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Editorial

Chemical Management and Treatment of Agriculture and Food Industries Wastes

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Agriculture and related industries are one of the most strategic sectors for many countries. Agricultural residues are obtained from crops and livestock residues. Currently, the worldwide total harvest areas of cereals, primary oil crops, pulses, roots and tubers, and primary fiber crops are around 721.4×10^6, 301.9×10^6, 85.2×10^6, 61.9×10^6, and 37.7×10^6 ha, respectively. The worldwide industrial production of raw centrifugal sugar, molasses, oil palm, and oil soybean is around 176.9×10^6, 61.0×10^6, 57.3×10^6, and 45.7×10^6 tones, respectively. In general, the agrofood industry is increasingly modern and automated with a single objective that is to increase its production to meet the needs of the market and fulfil the economic objectives.

Parallel to these agricultural and industrial activities, large volumes of solid and liquid residues are generated that present a serious environmental problem in the case of not being well treated or managed. Considering the current social and scientific development, all these residues nowadays can be transformed to by-products with the aim to be reused as a new product useful to the society.

The special issue covers a very wide field as the agrofood industries generate various wastes, and there are an infinite number of applications and possible reuses of such wastes. In our initial proposal, we have tried to establish the state of the art for the agricultural and food industries residues, either in the solid or liquid state. The special issue has indicated that welcome manuscripts about the management and treatment methods of solid and liquid wastes and special attention will be given to works about the valorization of wastes as a source for sustainable bioenergy, water recirculation, and waste composting, where conventional and unconventional techniques are used. In addition, methods for the exploitation of forest and municipal wood wastes for energy generation will also be considered. In addition, potential topics to accept have been indicated. By way of example, it has been pointed the following:

(i) Agricultural crop residues for energy recovery and animal feed
(ii) Food industries residues for water and energy regeneration
(iii) Wastes management and composting
(iv) Residues from industrial oil crops: management and treatment
(v) Residues of olive industries: management and treatment
(vi) Lignocellulosic wastes as feedstocks for biofuels and biochar production
(vii) Conversion of waste to biogas, compost, and fertilizers
(viii) Wastewater treatment methods
(ix) Waste management and policies
(x) Advances in the liquid and solid state wastes treatment techniques and management
(xi) Separation of phenolic compounds with a high added value from agroindustrial wastes
(xii) Valorization of agriculture and industrial by-products to new useful products

From the first moment, we have been aware of the complexity that can reach the special issue. In fact, the seven accepted articles published in this special issue have dealt with different topics of high interest to the scientific community as well as to the industrial technology sector, as indicated below:

The article by E. Ramos-Zambrano et al. entitled "Cochineal Waxy Residues as Source of Policosanol: Chemical Hydrolysis and Enzymatic Transesterification" compares the chemical and enzymatic transesterification reactions for obtaining policosanol from waxy waste of cochineal insects generated in the carmine industry. First, in chemical reactions, different bases and solvents were evaluated; then, during transesterification, the use of molecular sieves, two lipases, and the effect on the reaction product yields of different alcohols as acyl receptors were analysed. The results obtained show an option to valorise the waste generated by the carmine industry. The policosanol obtained was composed mainly of triacontanol, an alcohol with a great commercial value due to its properties as the plant growth promoter. Triacontanol yields of up to 13% were attained through chemical hydrolysis and up to 19% by a novel method of enzymatic transesterification. Enzymatic transesterification was carried out with lipase *Candida antarctica* (CAL-Bn) in a reaction medium with toluene, molecular sieves, and different acyl receptors. This ecofriendly method can be applied to other wax sources to improve policosanol extraction.

The article by B. Bai et al. entitled "Lauric Acid-Modified Nitraria Seed Meal Composite as Green Carrier Material for Pesticide Controlled Release" presents a novel hydrophobic carrier LA-NSM, modified *Nitraria* seed meals with lauric acid, was fabricated through a facile chemical-surface modification route. The structure, surface wettability, and morphology of the obtained LA-NSM were characterized by Fourier-transform infrared spectroscopy (FT-IR), contact angle measurements (CAM), and scanning electron microscopy (SEM). Moreover, the degree of esterification and the influence of pH, temperature, and soil humidity on the release capacity of LA-NSM@DEL were also studied. Generally, the controlled DEL release of the LA-NSM platform not only enhanced the service efficiency of agrochemicals but also extended the utilization of waste *Nitraria* seeds. The results obtained show an environmentally friendly LA-NSM carrier was successfully prepared through modifying waste NSMs with lauric acid. FT-IR, SEM, and CAM analyses confirmed the reaction between hydroxyl groups of NSMs and carboxyl groups of lauric acid. The loading experimental results indicate that the equilibrium loading capacity of DEL into the LA-NSM carrier can reach about 1068 mg/g. The pH of soil, environmental temperature, and soil humidity have an obvious influence on the releasing property of LA-NSM@DEL. Moreover, the release process fitted well to the Higuchi model. Of particular interest regarding this technology that deserves to be mentioned is that the present route not only makes good use of natural waste resources but also can significantly address and reduce multiple issues created by pesticides, in view of their handy, convenient, and inexpensive fabrication method.

The article by K. Le Van and T. L. Thi Thu entitled "Preparation of Pore-Size Controllable Activated Carbon from Rice Husk Using Dual Activating Agent and Its Application in Supercapacitor" presents activated carbons prepared from rice husk by chemical activation with dual activation agents to obtain activated carbons with high porosity and large specific surface area. Additionally, the effect of the NaOH/KOH ratio on the specific surface area, pore structure, morphology, and thermal stability of the final activated carbons was studied. Moreover, the obtained materials were characterized and evaluated for potential application as supercapacitor electrode materials.

The article by M. K. Daud et al. entitled "Potential of Duckweed (*Lemna minor*) for the Phytoremediation of Landfill Leachate" presents a phytoextraction of zinc, copper, lead, iron, and nickel from landfill leachate by duckweed (*L. minor*). Bioconcentration factor and removal efficiency were also calculated. Results of this study proved that *L. minor* significantly reduced the concentration of heavy metals in landfill leachate. Removal efficiency of *L. minor*, for all the metals, from landfill leachate was more than 70% with the maximum value for copper (91%). Reduction in chemical oxygen demand (COD) and biological oxygen demand (BOD) was observed by 39% and 47%, respectively. The value of bioconcentration factor (BCF) was less than 1 with the maximum figure for copper (0.84) and lead (0.81), showing that the plant is a moderate accumulator for these heavy metals. Finally, the authors present *L. minor* as a sustainable alternative candidate.

The article by J. Liu et al. entitled "Three-Dimensional Excitation and Emission Fluorescence-Based Method for Evaluation of Maillard Reaction Products in Food Waste Treatment" presents a method to characterize and quantify Maillard reaction products (MRPs) created by hydrothermal treatment of food waste. Molecular weight fractionation, indirect spectrometric indicators, and three-dimensional excitation-emission fluorescence (3DEEM) analysis identified MRPs. The 3DEEM method combined with fluorescence regional integration (FRI) and parallel factor (PARAFAC) analyses was able to differentiate clearly between MRPs and other dissolved organic compounds compared to other approaches.

The article by T.-L. Pham and H. M. Bui entitled "Comparison of Diazinon Toxicity to Temperate and Tropical Freshwater *Daphnia* Species" presents an acute 48 h assay and a chronic 14-day assay performed to study the effects of diazinon on two cladoceran species. The toxicity of diazinon to early life stages of the temperate species *Daphnia magna* was tested, and the toxicity on *D. magna* was compared to that on the tropical species *Daphnia lumholtzi*. The results will provide baseline information to establish the benchmark for organophosphate insecticides in tropical waters. The results obtained confirmed that diazinon poses significant risk to aquatic organisms, namely, nontarget *Daphnia* species. The population growth of *D. magna* and *Daphnia lumholtzi* was adversely affected by diazinon after a chronic exposure period. Compared with *D. magna*, *D. lumholtzi* showed even higher sensitivity to diazinon in the acute test. The results of this study are important for

prediction of toxic effects and environmental risk associated with insecticides. Further studies using additional organophosphate insecticides, different tropical test species, and test conditions are needed to assess the possible environmental risk associated with pesticides in tropical aquatic ecosystems.

The article by Z. Majbar et al. entitled "Co-composting of Olive Mill Waste and Wine-Processing Waste: An Application of Compost as Soil Amendment" presents the valorization of the olive mill wastes and by-products wine industry by co-composting. In addition, the evolution of the parameters describing the co-composting of mixtures of olive mill wastes and green waste was studied and the effect of the different composts produced on the performance and yield of radish in the field was tested. The results showed that the co-composting of olive mill wastes and the wine by-products with green waste has proved to be an effective means of producing an organic amendment for agricultural soils. The monitoring of the physicochemical parameters during this process has revealed a good progress of the co-composting process, a biodegradation of organic matter, and a bioconversion of unstable matter into a stable product rich in humic substances. This biotransformation was also confirmed by the phytotoxicity test of the compost extracts produced, which showed that the various composts produced are mature and show no phytotoxic effect.

Conflicts of Interest

The Guest Editor and Guest Co-editors declare that there are no conflicts of interest or agreements with private companies, which will prevent us working impartially in the editorial process.

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