International Ozone Association

September 8, 2021

Dear Members of the International Ozone Association,

The International Ozone Association (IOA) issued a statement on the COVID-19 on March 22, 2020. At that time, the IOA received several inquiries regarding the effectiveness of ozone to disinfect water and surfaces for the coronavirus SARS-CoV-2 that causes the illness Coronavirus Disease 2019 (COVID-19). The current COVID-19 pandemic is unprecedented; however, the global response draws on the lessons learned from other disease outbreaks over the past several decades. The IOA encouraged researchers to pursue the evaluation of ozone inactivation of this coronavirus. There was a positive response to investigate the methodologies to inactivate this virus.
The IOA supported in July 2020 the project for a Wastewater-Based Epidemiology (WBE) proposed by McMaster University, Ontario, Canada, that involves investigating whether wastewater testing for coronavirus signatures can be leveraged as an early detection biomarker to assess community widespread of the disease. The research group Joined the province of Ontario in undertaking a COVID-19 wastewater surveillance initiative to test wastewater samples in communities across the province to determine whether wastewater surveillance can be used in conjunction with clinical data as a tool to inform a public health response.

Ozone is a strong oxidant, and it has been used for the inactivation of almost all kinds of bacteria and viruses, it has been extensively used to disinfect water, and wastewater, and many other applications such as room sanitization, in agrifood, and as a therapy in the medical field. Unlike many other disinfectants, ozone is produced in-situ using only electricity and a source of molecular oxygen such as air or pure oxygen. It can be used in gaseous or dissolved in liquid forms. After use, it breaks down back to oxygen either naturally or through the use of devices such as catalytic ozone destructors.
Ozone has received increased attention for use against viruses due to its strong disinfection abilities. In general, viruses consist of a nucleic acid genome (DNA or RNA) coated by a protein comprised nucleocapsid. Some viruses, such as SARS-CoV-2, additionally maintain a viral envelope comprised lipids and proteins from its host cell membrane as its outermost layer. Enveloped viruses have long been assumed to exhibit decreased environmental persistence when compared to non-enveloped viruses, which has resulted in their omission in many environmental-related disinfection studies.
Research on ozone has mainly focused on inactivating waterborne viruses and have demonstrated that relatively low ozone concentrations and short contact times to achieve required inactivation's. Ozone is known to sufficiently inactivate viruses, such as

rotaviruses, parvoviruses, feline calicivirus, and hepatitis A virus. As a strong oxidizing agent, ozone is particularly lethal against viruses, both enveloped and nonenveloped.

Previous research has shown that ozone is also effective against airborne and on-surface viruses. The use of controlled ozone dose, and air relative humidity (RH), a noticeable virus inactivation increased the rate of inactivation of viruses, making ozone a fast, and attractive application for inactivating airborne and on-surface viruses. Un occupied indoor-space decontamination was a successful reach by ozone applications at different concentrations. Studies found the RH increase could accelerate the inactivation goals. Recent research studies have started to emerge showing growing evidence that ozone is effective against SARS-CoV-2 in liquid and on-surface. Although little research has been carried out for aerosolized virus, extrapolation of on-surface droplet data also reveals high effectiveness of ozone against airborne SARS-CoV-2. An appreciable volume of literature on this topic is emerging and the community is invited to consult the IOA journal Ozone: Science and Engineering for details about specific studies.
SARS-CoV-2 transmission is mainly by direct exposure to droplets produced by individuals infected with the virus or through contact with contaminated surfaces. with increasing evidence of indirect transmission could be from contaminated surfaces exposed to viruses in droplets carried through aerosol transmission. Although the waterborne route of transmission is not established, previous studies have shown that COVID-19 virus can be found in untreated wastewater.
The Ozone Industry started to introduce mobile units, generating ozone for indoor use decontamination, with remote control to maintain safe applications. The remaining ozone applied is subsequently removed by a built-in Ozone Destruct Unit. This application provides shorter period to reoccupy the room, after safe application for decontamination of the room, and elimination any potential impact on human health by withdrawing the remaining ozone.

In closing, I would like to thank all the efforts by the scientists, engineers, the medical health sector, the front-line workers, and the staff providing safe operation of water and wastewater systems.
Stay safe, maintain physical distance, wear a mask, follow the advice of health departments where you live and work, and get vaccinated.

Sincerely,

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