

Editorial

Special Issue on “Soil and Sustainable Development: Challenges and Solutions”

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1. Introduction and Papers Published in This Special Issue

Food production is increasing year by year, with modern agriculture occupying high-fertility soils. These soils are under significant pressure from intensive cultivation, making it important to implement practices that can support the sustainability and resilience of agroecosystems. Many of these soils receive amendments that can significantly increase the concentration of different pollutants, such as metals [1,2], whose residues may appear in certain produce and generate a public health problem [3]. In recent decades, the scientific community has awaked to the problem of new contaminants called emerging contaminants, such as antibiotics, which mainly reach detectable and potentially hazardous concentrations in soils due to the application of organic amendments and slurry [4,5]. The presence of these antibiotics in soils can not only generate soil and water contamination problems [6–8] but also generate the emergence of resistant microorganisms [9,10]. In this sense, decontamination techniques were developed to solve the problems that can be generated by the increase in the concentration of both metals and emerging contaminants, as well as other techniques that aim to improve crop yields. Within this framework is this Special Issue entitled “Soil and Sustainable Development: Challenges and Solutions”, where two important aspects are taken into account:

1. On the one hand, compost can be used as fertilizer to favor crop development, a topic covered by manuscripts such as “Evaluation of the Potential of Agro-Industrial Waste-Based Composts to Control Botrytis Gray Mold and Soilborne Fungal Diseases in Lettuce” [11], “Long-term effects of calcium-based liming materials on soil fertility sustainability and rye yield as indicators of soil quality in a typical paleixerulto” [12], and “Cowpea crop response to mineral and organic fertilisation in SE Spain” [13].

The most relevant results indicate that some compost can inhibit the growth of determined fungi, and this can result in more economic and environmental benefits due to a reduction in the use of fungicides. On the other hand, applying liming agents and organic fertilizers clearly improves rye production and thus improves the doses of liming agents applied to the soil, with consequent benefits for both the environment and farmers.

2. On the other hand, there are contamination studies of metals (“Influence of Physicochemical Properties and Parent Material on Chromium Fractionation in Soil” [14] and “Monitoring, Diffusion and Source Speculation Model of Urban Soil Pollution” [15] as well as emerging contaminants, such as antibiotics, including the work of Conde-Cid et al. [16] “Tetracycline and Sulfonamide Antibiotics in Soils: Presence,



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Fate and Environmental Risks” and Rodríguez González et al. [17] “The Effect of Clarithromycin Toxicity on the Growth of Bacterial Communities in Agricultural Soils”.

The most relevant results indicate that the fractionation of metals is an important aspect to consider when carrying out contamination monitoring studies and that agriculture developed in the surroundings of cities has to take into account the contamination of soils in these urban environments and its impacts on the environment and the quality of agricultural products.

On the other hand, studies of emerging pollutants, such as antibiotics, indicate that tetracyclines are strongly adsorbed to soils, and their desorption is very low, so their mobility is also very low. Regarding the effect of antibiotics such as Clarithromycin on soil microorganisms, the results indicate that toxicity decreases with time, which may be relevant from an environmental point of view and when controlling the application of amendments and slurry to agricultural soils.

2. Future Perspectives

This is a subject that still needs a significant amount of research to advance new insights into the different behaviors of metals and emerging pollutants in soils associated with new organic fertilization practices. This is due to the great variety of possible contaminants and the different physico-chemical properties of soils, which means that the same contaminant can behave differently depending on the soil. In the future, it would also be desirable to make progress in applying environmentally friendly, cheap, and easy-to-apply techniques for the remediation of contaminated soils.

3. Conclusions

All the topics described above were deeply discussed in the Iberian Conference “Soil and Sustainable Development: Challenges and Solutions” organized by the GreenUPorto and the Faculty of Sciences of the University of Porto, with the Support of Portuguese and Spanish Soil Science Societies. This type of Special Issue caters to the wider scientific community, given that there are many disciplines (chemistry, physics, agronomy, biology, and geology, among others) that, in one way or another, can be dedicated to the study of the environment and sustainable agricultural production. These two aspects will be even more relevant in the future due to the advance in the world population and industrialization, which will keep scientists even more involved in the future.

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