

## FOREWORD

This special issue is entitled Green Chemistry and Sustainable Development. Sustainable Development expresses the vision of the 21st century and of our society which was founded in the 1972 and 1992 Rio Declaration and laid down the Maastricht Treaties for the European Union (1992) and Amsterdam (1997). The Rio Declaration was accompanied by a Strategic Plan, Agenda 21, the principles of which are identical to the 12 Principles of Green Chemistry, and Green Chemistry has been recognized as a Key Factor for the Sustainability Implementation. The model of Sustainable Rural and Industrial Development and other productive and economic models supported by the European Union, such as Cyclical Economy, Industrial Ecology and Bio-Economy aim at Sustainable Development. Its principles such as prevention, waste minimization, recycling, energy recovery and materials recovery are identical to the principles of green chemistry.

Some practical issues that have already being incorporated in our daily life include examples of re-use / recycling of olive oil, cheese, oil and other waste residues, even hazardous waste can be used to produce useful products through processes that promote Sustainable Development.

Five points need to be mentioned as both classical and emerging issues: (a) Green chemistry is a key factor for sustainable rural and industrial development. Agricultural production and exploitation of biomass from agro-food waste and the food industry are necessary to meet the needs of our society in energy and consumer goods in order to maintain and to improve the existing quality of life. At the same time global problems (eg climate change) linked to the sustainability of the planet earth are also tackled. (b) Closure of the cycle in waste management is a new development model with tools, processes, and positive examples. It is a new productive and economic model of the cyclical economy that promotes sustainable development efficiently by following the principles of Green Chemistry. (c) Applications of new materials to microencapsulation is a field of green chemistry in the development of new analytical techniques for the determination of organic harmful compounds and the assessment of the effects on the environment and food. A series of new analytical techniques for the determination of residues of pesticides, their toxic metabolites, compounds with hormonal disrupting action and pharmaceutical compounds in the aquatic environment, in liquid wastes and in selected food products of animal and plant production, using new materials in the micro extraction and processing of the analyzed samples have been developed. This is an evolution in the direction of the principles of green chemistry. (d) Advanced oxidation processes for environmental applications are a family of physicochemical processes that have been extensively studied in environmental applications over recent decades, with emphasis on wastewater and water treatment. They require tuning of parameters for improving the cost of their application through improved performance. And (e) Education is the key to achieve the goals of Green Chemistry. The new philosophy of Chemistry needs to be disseminated at all levels of education so that new scientists plan their research according to the principles of green chemistry. Also, simple consumers need to be able to seek and choose products produced with the principles of green chemistry.

The objectives of this special issue are to highlight: (a) the philosophy of Green Chemistry, its relationship with industry, education, sustainable development, consumer, as well as research conducted nowadays, (b) the role and potential of Green Chemistry and Green Chemical Technology in dealing with environmental problems, both locally and globally, related to waste, hazardous chemicals, toxic, clean energy production, the use of renewable raw

materials, climate change, food production, waste management and exploitation, and the provision of clean water, and (c) the multidisciplinary nature of Green Chemistry in dealing with the global problems of human health, the environment and the sustainability of our planet. There are fourteen (14) papers covering these objectives.

It is noteworthy that the titles of the papers include words such as “cycle” or “circular”, and prefixes such as “bio”, “eco”, “micro”, “nano”, “ultra”, “multi”, and “geo”. Most of the papers deal with the management, treatment, and valorization of waste. Several papers deal with the application of materials that are characterized with the above prefixes. Another set of papers deal with monitoring of pollution that demonstrate the need for change towards Sustainable Development.

In summary, within this special issue a wide range of topics related to Green Chemistry and Technology are covered providing insights on current advancements of these issues.

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