The SAFEST WATER In The World

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MIOX Corporation Discovers a Reason Why *Cryptosporidium* is Resistant to Chlorine

ALBUQUERQUE, NM – March 4, 2010 – MIOX Corporation, a leader in safe water disinfection, published a peer-reviewed scientific paper in *Applied and Environmental Microbiology,* a journal of the American Society for Microbiology. The research for this publication was conducted in collaboration with the Center of Infectious Diseases and Biodefenses, University of New Mexico Health Sciences Center. The research was led by Principal Microbiologist George Bajszar, PhD.

The paper, entitled "Stress-induced Hsp70 gene expression and inactivation of *Cryptosporidium parvum* oocysts by chlorine-based oxidants," uncovers for the first time that chlorine triggers a strong defensive molecular response to oxidative stress in this important waterborne parasite. This response likely contributes to the high resistance of these waterborne pathogens to chlorination. After this initial defensive response mechanism to oxidative stress is "overwhelmed" by extended contact time or at higher concentration of chlorine oxidant, the exposure to the oxidant leads to oocyst death. The relative biocidal effect of bleach and electrolytically generated mixed oxidant solution (MOS) on the oocysts was compared at identical free chlorine concentrations. The results showed that MOS exhibits a higher efficacy in oocyst inactivation than hypochlorite.

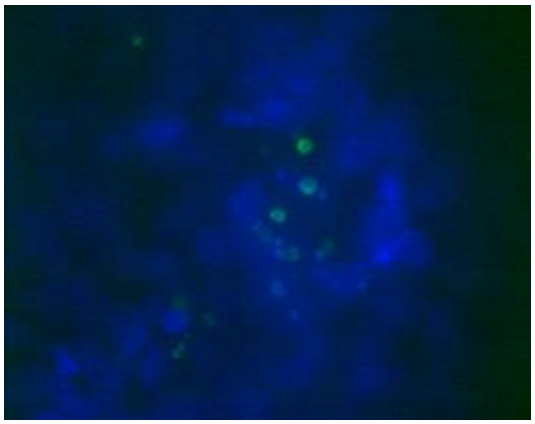

Photo courtesy of Dr. Alexander Dekonenko, University of New Mexico Health Sciences Center.

Pictured: *Cryptosporidium parvum*. Clusters of infection by *C. parvum* in a cell culture monolayer. The *C. parvum* cells are labeled with a green fluorescent antibody, and the host cells (HCT-8; an intestinal colorectal adenocarcinoma cell culture, which can be infected with *C. parvum*) are stained in the background with a blue fluorescent dye (DAPI).

Oocyst viability was monitored by a commonly accepted infectivity assay, which uses live mammalian cells to estimate the infectivity of oocysts. In addition, a fast molecular diagnostic assay, based on the quantitative reverse-transcription polymerase chain reaction (qRT-PCR) technique was applied. The comparative assays gave consistent results. The latter method is faster and simpler to perform. While the qRT-PCR assay may not yet be used under current regulatory frameworks to monitor for *C. parvum* oocysts, it can be developed for rapid assessment of disinfection efficacy. With a faster assay, water treatment **plant** operators would be able to adjust and optimize disinfection dose rates more rapidly in response to changing conditions. This would allow them to reduce the use of disinfection chemicals thereby reducing disinfection by-product formation in the finished water or increase dose if the risk of contamination is greater.

The MIOX-UNM research team also observed that *Cryptosporidium* oocysts can remain physically intact for several days following disinfection treatment – even when they are already dead.

These findings will enable MIOX and others in the drinking water community to develop more efficient disinfection protocols and analytical methods for the inactivation of chlorine-resistant microorganisms.

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About MIOX Corporation
MIOX® Corporation (www.miox.com) is focused on solving one of the world's most pressing issues: the need for affordable, safe, and healthy water. MIOX's patented on-site water disinfection technology safely and economically generates either hypochlorite or advanced mixed oxidant using just salt, water and power, replacing the need to purchase, transport and store dangerous chemicals. MIOX is safely used in over 30 countries for public drinking water systems, water reuse projects, and non-municipal applications including the food and beverage, power, and aquatics and leisure industries.