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Editorial

SARS-CoV-2 and other pathogenic microorganisms in the environment



ARTICLE INFO

Keywords

COVID-19
 Environmental issues
 Epidemics
 Infectious diseases microorganisms
 Pandemics
 SARS-CoV-2
 Virus

ABSTRACT

The title of the Virtual Special Issue (VSI) “SARS-CoV-2 and other pathogenic microorganisms in the environment”, clearly indicates a main focus not only on the virus causing the current pandemic, but also on other pathogenic microorganisms and their spatial and temporal dynamics in environmental compartments. Overall, the VSI has received more than 100 submissions relating to most of the possible fields connected to the pandemic, many of them of high scientific value. A rigorous peer-reviewing process has been carried out, with a panel of experts making a great work to evaluate that important number of submissions. As a result, those manuscripts reaching the highest scientific standards were selected for publication. We think that the papers included constitute a set of high-quality contributions, which should help to improve the overall scientific perspective regarding this crucial issue. In this piece, the Editors comment some issues on the papers accepted for publication, and include additional reflections.

1. Introduction

SARS-CoV-2 has caused the COVID-19 pandemic, currently still affecting many geographic areas over the world. This infectious disease -as other caused by different pathogenic microorganisms-needed and still needs to be investigated not only in that related to find a cure and medical treatments for sick people, but also related environmental aspects. Although some of the Guest Editors of this VSI have previously edited other Special Issues focusing on various aspects of this novel coronavirus and other pathogenic microorganisms (Núñez-Delgado, 2020; Núñez-Delgado et al., 2021), additional research is needed.

In fact, human-to-human transmission is a critical factor, but shedding of SARS-CoV-2 virus (and/or other pathogenic microbes) through excreta, reaching wastewater, and then watercourses or other environmental compartments (soil, plants, surface and groundwater, etc.) is of increasing concern. It is especially important in those regions where wastewater collection and treatment are not available, and sanitation is limited. In addition, the effects of weather conditions, as well as those of air pollutants, are being investigated for this virus and other microbes causing epidemics. In this sense, airborne transmission has been considered crucial, now and in the future. The eventual waterborne transmission is also important, with relevance due to wastewater-based epidemiology, and mostly taking into account that future mutations could make more feasible fecal-oral and/or other transmission routes, which highlights the great interest of interdisciplinary research.

Based on the above, the Editors of this VSI launched a Call for Papers in this journal, encouraging authors to submit high quality manuscripts presenting new research results of global relevance, as well as new perspectives or reviews on the matter. It focused on a wide range of environmental aspects related to pathogens with epidemic/pandemic

potential, and especially on SARS-CoV-2 and subsequent mutations of this novel coronavirus.

With more than 100 submissions received, the Editors include below some comments on the papers published and related aspects.

2. Comments on papers published in the virtual special issue

On June 20, 2021, the papers that have been published are the following: Adelodun et al. (2021) prepared a review on monitoring the presence and persistence of SARS-CoV-2 in water-food-environmental compartments. Ahmed et al. (2021) published a study on intraday variability of indicator and pathogenic viruses in 1-h and 24-h composite wastewater samples, in relation to their implications for wastewater-based epidemiology. In turn, Anand et al. (2021a) presented an environmental outlook regarding SARS-CoV-2 and other viruses in soil, while Anand et al. (2021b) showed an interdisciplinary vision for the COVID-19 disease, from transmission to control. On the other hand, Bontempi (2021) reported the Italian “strange” situation in relation to the Europe second wave of COVID-19 infection, while Bontempi and Coccia (2021) focused on international trade as critical parameter of COVID-19 spread that outclasses demographic, economic, environmental, and pollution factors. Byun et al. (2021) performed a critical analysis of empirical and epidemiological studies at global and local scales, with the aim of answering whether COVID-19 is seasonal (or not). The paper by Chen (2021) considered quantifying collective intelligence and behaviors of SARS-CoV-2 via environmental resources from virus’ perspectives, while Chen et al. (2021a) reported the results of an investigation for airflow and deposition of PM2.5 contaminated with SARS-CoV-2 virus in healthy and diseased human airway. Chen et al. (2021b) also detailed an analysis of microparticle deposition in the

<https://doi.org/10.1016/j.envres.2021.111606>

human lung by taguchi method and response surface methodology. Coccia (2021a) carried out a global analysis on high health expenditures and low exposure of population to air pollution as critical factors that can reduce fatality rate in COVID-19 pandemic crisis. This same author (Coccia, 2021b) considered the impact of the first and second waves of the COVID-19 pandemic in the society in order to make comparative analysis to support control measures to cope with negative effects of future infectious diseases.

Dargahi et al. (2021) investigated the SARS CoV-2 virus in environmental surfaces, while Gomes-Passos et al. (2021) made an exploratory assessment of the occurrence of SARS-CoV-2 in aerosols in hospital facilities and public spaces of a metropolitan center in Brazil. In turn, González et al. (2021) carried out a review on respiratory viruses in foods and their potential transmission through the diet, whereas Gwenzi and Rzymiski (2021) showed a perspective on Africa's subdued research response to COVID-19. On the other hand, Iyer et al. (2021) presented a solid waste perspective regarding environmental survival of SARS-CoV-2, while Jadil and Ouzir (2021) made a multi-country comparison to explore the predictors of health-protective behavior during the COVID-19 pandemic. Kumar et al. (2021) performed a temporal study on SARS-CoV-2 RNA detection and need for the escalation, to unravel the early warning capability of wastewater surveillance for COVID-19. Liu et al. (2021a) showed implications for COVID-19 related to the fact that selenium plays a key role in the biological effects of some viruses. Liu et al. (2021b) reported the data of a study on the role of seasonality in the spread of COVID-19 pandemic, whereas Mahanta et al. (2021) conducted a performance study of a sterilization box, using a combination of heat and ultraviolet light irradiation for the prevention of COVID-19. More general was the study by Moresco et al. (2021), dealing with the survival of human enteric and respiratory viruses on plastics in soil, freshwater, and marine environments, as was that conducted by Pirasteh-Anosheh et al. (2021), focused on haloculture as a system to mitigate the negative impacts of pandemics on the environment, society, and economy.

In another kind of research, Sampaio et al. (2021) studied the impact of COVID-19 outbreak on nurses' mental health, by means of a prospective cohort study. Stufano et al. (2021) focused on the COVID-19 outbreak in Lombardy (Italy), making an analysis on the short-term relationship between air pollution, climatic factors and the susceptibility to SARS-CoV-2 infection, while Suarez-Lopez et al. (2021) studied COVID-19 and children's health in the United States, with consideration of physical and social environments during the pandemic. Finally, Tiwari et al. (2021) published a paper on the surveillance of Wastewater for Early Epidemic Prediction, considering environmental and health security perspectives in the post COVID-19 Anthropocene.

Some countries, such as Italy and India, have contributed in a high proportion of the papers, but other interesting articles were also published by teams from China, Spain, Australia, USA, Portugal, Brazil, and other geographic areas in the world. Some submissions are still being processed.

The Editors of the VSI hope that this set of high-quality contributions could shed light on the subject, as well as stimulate further multi-disciplinary research on these topics. In fact, even if this VSI is still receiving new submissions, as new interesting research-works are continuously arriving to the journal, other complementary VSIs would be also pertinent, focusing on key scientific aspects not covered by the current one. We hope that with the content of this and other future complementary VSIs, all main details regarding the coronavirus, the pandemic, its socioeconomic and environmental implications, and the best practices to fight against it and to prevent future pandemics, could be elucidated. We are sure that a cautious and intelligent management of the environment should be essential to achieve the main goals, including the preservation of human life on the Earth.

Declaration of competing interest

None.

Acknowledgements

The Editors would like to thank all Authors, Reviewers and Staff of Environmental Research and Elsevier involved in the tasks needed to reach the final success of thisVSI.

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Avelino Núñez-Delgado*

Dept. Soil Sci. and Agric. Chem., Univ. Santiago de Compostela, Engineering Polytech. School, Campus Univ. S/n, 27002, Lugo, Spain

Elza Bontempi

INSTM and University of Brescia, Via Branze 38, 25123, Brescia, Italy

Mario Coccia

National Research Council of Italy, Research Institute on Sustainable Economic Growth, Roma, Italy

Manish Kumar

Indian Institute of Technology Gandhinagar, Palaj, Gujarat, 382 355, India

Kata Farkas

School of Natural Sciences, Bangor University, Deiniol Rd, Bangor, Gwynedd, UK

José L. Domingo

Laboratory of Toxicology and Environmental Health, School of Medicine, Universitat Rovira I Virgili, Reus, Spain

* Corresponding author.

E-mail address: avelino.nunez@usc.es (A. Núñez-Delgado).