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Editors

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“Educating the mind without educating the heart is no education at all.”

- Aristotle

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Preface

Writing a preface for a periodical research book on “Emerging Environmental Technologies and Health Protection” always is a challenge for research dissemination; research and development for stakeholders and all the while keeping in mind not to do any injustice to the zeal of a contributor who has worked so hard to pen the text. “Emerging Environmental Technologies and Health Protection” last decades old philosophy has been attracting the attention of scientists worldwide. Industrialists as well as academicians are equally interested in this new stream of environmental - chemical science for the semantics and building capacities between different scientific disciplines and semantics in engineering, biotechnology, materials and social sciences for health protection and sustainable development.

Researchers, all over the world, are conducting active research in different fields of engineering, science and technology by adopting green chemistry principles and methodologies to devise new processes with a view towards helping, protecting, and ultimately saving the environment of our planet from further anthropogenic interruptions and damage. Achieving sustainability and renewability of resources is the basic spirit of green chemistry; it inspires us to try alternative “green” approaches in place of traditional “gray” practices in everyday industrial and scientific activities. Waste management, food protection, innovative materials and safety design avoiding associated risks and hazards is a matter of great concern. It’s quality important for both domestic purposes and industrial needs. Emerging environmental technologies in waste management; food productivity; food protection; public health; safety design; innovative materials; monitoring are therefore an important task. But, selecting technology dyes at a cost to the environment that should be avoided when considering which technique to use.

Hence, the far important challenge is to make an applied technique sufficiently “green.” Environmental resources pollution is often discussed with respect to various pollutants and their treatments, but the issue of emerging technologies that support health protection and sustainability has not been discussed sufficiently in the literature. So, the emerging environmental technologies and environmental health protection has tremendous scope worldwide. That is why emerging environmental technologies and health protection is an important issue which needs to be addressed seriously.

The sections of volume one for the transactions on “Emerging Environmental Technologies and Health Protection” periodical research book are the outcome of the scholarly writing of researchers of international repute with stellar credentials, who have tried to present an overview of current solutions to particular environmental problems that promote sustainability from different scientific fields. The main aim is to protect human health and environmental resources building capacities that support a sustainable development taken place proper designs and applied environmental technologies, all of which are “green.” The book contains twelve chapters, all of which focus on the theme of green technologies, green chemistry and discuss techniques, tools and materials which are nonhazardous, eco-friendly, and, moreover, low waste generating.

Nowadays, throughout the world, over 80% of the land that is suitable for raising crops is in use . Vertical indoor farming environmental technologies are coming up as emerging technologies for health protection in urban environments. Efficient agroponic systems could provide safe qualitative food and protect environment and public health from long term chemical hazards. By the year 2050, nearly 80% of the earth’s population will reside in urban centers. Applying the most conservative estimates to current demographic trends, the human population will increase by about 3 billion people during the interim. A new land of efficient constructions in agroponic systems will be needed to grow enough food to feed human population and live stocks, competing traditional farming practices that continue as they are practiced today. Section 1 examines the concept of vertical hydroponics an introduction to the idea of hydroponics is presented.

In recent years, leachate treatment has introduced a myriad of novel waste water treatment techniques and efficient sanitary engineering solutions that can have promising outcomes in environmental cleanup and remediation. Particularly, economic solutions such as waste pre-treatment; leachate recirculation and co-disposal with inert materials could be used for removal of toxic pollutants from aquatic systems. Landfilling of municipal waste is a selected economic waste disposal method of the waste management system in most of the countries in the world. The generated leachate must be appropriately treated before being discharged into the environment for public health protection and sustainable development. Thus, Section 2 focuses on the use of the main technologies meant for leachate treatment can be classified as follows (i) biological

methods, (ii) chemical and physical methods. This is a review presenting the main processes currently used for the landfill leachates treatments as well as future design parameters that should be taken into account the climate change. Water quantities should be saved from landfill leachates waste water treatments supporting sustainability in efficient irrigation designs or other projects that promote sustainability.

The food industry always generates solid wastes as well as high volumes of effluents, the handling of which constitutes a considerable challenge. Currently, efforts are focused on the optimization of food processing technology, trying to minimize the by-products and waste that are generated. The use of the by-products also known as by-product valorization is a crucial subject nowadays that not only confers added value to the waste products but also allows food companies to have a sustainable development.

Section 3, presents the wine industry, the main by-products and the waste that are produced, the handling of them and the possible uses they may have. In fact, waste from food industry constitutes a vast resource of a myriad of bioactive compounds. Furthermore, the use of them can in turn reduce the environmental impact derived from the accumulation of such compounds. Particularly, we focus in polyphenols from grape and in the beneficial properties they have. Furthermore, we describe how these phenolic compounds interact with proteins related to neurodegenerative diseases such as acetylcholinesterase and α -synuclein.

In recent years, interest in the use of biologically active compounds from natural sources increased, because consumers are looking for safer and healthier food without addition of chemicals. Section 4 is a review chapter that addresses the role of yeasts in foods and beverages degradation by considering the modes of contamination and colonization by yeasts, the yeast population diversity, and the analytical techniques for their identification, primarily molecular methods. In nature there are many different types of antimicrobial compounds. Phenolic compounds may affect growth and viability of microorganisms and the use of phenolic compounds as antimicrobial agents would provide an additional benefits, including dual-function effects of both preservation and delivery health benefits. Polyphenols present in different vegetables could be feasible natural and non-toxic alternative to prevent growth of spoilage yeasts and improve the microbiological quality of foods.

Phytogenics have been used for medicinal purposes, and as each plant species exhibits diverse and unique efficacy, they are argued as the optimal material to replace the conventional methods in livestock husbandry against various livestock stresses. In section 5 the phytogetic feed additives are presented. A supply that meets the demand is one of the key factors in any industry. Therefore, various attempts have been made in livestock industry to satisfy the demand. Basically, livestock population has been substantially increased, and the methods such as breeding and use of antibiotic and inorganic feed additives have been employed to improve productivity. Such methods have resulted in unprecedented increase in productivity of the modern live stock industry although they are not likely to satisfy the steep increase in livestock demand in the future. Moreover, these methods have resulted in various problems with respect to antibiotic-resistant bacteria, environmental pollution, and livestock stress and welfare.

The recent discovery of various biological activities of natural resources has focused much attention on their efficacy, and in consequence, the application of medicinal plants has expanded globally. To illustrate, medicinal plants are used for research on new drug development in primary health care. Nevertheless, natural resource protection policies such as the Nagoya Protocol have promoted global competition, wherein a challenge is posed by the high cost of natural resources. Section 6 presents a review discover novel plants among agricultural by-products and tropical plants, which are currently used as simple ornamental plants. Furthermore, it is anticipated that going beyond the use of plants in humans and studying their use in livestock and pets would extend the scope of application for plants.

The inclusion of agricultural wastes in construction has drawn research attention in recent times. In this work, wastes including fibres obtained from different parts of the oil palm tree, chicken feather and

sugarcane bagasse, are considered. Information is also provided on the properties, enhancement techniques, current and potential application of the wastes in construction. Section 7 presents an extensive review on oil palm fibres is presented as well as the incorporation of sugarcane bagasse and chicken feathers, as additive, in the production of unfired clay bricks. The clay mixes partially replaced (by volume) at 1, 3, and 5% of either of bagasse fibres and feather fibres were prepared and cube specimens of (5x5x5) cm³ were made by moulding. Tests results reveal that the addition of the wastes leads to 13% and 3% reduction in brick density, each at 5% feather fibre and bagasse fibre inclusions respectively. Furthermore, improvement in compressive strength reached 78% while linear shrinkage in the clay samples is reduced. The use of agricultural wastes as cheap and environmentally-friendly construction materials is beneficial towards provision of affordable housing in developing countries.

Section 8 presents a review about the importance of the soil cover and environmental management of landfill emissions with waste biodegradation for agricultural food and public health protection. The aim is to better understand the role of soil cover, waste pretreatment, biodegradation processes on the landfill gas migration and bioremediation in relation to landfill emissions management techniques. The variations of landfill gas migration next to landfill boundaries are evaluated. The field data confirm that waste pretreatment and leachate recirculation are sustainable and accelerate the waste biodegradation protecting agricultural resources and public health from toxic chemical hazards.

A fundamental characteristic of modern industrial units is their ability to quickly and efficiently adapt their production to the market demands. Currently, the structure of social consumption is characterized by rapid changes, industrial production having a maximum life span of up to 5 years. Besides, a new globally perceptible trend is to manufacture customized products, requiring the shift from mass production to small and unique series production. That is why during the last years, incremental sheet forming (ISF) - a flexible, versatile and cheap technology - has received a growing attention of both the industrial and the academic world. It is a valuable solution to the contemporary society needs. Section 9 summarizes some basic aspects related to this technology and to review its main applicability field based on existing literature.

Section 10 presents information management solutions in health tourism facilities, in terms of mobility of goods, road design safety and management problems. Solutions to consumption of electricity or development of artificial lakes for waterways facilities as part of health tourism sustainable solutions in services and goods are also discussed. Furthermore, solutions for health tourism facilities that can recover their produced fermentable waste water quantities and water discharges for recreational activities and sports are also suggested. Finally, sustainable solutions for the application of polymers, safe mobility of people, goods and operation of efficient road design supporting eco-designs and road safety are presented too.

Despite the rapid growth of Information and Communication Technologies (ICT) and their benefits for business processes, intermodal freight transport companies still face challenges in ICT adoption including low compatibility, low level of management support and insufficient awareness of the expected advantages. This may prevent companies from thoroughly deploying ICT, although the benefits of being proactive in Intelligent Transportation Systems (ITS) adoption are largely documented. Section 11 investigates the antecedents of ITS adoption in intermodal freight transport companies at both the levels of company and managers. This is important because the uptake of recent ICT advantages in the intermodal freight transport arena seems slow and the evidence on the determinants of such posteriori acceptability of ITS is limited in current applied ITS studies. A framework is presented that identifies four broad categories of environmental, organisational, technological and individual characteristics, and show how these categories influence the decision-making process of both companies and managers to adopt ICT in the intermodal freight industry. This adoption framework draws on theoretical perspectives in Technologic, Organization and Environmental (TOE) theory and Unified theory of Acceptance and Use of Technology (UATUA). The implications of this research are discussed for academicians and practitioners.

Section 12 presents the importance of food quality and safety. It analyses the quality assurance. It evaluates the necessity of ISO standards for food quality and safety overall that exist to indicate the efforts should be made by businesses so as to protect the quality of their associated services in food industry.

Furthermore, this research book can be used as an important platform to inspire researchers and

stakeholders in any related fields to develop greener processes for important techniques for use in associated fields of green chemistry; food productivity; food protection; waste management; biotechnology; materials; safety design; monitoring; environmental protection; public health protection and associated information communication technologies. We gratefully acknowledge all the contributors of this annual research volume book, without whom these valuable research sections could not have been completed. We express our highest gratitude and thankfulness to all of them.

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