
Preface

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Biographical notes: Dr. Rajiv K. Sinha is Senior Lecturer at Griffith University, Australia. He is in academics since 1971. He has published over 130 papers in international journals, 21 books and produced 7 PhDs. He is a 'Google Scholar' and has gained international recognition in Vermiculture Research. His research interest is in 'Vermifiltration' of municipal and industrial wastewater, 'Vermiremediation' of contaminated soils, 'Vermicomposting' of MSW and development of vermicompost as a sustainable alternative to chemical fertilisers. His works in 'vermiremediation' is being used by USEPA for remediation of Great Lakes Soils. He is the principal 'Guest Editor' of this Special Issue.

Dr. Sunil Herat is Senior Lecturer at Griffith University. His research interests include solid waste management, cleaner production and electrical and electronic wastes. He was instrumental in establishing the sole E-Waste research centre in Australia. He has published over 50 research papers in international peer-reviewed journals. He has also presented in number of international conferences and appeared in number of media interviews. He is a current member of United Nation's Solving the E-waste Problem (StEP) taskforce on capacity building. He is also one of the 'Guest Editors' of this Special Issue on Vermiculture Technology.

Dr. Sunita Agarwal is Assistant Professor in PG Department of Home Science, University of Rajasthan, Jaipur, India. She did her PhD on 'Vermiculture Studies' under supervision of Dr. Rajiv K. Sinha. She has published 21 papers (10 in international journals) and 3 books. Her focus of research is on 'Waste Management' by Vermiculture Technology and Use of Vermicompost for

Organic Farming of Vegetables'. She is also working on 'Hygiene & Sanitation Project' of UNICEF. 'Woman Empowerment' is another thrust area of her work. She is also one of the 'Guest Editors' of the present Special Issue on Vermiculture Technology.

Yung-Tse Hung is Professor of Civil Engineering at Cleveland State University, Cleveland, Ohio, USA, since 1981. He has his BS and MS Degrees in Civil Engineering from Cheng Kung University in Taiwan, and his PhD in Environmental Engineering from the University of Texas at Austin in 1970. He has taught at 16 universities in eight countries. His areas of specialisation are in biological wastewater treatment, industrial and hazardous waste treatment, and municipal wastewater treatment.

Vermiculture is a growing industry all over the world and a 'waste-less' enterprise as all by-products, e.g., earthworms biomass, and end products, e.g., degraded wastes (nutritive vermicompost), treated wastewater (disinfected and detoxified nutritive water) and remediated soil (detoxified and fertile rich in NPK and useful microbes), are economically 'useful and productive' for humankind.

Earthworms are an important organism in the ecosystem doing great service for humankind for millions of years now. It combines immense social, economic and environmental values together, which is now being realised and recognised. Earthworms have over 600 million years of experience in waste and land management, soil improvement and farm production. Sir Charles Darwin, the great visionary scientist, highlighted about its role in 'soil improvement and farm production' and called them as 'an unheralded soldier of humankind' and 'friends of farmers' long time ago. Value of earthworms in plant propagation was also emphasised by the great Indian author Surpala in his epic 'Vriksha-ayurveda' (Science of Tree Growing) as early as in the 10th century AD. This traditional wisdom has been scientifically verified today. Value of earthworms in waste management was emphasised by Greek Philosopher Aristotle who called earthworms as 'intestine of earth', which meant that they can digest wide variety of materials from earth.

A revolution is unfolding in vermiculture studies for multiple uses in environmental protection and sustainable development. The global scientific community is searching for a technology, which should be 'economically cheaper', 'environmentally sustainable' and 'socially acceptable'. Vermiculture Biotechnology combines all these virtues together. Their role as 'waste and soil managers', and 'plant growth promoters' were known for long, but some 'new discoveries' about their abilities in 'degradation of some hazardous wastes', in 'treatment of wastewater', 'remediation of chemically contaminated soil' and more recently about their potential use in 'modern medicine' for protection of human health and as a rich source of 'high-quality protein' and source of some 'industrial raw materials' have brought a revolution in the vermiculture studies. The papers presented in this 'Special Volume' highlight some of those features of earthworms.

Vermiculture technologies are self-promoted, self-regulated, self-improved and self-enhanced, low- or no-energy requiring zero-waste technologies, easy to construct, operate and maintain. It excels all 'bio-conversion', 'bio-degradation' and 'bio-production' technologies by the fact that it can utilise organics that otherwise cannot be utilised by others. It excels all 'bio-treatment' technologies because it

achieves greater utilisation than the rate of destruction achieved by other technologies. It involves about 100–1000 times higher ‘value addition’ than other biological technologies.

Vermiculture is a ‘big business’ and a growing industry today. Besides converting ‘waste into wealth’, it is also helping in ‘employment generation’ and ‘poverty eradication programmes’ in several developing countries.

Tribute to the earthworms

Earthworms as ‘ecosystem engineers’ are justifying the beliefs and fulfilling the dreams of Sir Charles Darwin who wrote “*there may not be any other creature in world that has played so important a role in the history of life on earth*”.

One of the leading authorities on earthworms and vermiculture studies, Dr. Anatoly Igonin of Russia, has said

“Nobody and nothing can be compared with earthworms and their positive influence on the whole living Nature. They create soil and everything that lives in it. They are the most numerous animals on Earth and the main creatures converting all organic matter into soil humus providing soil’s fertility and biosphere’s functions: disinfecting, neutralising, protective and productive.”