Faculty of Applied Sciences
Sabaragamuwa University of Sri Lanka

Out of the Press

Our publications - June

Volume 3 Issue 6

06th July 2023

Peer-reviewed Journal Articles

DNR

Evaluation of microbiological quality of commercially available bottled drinking water in Colombo district, Sri Lanka

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Abstract

In recent times, the consumption of bottled water has dramatically increased in Sri Lanka. However, compliance by the producers with the bottled water regulations is debatable, which poses questions about bottled water quality. This study aimed at evaluating the microbiological quality of bottled water in the Colombo district, Sri Lanka. Twenty-six brands of drinking water were collected from the Colombo district (19 locations) microbial quality was detected by checking the total coliforms (TC), fecal coliforms (FC), heterotrophic bacteria, fungi and algae. The results revealed that 50 % of drinking water brands violated the Sri Lanka Standards Institution (SLSI) and WHO guidelines, and the Sri Lanka Health Ministry regulation (0 cfu/100 ml). Twenty-three percent of brands exceeded the limits for presumptive FC (0 cfu/100 ml in accordance with WHO guidelines, SLSI, and the Sri Lanka Health Ministry requirement). Moreover, 35% showed higher heterotrophic bacteria which exceeded the WHO guidelines (50 cfu/ml). The dominant fungi found in the bottled water were *Aspergillus* spp., *Rhizopus* sp., *Trichoderma* sp. and *Mucor* sp. *Chlorella vulgaris* was identified as the algal species that was present in the drinking water samples and it was 8 % of the samples checked. Additionally, the statistical analysis of water sources revealed no significant differences in the levels of fecal and total coliforms in samples across springs, tube wells, and dug wells. However, the tube wells have a significant difference in HPC and algae than dug wells and springs. The findings of this study concluded that the bottled water industry needs to be closely supervised by competent authorities to provide customers with more healthy bottled water in Sri Lanka.

About the Journal

Ceylon Journal of Science

Impact Factor – 0.6

http://doi.org/10.4038/cjs.v52i2.8159

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DNR

Boron contamination and its risk management in terrestrial and aquatic environmental settings

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Abstract

Boron (B) is released to terrestrial and aquatic environments through both natural and anthropogenic sources. This review describes the current knowledge on B contamination in soil and aquatic environments in relation to its geogenic and anthropogenic sources, biogeochemistry, environmental and human health impacts, remediation approaches, and regulatory practices. The common naturally occurring sources of B include borosilicate minerals, volcanic eruptions, geothermal and groundwater streams, and marine water. Boron is extensively used to manufacture fiberglass, thermal-resistant borosilicate glass and porcelain, cleaning detergents, vitreous enamels, weedicides, fertilizers, and B-based steel for nuclear shields. Anthropogenic sources of B released into the environment include wastewater for irrigation, B fertilizer application, and waste from mining and processing industries. Boron is an essential element for plant nutrition and is taken up mainly as boric acid molecules. Although B deficiency in agricultural soils has been observed, B toxicity can inhibit plant growth in soils under arid and semiarid regions. High B intake by humans can be detrimental to the stomach, liver, kidneys and brain, and eventually results in death. Amelioration of soils and water sources enriched with B can be achieved by immobilization, leaching, adsorption, phytoremediation, reverse osmosis, and nanofiltration. The development of cost-effective technologies for B removal from B-rich irrigation water including electrodialysis and electrocoagulation techniques is likely to help control the predominant anthropogenic input of B to the soil. Future research initiatives for the sustainable remediation of B contamination using advanced technologies in soil and water environments are also recommended.

About the Journal

Science of the Total Environment

Impact Factor – 9.8

https://doi.org/10.1016/j.scitotenv.2023.164744

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DPST

An evidence of electron donor behavior of single-walled carbon nanotube in photo-induced electron transfer

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Abstract

The electron transfer reaction between C_{60} and SWCNTs in D_2O was investigated. Repeated laser irradiation of water-soluble C_{60} encapsulated in γ-cyclodextrin and SWCNTs with carboxymethylcellulose dispersed in D_2O resulted in the accumulation of C_{60} anion radicals and a decrease in the E_{11} absorption band of SWCNTs, strongly suggesting electron transfer between C_{60} and SWCNTs. Transient absorption techniques revealed that this electron transfer occurred through the excited triplet of C_{60}.

About the Journal

Journal of Photochemistry and Photobiology

Impact Factor – 2.2

https://doi.org/10.1016/j.jpap.2023.100193

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Book Chapters

DNR

Natural Enemies Against Dengue: Opportunities and Constraints on Biological Control of Dengue Vectors in Sri Lanka

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Abstract

Dengue is recognized as one of the most common and rapidly spreading mosquito-borne viral disease, causing approximately 100 million infections annually around the world, also making a major challenge to the health sectors of Sri Lanka, due to the absence of a specific treatment or a vaccine. Hence health entities around the world rely upon vector control as the primary management strategy for dengue prevention. Regardless of the availability of diverse vector control strategies, unintentional ill effects on the environment and the fast development of insecticide resistance have hindered their success. Biological control of larval and adult stages of *Aedes* vector mosquitoes using locally available natural predators provides a cost-effective, sustainable, and environmentally friendly strategy for dengue vector control. The remarkable ecosystem diversity in Sri Lanka harbors a wide range of natural predators of *Aedes* , which range from microscopic copepods (*Mesocyclops leuckarti* and *Mesocyclops scrassus*) to macroscopic dragonflies (*Pantala flavescens* and *Anax indicus*) and fish (*Aplocheilus dayi, Aplocheilus parvus* , and *Puntius bimaculatus*). Ongoing research recommends aforementioned native species as excellent biological control agents of Aedes over some exotic species introduced for the same purpose, as a major contributing aspect in integrated vector management for dengue.

About the Book

One Health: Human, Animal, and Environment Triad

Publisher: John Wiley & Sons, Inc.

https://doi.org/10.1002/9781119867333.ch24

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