Special issue on sustainable waste treatment and management

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The treatment and disposal of organic solid waste are becoming a global challenge to the sustainability of societies. This special issue of Environmental Science and Pollution Research (ESPR) comprises 8 papers selected from the 3rd Subject Specialized Conference of International Bioprocessing Association and the International Conference on Sustainable Waste Treatment and Management (SWTM-2019), which was held in Yangling, China, on 6–9 May 2019. The SWTM-2019 conference attracted about 250 participants from more than 20 countries. Approximately 6 special symposia covering sustainable waste treatment, management, utilization, and related environmental impact evaluation were held during the SWTM-2019 conference. With a stringent peer review, 8 original research papers focusing on 4 different topics were accepted for publication in this special issue.

The first topic concerns the thermochemical conversion of biomass residues into biochar and functional materials for pollution remediation. This topic included two manuscripts. In the article entitled “Performance of the emerging biochar on the stabilization of potentially toxic metals in smelter- and mining-contaminated soils” (Ren et al. 2020), the authors prepared biochar from kiwifruit pruning branches by slow pyrolysis and used it as an amendment on in situ stabilization of potentially toxic metals (Cd, Zn, and Pb) in smelting- and mining-contaminated soils. The manuscript entitled “Characterization and adsorption capacity of modified 3D porous aerogel from grapefruit peels for removal of oils and organic solvents” (Imran et al. 2020) synthesized a hydrophobic aerogel with three-dimensional (3D) structure from

grapefruit peel by hydrothermal approach and used the porous aerogel as an adsorbent for removal of oils and organic solvents from polluted water. The findings of these studies benefit the agricultural waste recycling utilization and the contaminated water and soil remediation, as reported in many other studies (e.g., Bandara et al. 2020; Lehmann 2019; Lu et al. 2020; Wu et al. 2020).

The second topic focused on the bioconversion of degradable organic waste to a stable carbon-rich product, which included the manuscript entitled “Comparison of molecular transformation of dissolved organic matter in vermicomposting and thermophilic composting by ESI-FT-ICR-MS” (Liu et al. 2020b). The authors comparatively discussed the differences in molecular composition and the molecular transformation of dissolved organic matter during vermicomposting and the thermophilic composting of dairy manure with the help of electrospray ionization coupled with Fourier transform ion cyclotron resonance mass spectrometry. It was found that compared with the thermophilic composting, vermicomposting was more efficient in organic waste recycling with respect to nitrogen conservation, dissolved organic matter humification, and formation of highly oxidized aromatized molecules.

The third topic gave insight about the global concern over greenhouse gas emissions and climate changes. The manuscript entitled “Modeling CO₂ exchange and meteorological factors of an apple orchard using partial least square regression” (Yang et al. 2020a) aimed to identify the seasonal characteristics of CO₂ exchange and meteorological variables in 2016–2017, to quantify carbon sequestration in above- and belowground biomass, and modeling CO₂ exchange as a function of the main meteorological drivers during the life cycle of an apple orchard, whereas the manuscript “Seasonal variation of net ecosystem CO₂ exchange and its influencing factors in an apple orchard in the Loess Plateau” (Yang et al. 2020b) explored the daily and inter-annual ability and temporal variation between the carbon source and sinks of apple orchards and evaluated the effect of the precipitation amount and temperature on the amount of net ecosystem CO₂ exchange of the apple orchard in the Loess Plateau.

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The fourth topic concerns the remediation of soil polluted with potentially toxic metals. In this topic, Wang et al. (2020) investigated the potential use and effects of solid waste (fly ash) on the stabilization of Cd in contaminated soils from three different sites. Liu et al. (2020a) studied the influence of compost combined with *Streptomyces pactum* (Act12) on Cd- and Pb-contaminated soil physicochemical properties. In this work, the related enzymatic activities and the related effects on phytoextraction of Cd and Pb by potherb mustard (*Brassica juncea* Coss) were declared. The findings of these two studies will provide a reference for the soil remediation practice.

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