# A Simple Solution to Control Spread of Aerosolized Viruses and Bacteria can be Found in Water Treatment Technologies

*Atomization of a new mineral oxychloride solution opens opportunities for fast and large-scale control of the spread of aerosolized pathogens*

Photograph of a sneeze in progress, revealing the plume of salivary droplets as they are expelled in a large cone-shape array

CHICAGO, IL, UNITED STATES, March 9, 2020 /EINPresswire.com/ -- Aerosolized pathogens play a fundamental role in the transmission of disease and exposure is inherent to human life. The aerosolized spread occurs through both “droplet” and “airborne” means. Droplet transmission is defined by expelled particles likely to settle quickly on a surface near the source, typically within 2 to 6 feet away. A vulnerable person must be close to the source of the infection expelling the droplets, and these need to enter its respiratory tract, eyes, mouth, nasal passages, and so forth. In contrast, airborne transmission is defined by expelled particles, so small in size, that can remain suspended in air for long periods of time, sometimes a week or more, and can be geographically transported by winds and other conditions that affect air movement. Airborne particles expose a much higher number of susceptible individuals and much further away from the source of infection. The size of the droplet particle determines the length of time the transmission of a microbe remains airborne, and the survival time of a pathogenic microorganism determines how long the airborne transmission remains infectious.

> “Sanitary science has made big progress against waterborne pathogens. We now have a strategic arsenal of green and powerful water disinfection technologies to remove all biological contamination.”
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> *Emma Flanagan, President of Envirocleen*

Microorganisms transmitted by droplets can respond to some treatments devised to eliminate waterborne infections. Various water treatment chemicals are used as gas scrubbers to neutralize airborne contaminants, and in fogging and misting devices to eliminate airborne pathogens. A qualifying candidate to succeed at breaking the chain of airborne transmission and interrupt the spread of infection must have excellent biocidal activity, with high potency at very low concentrations, be effective at inactivating pathogens in just a few seconds, be nontoxic at the necessary dosage, safe for humans, pets and plants, breathable, biodegradable and sustainable.

In 2013, a US-made mineral oxychloride formulation that delivers advanced oxidation

technology as a ready-to-use green chemistry water treatment product, received NSF ANSI 60 certification and approval to be sold as a drinking water sanitizing product. On that same year, a cooperative study on fogged disinfectants to inactivate conidia of P. Digitatum led by the USDA-ARS, San Joaquin Agricultural Sciences Center, was published on Elsevier's Postharvest Biology and Technology magazine reporting that the mineral oxychloride solution outperformed 15 other sanitizers applied as fogged disinfectants to inactivate the spores of the fungi that causes green mold in citrus. Results showed that it required almost 5 times less mineral oxychloride solution than active chlorine, the runner up, to inhibit 99% of the fungi, and 100 times less than Formaldehyde, which ended in 3rd place. This study demonstrated that fogged mineral oxychloride solution is just as effective when aerosolized in minuscule size droplets as when applied to large water systems, generating large amounts of oxygen radicals and ions that react at very fast rates and can affect significant changes at the molecular level of microbial contaminants and chemical pollutants.

The innovative technology of the mineral oxychloride solution made possible an advanced oxidation process to be available commercially without requiring a continuous external source of energy. This means that for the first time, advanced oxidation can be stored for long periods of time, transported to remote places, and available on-demand everywhere without depending on energy supply. Advanced oxidation is very effective at eliminating pathogens quickly by driving them to oxidative stress and causing cell lysis, which destroys their DNA without leaving genetic material that can mutate and create resistance. There is no known pathogen able to survive advanced oxidation. The amount of water the reactive oxygen molecules need to perform oxidation is microscopic. The mineral oxychloride solution can be applied in very small sizes, tinier than a droplet, even nanoscale small, using foggers, sprayers and aerosolization devices. There is a vast source of published scientific data showing that advanced oxidation processes kill most microorganisms in microseconds. Bacteria are easier to kill than fungi; viruses are easier to kill than bacteria, and enveloped viruses are more susceptible to oxidation than non-enveloped, or naked viruses.

The reactive oxygen species generated by the mineral oxychloride reagent are present in dissolved form and ionized as unstable molecules, and easily bioabsorbable. The vapors and aerosolized mist are breathable and will not cause irritation to the lung linings when inhaled in low concentrations. It has been found effective at eliminating on contact waterborne viruses and bacteria at concentration levels well below 0.001%. The mineral oxychloride reagent and the non-toxic nature of its oxidative technology is an attractive proposition as a scalable water-based vector to interrupt the spread of pathogens by breaking the chain at the mode of transmission. Dilutions of mineral oxychloride reagent under 1% can reliably treat indoor and outdoor environments to inactivate airborne microorganisms and sanitize exposed surfaces. It can be used with domestic devices like aromatherapy diffusers, as well as room vaporizers, humidifiers, and large environmental fogging and misting systems.

The mineral oxychloride reagent is sold with the trademark Bio-hydrox™, by Envirocleen LLC. In 2018 the technology was included in the EPA FIFRA registry. All its ingredients are FDA GRAS approved for direct food contact. For further information please visit the company website.

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