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ARTICLES

Global perspective on microplastics in landfill leachate; Occurrence, abundance, characteristics, and environmental impact

Gayathri Chamanee, Madushika Sewwandi, Hasintha Wijesekara, Meththika Vithanage

ABSTRACT

Plastic wastes deposited in landfills eventually break down and degrade into microplastics by physical, chemical, and biological forces. Though microplastics in leachate pose significant threats to the environment, the leachate generated from landfills has not received much attention as a possible source of environmental microplastics. A descriptive and systematic investigation of the global distribution of microplastics in landfill leachate does not exist to date. Therefore, this attempt is to provide a concise scientometric review of the studies on the presence of microplastics in landfill leachate. The present review revealed that the global trend in research on microplastics in leachate has increased exponentially after 2018 and China is the leading country. Different geographical regions have reported different microplastic abundances with the highest of 291.0 ± 91.0 items/L from a landfill in Shanghai. The use of novel sampling techniques to detect small microplastics (20–100 μm) has led to the high abundance of microplastics in landfill leachate in Shanghai. Due to its widespread usage, polyethylene is the most typically encountered polymer type in landfill leachate around the world. However, it is quite challenging to compare the results among studies due to the use of different size categories and extraction techniques. The removal of microplastics by the current leachate treatment facilities is still mostly unexplored, thus it is crucial to develop novel technologies to treat the microplastics in landfill leachate. Further investigations on the transport of microplastics in landfill leachate are urgently required to have a better understanding of potential human exposure and health implications.

About the Journal

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BOOK CHAPTERS

Solution-processable organic lasers and their future prospects

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ABSTRACT

Organic lasers have attracted intense attention over the years because of their promising properties such as color tunability, flexibility, and low cost, compared to inorganic counterparts. Today, a wide variety of organic dyes and organic semiconductor laser materials are available, which can lase from UV to visible and NIR regions. One of the critical advantages of organic laser materials compared to inorganic laser materials is that the laser emission can be finely tuned via a small alteration of the organic luminophores. Most of these materials can also be processed via vacuum deposition and solution processing techniques by designing the proper molecular structures. For low-cost and large-scale production of organic lasers, solution-processable techniques are more favorable in terms of both energy-saving and production cost issues. In this chapter, we summarize recent works on solution-processable organic lasers and their prospects.

About the Book

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Devices

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MONOGRAPHS

Checklist, typification details, and nomenclature status of ascomycetous fungi originally described in Sri Lanka

Nalin N. Wijayawardene, Dong-Qin Dai, Bhagya M. Premarathne, Madhara K. Wimalasena, R.G. Udeni Jayalal, Kawmini D. Wickramanayake, Hasanka Dangalla, W. Hashini Jayathunga, Rashika S. Brahmanage, Samantha C. Karunaratna, Gothamie Weerakoon, Kahandawa G.S.U. Ariyawansa, P. Neelamanie Yapa, Sumedha Madawala, Chandrika M. Nanayakkara, Xin-Lei Fan, Paul M. Kirk, Gui-Qing Zhang, Aseni Ediriweera, D. Jayarama Bhat, Turki M. Dawoud, Saowaluck Tibpromma, D.S.A. Wijesundara

ABSTRACT

Despite being a biodiversity-rich country, Sri Lanka's fungal diversity remains largely unexplored. In the 19th century, British mycologists conducted extensive research, leading to the identification of more than 1,800 fungal taxa, including ascomycetous and basidiomycetous species. However, the majority of these taxa have not been revisited since their initial description, and molecular evidence is lacking. Moreover, a significant number of fungal taxa have been deemed invalid or illegitimate, indicating the need for a nomenclatural revision. To address this knowledge gap, this review provides a comprehensive list of ascomycetous taxa (including both lichen-forming and non-lichenized) that were originally described in Sri Lanka. Names are listed according to the original names which were included in the protologue. In the cases where species have been transferred to other genera, the current names and new classifications are provided. The typification details, nomenclature status, and classification are also presented. This checklist will serve as a valuable resource for the future epitypification of old taxa, as much of the existing information is poorly documented and scattered.

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CONFERENCE PROCEEDINGS

An Assessment of distribution of Airborne Microplastic using Epiphytic Crustose Lichens in Surrounding Areas of an Open Dumpsite of a Plastic Crusher Plant at Kanadola, Sri Lanka

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ABSTRACT

Airborne microplastics (AMPs) have gained significant global attention due to their presence in the atmosphere and potential risks to human health and the environment. This study focuses on the assessment of microplastic contamination in the air originating from an open dumpsite of a plastic crusher plant in Kanadola, Sri Lanka. Epiphytic crustose lichen samples were collected from trees using stratified random sampling. The study area was divided into three sampling zones based on the distance from the plastic crusher plant: a proximate zone (n=4, 50 m), an intermediate zone (n=3, 50-100 m), and a distant zone (n=3, 100-200 m). In addition, epiphytic crustose lichen samples (n=3) were collected from an undisturbed forest patch at Kumbalgama, as the background control experiment. The acid-digestion method was employed to release the accumulated microplastics from the lichen thallus. Microscopic analysis and a hot needle test were used for microplastic visual inspection and identification, respectively. The total number of microplastics per 1 g of dry weight of lichen in each sampling zone was statistically analyzed using one way ANOVA and the results revealed a significant difference ($p=0.003$) in AMPs distribution among the sampling zones. Post-hoc pairwise comparisons using the Tukey test indicated no significant difference in AMPs distribution between the proximate zone and the intermediate zone, but it significantly differed from the control site. In conclusion, this study highlights substantial plastic pollution in the proximate zone and the intermediate zones of the plastic crusher plant site compared to the forest (control) site. The findings underscore the potential of lichen as a biomonitoring agent for qualitative and quantitative analysis of airborne microplastic pollution.

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Factors Affecting to the Development of School-Level Badminton Players in Central Province

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ABSTRACT

Badminton holds a significant position among racket sports globally, known for its short duration and high-intensity gameplay involving two or four players. The sport's progress is influenced by various factors, which ultimately shape a player's maximum performance. There is limited research on Badminton in Sri Lanka. Hence, the primary objective of this study was to explore the physical, human, economic, and sports development factors impacting school Badminton in Sri Lanka's Central Province. The study included a sample of eighty-four participants, consisting of forty-two physical education teachers and forty-two school students (n=84, PE Teachers = 42, Students = 42). Data was collected using the multi-state sample method in Central Province, utilizing separate questionnaires with twenty questions for both physical education teachers and students. The questionnaires utilized a five Likert Scale (Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree). The data was analyzed using Minitab 19, and the findings were presented using tables and graphs. The results indicated a negative relationship (-) between the physical factors, economic factors, and sports development factors concerning Badminton development, suggesting that these aspects require improvement to foster the sport's growth. The human factors of school students and physical education teachers exhibited a neutral (0) relationship with Badminton development, implying that there is neither a positive nor a negative association. The finding also proved that an depth study of the current situation of school badminton games in Central Province, and better focus on the development of school-level badminton. To develop school Badminton in Sri Lanka's Central Province, following a long-term training plan, conducting training programs, providing adequate facilities, and employing new technology is generally preferable.

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