mayur B. Kurade, Yoon-Hee Ha, Jiu-Qiang Xiong, Sanjay P. Govindwar, Min Jang, Byong-Hun Jeon
Journal Name	Chemical Engineering Journal
Year	2021
Volume and Issue	415
Pages	129040
Abstracts	The industrial revolution in the production of pharmaceuticals and personal care products (PPCPs) has significantly improved public health in recent years. However, this development has also led to water pollution because of the unintentional disposal of these synthetic chemicals, creating unacceptable sanitary conditions. Conventional wastewater treatment systems can eliminate most of the contaminants, however these are not efficient in removing PPCPs. Plant-based remediation is a simple, yet very effective and eco-friendly approach that can complement existing wastewater treatment. Phytoremediation of emerging contaminants is relatively new, and various key concepts including the uptake and detoxification mechanisms remain relatively unexplored compared with microbial processes. This review comprehensively discusses the latest studies on the biochemistry and application of phytoremediation for the removal of PPCPs from wastewater, focusing on the mechanisms of uptake and detoxification through the enzymatic biotransformation of PPCPs and the latest field applications using innovative engineered systems.Future research recommendations are addressed, including the need of topics warranting investigation in PPCPs interactions with plant tissues, their metabolic transformation in plants, development of new predictive uptake models and futuristic advancements involving the cutting-edge methodologies in genetic engineering for the realization of advanced phytoremediation technologies. This review is an effort to gather the scattered information on research updates of phytoremediation in recent decade to present an outlook of the emerging, green biotechnology for the rehabilitation of the environment.
Keywords	Emerging contaminants; Phytoremediation; Plant enzymes; Plant uptake ; Pharmaceutical contaminants; Biotransformation; Constructed Wetland