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Editorial

An Innovative Approach to Cleaning Up Organic and Inorganic Contaminations from Soil and Water

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1. Introduction

Changes in cultivation practices, rapidly increasing anthropogenic activities, and huge industrial waste generation severely affect soil and water ecosystems [1]. The application of agrochemicals has increased crop production to meet the growing food demand. Therefore, the soil is becoming a sink for toxic elements. Water resources are limited, and pollutants from various industrial waste sources are continuously released into the environment. Industrial releases of heavy metals and agrochemicals infiltrate aquatic ecosystems and pollute water. The perturbations of these toxic elements in soil and water resources could enhance the risks of accumulation in the food chain. They may pose a serious health threat to the local population [2]. Higher concentration of contaminants not only affects human beings but also influences the soil microbial functionality and soil health [3]. The concern over the toxic effects of pollutants has motivated research on insight exploration into the potential of plant uptake, bio/geo-transformation, accumulation and remediation technologies. The conventional methods for the elimination of toxic elements from soil and water systems have progressively been shown to be insufficient. Therefore, alternative, more environmentally friendly, efficient strategies to urgently eliminate these toxic organic/inorganic elements up to acceptable levels are required.

2. Summary of This Special Issue

This Special Issue, entitled "An innovative approach to cleaning up organic and inorganic contaminations from soil and water", published innovative research on nano-enhanced bio/phytoremediation. This Special Issue has published five research manuscripts and three review articles. The organic and inorganic mix pollutants impose health and ecological risks [4]. The research conducted by Konstantinova et al. [4] focused on the toxic effects of potentially toxic elements, polycyclic aromatic hydrocarbons, and found Zn, As, Cd, and benzo[a]pyrene (BaP) were the most dangerous pollutants in technogenically disturbed areas. Further, the authors indicated the combined intake of pollutants imposed a substantial risk for children. In another study, Bhardwaj et al. [5] assessed the health risk of vegetables grown on soils amended with municipal solid waste containing heavy metals and other toxic elements. Various doses of municipal solid wastes were considered, and a safer ratio of $\leq$25% was noted. When the ratio of municipal solid wastes was increased, the accumulation of toxic elements also increased in edible crops, which posed a threat to human health.

Souto et al. [6] showed the ability of the SEB-PW (Surface Energy Balance Model for Partially Wetted) model to estimate actual evapotranspiration (Eta) and analyze the diurnal and seasonal dynamics of evaporation (E) and transpiration (T) in two *Corylus avellana* L. orchards using drip or micro-sprinkler irrigation systems. The study results indicated that

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the used model enhanced soil E by allowing the wetted and non-wetted areas. This model could enhance water efficiency for sustainable agriculture.

Nanotechnology is an emerging field that has shown promising results, especially in metal removal by nanoparticles. Removal of Pb(II) from the aqueous solution was performed by nano zero-valent iron particles (nZVFe). The composite of nZVFe with rice straw was prepared and efficiently tested for Pb(II) removal [7]. The increasing global demand for sustainable practices and ecosystem management strategies has sparked interest in biochar application. Biochar is a carbonaceous material produced through the pyrolysis of organic biomass. The formation of biochar-based nanocomposite materials is effective in eliminating toxic elements. The sunflower husk biochar composite material based on $CoFe_2O_4$ has the highest adsorption capacity of 6.98 mg/g [8]—the composite has shown great potential for practical industrial wastewater treatment.

A comprehensive review of water remediation using nanotechnology approaches was published [9]. Authors raised concern about how metalloids enter plant tissues through irrigation and other sources, polluting water resources. The work also critically discussed recent nanotechnological approaches to eliminate toxic elements from water. Focuses were on nano-assisted remediation for heavy metals and mine pills [10]. It is necessary to explore the mechanism of nano-assisted remediation for organic and organic contaminants from water and soil systems. In conclusion, the Special Issue entitled An Innovative Approach to Cleaning Up Organic and Inorganic Contaminations from Soil and Water was compiled successfully with innovative research and a comprehensive review of cleaning organic and inorganic contaminants from water and soils. Published results added scholarly knowledge for the environmental cleanup program.

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