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## **Preface**

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**Biographical notes:** V.K. Garg is working as reader in the Department of Environmental Science and Engineering, Guru Jambheshwar University of Science and Technology, Hisar, India. His teaching and research include solid waste management, drinking water pollution with special reference to fluoride and nitrate, wastewater treatment using adsorption technology, ferti-irrigation and herbicide resistance. The research carried out till date has credited him with 150 publications including books (1), chapters in the books/proceedings (12), original and reviewed papers (International 45, National 30), research communications in conferences/symposia (23). He continues to serve as peer reviewer for many international journals.

Suman Mor is currently working as Lecturer/Assistant Professor in the Department of Environmental and Vocational Studies, Panjab University, Chandigarh, India. During early start of her career, she has established and successfully lead the 'Department of Energy and Environmental Sciences' at CDL University, Sirsa, India. She has contributed to more than ten peer reviewed international papers and one book. She is severing as a referee to various international journals. She also won several national and international scholarships. She obtained a PhD from IIT Delhi, India in Energy and Environmental Engineering with specialisation in solid waste management.

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This special issue is 'Part Two' of the special issue on 'Solid waste management' which reports the research findings on landfill leachate management, resource recovery, value addition to the waste by composting and vermicomposting, characterisation and land application of the wastes.

Solid waste management has traditionally been a neglected area often accounted for severe health problems in the yesteryears. Only after the devastating accidents in developed and developing nations, solid waste management has been considered a necessity by most of the nations. This resulted in governments at the central, state and city level, Non-Government Organisations (NGOs) and individuals paying more attention to the continuously annoying problem of solid wastes, initiating various waste

management projects and special cleaning drives as well as drafting new policies. Environmental standards of solid waste treatment and disposal have gradually been improved, and new methods of waste collection, transportation, storage, segregation and resource recovery have emerged. A good deal of information has been generated in the published and patented literature. Over the period of last two decades, solid waste management has emerged as a scientific and engineering profession due to numerous benefits it offer. However, the task of managing solid wastes has become more and more problematic and complicated as new types of wastes such as hazardous chemicals, e-waste or different kind of plastic materials have been introduced into the consumption cycle in the recent years without adequate concepts and policies for their disposal. We are happy to present the 12 excellent papers in this special issue.

Landfill leachate contains a complex mixture of inorganic and organic pollutants, which may pollute the environment. The first two papers deal with landfill leachate management. Kängsepp et al. have reported column studies aiming at identification of suitable filter materials for pollutant removal from landfill leachate. Andrzej Białowie and Irena Wojnowska-Baryła have emphasised the use of plants with high transpiration ability as a cheap and effective method of landfill leachate disposal.

Nickel catalysts are used by different industries resulting in the production of large amount of solid waste containing nickel (spent catalyst). In third paper, Ghanem et al. have reported an interesting study on nickel recovery from spent catalyst by single and multi-stage-leaching of the exhausted catalyst with sulphuric acid.

Recently, the pyrolysis has been considered as an alternative method for sewage sludge treatment as well as to use this kind of waste to produce energy and more valuable chemical feed stocks. In fourth paper, Zhai et al. have reported the application of TG-FTIR technique to monitor the pyrolysis of sewage sludge and have also offered the theoretic references for the reuse of sewage sludge in future.

Olive-oil production is of great economic importance in the Mediterranean area. However, the Olive-oil production generates huge quantities of the olive mill husk. To overcome the problems caused by the disposal of olive mill husk, several technologies aiming to recycle the waste have been developed in recent years and composting is one of them. Composting transforms the waste into a stabilised product that can be used as a source of nutrients and humic substances for soils. Humic substances are extremely complex mixtures of organic molecules which play important functions in the environment since they interact with inorganic and organic molecules. In fifth paper, Ait Baddi Ghita and Hafidi Mohamed have demonstrated the applicability of Fluorescence spectroscopy and Differential scanning calorimetry analyses to assess the stability and maturity of olive mill waste composts in different stages of the process by following the variation of the humic acids structure.

Vermicomposting is the process in which earthworms are used to convert organic wastes into a humus-like material known as vermicompost. Sixth, seventh and eighth papers deal with the application of vermicomposting technology in solid waste management. Saha et al. have studied the effect of antibiotic producer fungi and free living nitrogen fixing bacteria on the quality of vermicompost prepared from municipality solid waste. The results showed that the decomposition of MSW is faster if it is inoculated with the studied microorganisms. Suthar has reported the impact of feed materials (crop residues + sheep manure, cowshed manure, and kitchen waste + leaf litter) on growth and fecundity performance of composting earthworms. He concluded that biomass and cocoon production rate in composting earthworms could be related to

the physico-chemical characteristics, palatability, and microbial composition of their feed material. Similarly, Saini et al. have reported the management of water hyacinth, sugarcane bagasse and rice husk by vermicomposting.

Energy generation from bark and wood residues has been adopted in Finland since it significantly reduces the use of fuel oil. However, the disadvantage of incinerating wood and peat, to produce energy, is the production of large quantities of ash. The ash is either dumped in industrial landfills or transported to municipal landfills. However, the increasing costs of land-filling have led to an urgent need for developing some new and innovative recycling options for ash. The recycling of ash depends on its chemical composition. In ninth paper Risto Pöykiö et al. have reported the concentrations of heavy metals in the fly-ash originating from the medium-sized municipal district heating plant of Kemin Energia Oy at Kemi, Northern Finland.

Petroleum industry produces huge amount of toxic oily wastes. Rogério S. Santos et al. have reported the possibility of using the petroleum industry waste to produce clay-based ceramics by powder technology. Metallurgical processes are known to generate many solid wastes including furnace dusts. Jan Jezierski and Krzysztof Janerka have reported that pneumatic injection technique could be an effective method for furnace dusts utilisation.

Water treatment residuals are the by-products of raw water treatment. The disposal of these by-products is a problem for water purification authorities due to their continuous production. Last but not least, Elsayed Ahmed Elkhatib and Ahmed Mohamed Mahdy have proposed a new concept of land application of water treatment residuals.

Finally, we like to thank all the contributors for sending their excellent manuscripts for consideration in the special issue, as well as all the reviewers who did an excellent job for improving the manuscripts. We are also grateful to Dr. Bhupinder Singh, Ms. Renuka Gupta, Mr. Anoop Yadav and Ms. Monika Jain for their extraordinary help to manage this issue.