HOT TOPICS: THEY SAID IT ABOUT HOCL

August 2018 – Michel van Schaik, owner & CEO, Aquaox LLC

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THEY SAID IT … we report it … and you evaluate the results and source credibility. [The full text of research studies/papers articles are made part of this HOT TOPICS and are found at the end.]

WHERE ARE WE? AQUAOX generators produce/supply hypochlorous acid that is electrostatically sprayed in hospitals to SAFELY assure efficacy of HOCL in killing pathogens and dispels any concern that HOCL could be related to allergenic/asthmatic reactions. The modern-day protocol of the **AQUAOX *Infection Control System*** lowers worker injuries/claims and elevates staff productivity to improve (hospital) patient satisfaction off the charts.

While not additionally claimed (on Aquaox's AX-525 containers), C.diff is indisputably managed as evidenced by anecdotal success from thousands of in-hospital applications. So, while Aquaox is nicely managing reality . . .

WHERE ARE YOU?

Where does your organization sit when it comes to 'healthy' and proactive reduction of chemical use?

Here comes a little nudge from the *good fairy* sitting on your shoulder: Simply follow the **MORAL IMPERATIVE** and, where applicable, the **LEGAL OBLIGATION** that EVERY facility gets their job done effectively while providing the safest working conditions possible.

OSHA's guiding principle – "Don't use hazardous chemicals if a less hazardous one is available." In other words, if there is a safer way to perform a job, choose the safer way.

The cost of killing **MRSA**, **E.coli** and other bacteria and viruses with chemicals also comes at great cost and often requires undesirable chemicals, chlorine or bleach – all bad. Besides, the long contact time required of chemicals evaporates (toxic) fumes into the air we breathe … in addition to leaving on surfaces residue that can irritate skin, eyes and respiratory.

In hospital applications, think first of long-term health consequences to staff and patients due to chemical absorption into the body. And always keep sight of the higher hard and soft costs of using chemicals, as opposed to *doing the right thing* with a more-potent, safe HOCL solution dispensed by electrostatic sprayer and ultra-high quality microfiber cloths and mopheads.

SUMMARY OF FINDINGS

From Green Seal Study.pdf

3.4 Cleaner Use
The most important impacts associated with the use of cleaners include health and safety concerns for the workers and building occupants and environmental releases of the cleaners. In addition to reduction of environmental impacts though product selections, purchasers and users of cleaning chemicals should consider dispensing systems that limit worker exposure to cleaning concentrates. These are described in Section 2.4. This section describes relevant health, safety, and environmental impacts and then discusses various ingredients and their impacts.
Appendix B contains health and environmental data by ingredient.

3.4.1 Health and Safety
Worker Exposure to Cleaning Chemicals. Workers are commonly exposed to cleaning chemicals through their skin and their lungs, although oral exposure is also possible. In their review of janitorial injuries in the state of Washington, Barron and Sutherland (1999) reported that 76% of janitorial injuries from chemical exposure involve skin and eye irritation or burns and 12% involve worker inhalation of chemical fumes. Barron et al. (1999) estimates that medical expenses and lost time for chemical injuries to janitors in the United States cost approximately $75 million annually. Therefore, Green Seal wants to encourage the selection of products that are not toxic, corrosive, skin or eye irritants, or sensitizers.

Toxics. Although cleaning chemicals are not generally the most significant source of VOCs in an indoor environment, they are a significant source of VOCs to the workers who use them. This makes the inhalation toxicity of volatile cleaning chemicals an important consideration. Due to concern over worker exposure to some volatile compounds, OSHA has set permissible exposure limits (PELs) and the American Conference of Governmental Industrial Hygienists (ACGIH) has set threshold limit values for a number of solvents. Cleaning chemicals can also be absorbed through the skin, particularly some glycol ethers. Dermal toxicity of cleaning chemicals is also an

important consideration. The potential for skin absorption can be greatly reduced by wearing gloves, as manufacturers generally recommend.
The Consumer Product Safety Commission (CPSC) defines a toxic material as (16 CFR Part 1500.3)
LD50 < 5 g/kg (oral)
LC50 < 20,000 ppm (inhalation)
LD50 < 2 g/kg (skin)
It is important to note that health effects occur at levels below those defined as toxic.

Corrosivity and Skin and Eye Irritation. A chemical with a pH outside the neutral range may cause injury to the skin and eyes. Although products with a pH greater than 11 or less than 2.5 pose the greatest risk for skin and eye injury (Grant 1974), pH is not the only measure of a chemical's potential for skin and eye injury.

Sensitizers. A sensitizer is a chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical. Sensitizers should be reported on MSDSs. A person can become sensitized to a cleaning chemical by inhaling it or from dermal exposure. Some of the responses to sensitizers include contact dermatitis and inflammation of the mucus membranes. According to the US Bureau of Labor Statistics, occupational skin diseases (mostly in the form of contact dermatitis) are the second most common type of occupational disease, accounting for 14% of all occupational diseases (BLS 1999b).

Flammability. The flammability of some solvents and propellants is an important safety issue. Flammable and combustible substances must be handled with extreme caution. The CPSC defines a flammable substance as one with a flashpoint between 20 and 100 °F and a combustible substance as one with a flashpoint between 100 and 150 °F (16 CFR Part 1500.3(c)(6)). OSHA defines several classes of combustible liquids. The Department of Transportation allows liquids to be tested to determine if the liquid can sustain a flame instead of relying on flashpoint. It is important to consider the combustibility of a product as a whole. For example, a dilute solution of ethanol in water would not be flammable or combustible. However, a cleaner containing high concentrations of pine oil, d-limonene, or other solvents could easily be flammable or combustible.

Indoor Air Quality. Americans on average spend 90% of their time indoors; therefore, good indoor air quality is essential to the health of building occupants (Berry 1994).
Common complaints resulting from poor indoor air quality include headache, fatigue, and sluggishness and irritation of the skin, eyes, nose, throat, and lungs (Berry 1994; Bardana and Montanaro 1997).
In general, the main causes of poor indoor air quality are poor ventilation, pollutants emitted outside, biological contamination due to poor moisture control, building materials, inadequate cleaning, and tobacco smoke (Berry 1994; Godish 1995; Bardana and Montanaro 1997).
Cleaning and the use of cleaners promote good indoor air quality by minimizing the amount of dust, dirt, and odors that can cause a negative response in building occupants.
Research Triangle Institute (RTI) (1994) assessed the effects of cleaning of indoor air quality and found that improved cleaning methods reduce the levels of biological, chemical, and particulate pollutants in the indoor environment. Additionally, cleaning removes sources of food for microorganisms and pests such as cockroaches and rodents. This reduces the potential for these organisms to cause poor indoor air quality.
On the other hand, many cleaners contain volatile ingredients, which evaporate during their use, and these VOCs cause sensory and central nervous system irritation. RTI (1994) found that cleaning chemicals containing lower concentrations of VOCs reduce the building levels of VOCs. Individuals exposed to 5 to 25 mg/m3 of a mixture of VOCs report an adverse response (Berry 1994; Kjaergaard 1991). In buildings, the major sources of VOCs include tobacco smoke, pesticides, and building materials such as insulation, wall and floor coverings, adhesives, and paint. Although cleaning chemicals are cited as a less significant source of VOCs, the use of VOCs in cleaners should be kept to a minimum to help maintain good indoor air quality.

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LIFE magazine reveals that the public is mostly unaware that **HOCl** actually cleans their water.
Chlorine is currently employed by over 98 percent of all U.S. water utilities that disinfect drinking water. It has proved to be a powerful barrier in restricting pathogens from reaching your faucet and making you ill.
Chlorine effectively kills a large variety of microbial waterborne pathogens, including those that can cause typhoid fever, dysentery, cholera and Legionnaires' disease. Chlorine is widely credited with virtually eliminating outbreaks of waterborne disease in the United States and other developed countries. And *Life* **magazine recently cited the filtration of drinking water and use of chlorine as "probably the most significant public health advance of the millennium."**

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Sonoma Pharmaceuticals Announces Publication of Consensus Report Describing Celacyn's (Hypochlorous Acid) Impact on Post-Procedure Treatment and Scar Prevention ... *June 28, 2017 04:05 ET* | **Source:** Sonoma Pharmaceuticals, Inc. For the abstract of this report: **https://www.ncbi.nlm.nih.gov/pubmed/28370943**
I am excited about the potential of HOCl to efficaciously and safely treat wounds and scars.
This consensus concluded that hypochlorous acid has been shown to be an efficacious and safe therapy in pre- and post-procedure management, hypertrophic and keloid scar prevention and treatment. Through its potent broad-spectrum antimicrobial activity and anti-biofilm effects, HOCl solution has been associated with a lower risk of wound infection than other available treatments including Hibiclens, betadine and povidone-iodine. It increases oxygenation

at wound sites, which may improve healing time. The safety of HOCl solution has demonstrated to be comparable to that of standard local antiseptics.

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Evaluation of sprayed hypochlorous acid solutions for their virucidal activity against avian influenza virus through *in vitro*experiments

The best way to combat with the [avian influenza (AI)**] plague is to enhance biosecurity**

Inactivation of AIV on the surfaces of objects or in the air at poultry farms would significantly reduce and or limit the chance for its circulation and outbreaks. Discovery of an **effective aerosol disinfectant** with applicability at farms that raise animals is a very important need to reduce *bioaerosol*.

Hypochlorous acid (HOCl) solution is one of the chlorine byproducts obtained by dissolving chlorine in water. The **virucidal ability of solutions containing a high amount of HOCl is better than those containing HCl^-, because the virucidal ability of HOCl is 120 times higher than that of HCl^-.** Furthermore, the level of ***free available chlorine*** in chlorine-based compounds (often called HOCl**) is highest in pH 5 solutions.**

DISCUSSION: Hypochlorites are powerful oxidizing agents with bactericidal, fungicidal and sporicidal activity, and hypochlorous acid is their active moiety. There is less information available concerning the mechanism of action of hypochlorous acid solution, but in general, it affects structural proteins, such as the capsid or surface compounds, lipid envelop (if present) and nucleic acids (DNA or RNA) of viruses.

Hypochlorous acid solution is one of the chlorine compounds with good disinfection ability. In the present study, the aqueous phase of the original solution containing a free available chlorine concentration of 50 ppm could reduce the titer of an ordinary AIV (H7N1) from $10^{7.7}$ $TCID_{50}/m\mathit{l}$ to lower than the detectable limit within 5 sec., which is faster than in previous reports, and its harvested solution after spraying from a distance of 1 cm had the same ability, but it lost its efficacy after spraying from a distance of 30 cm.

Installation and application of an appropriate spray system at the entrance (like an airlock entrance) and inside of animal farms at an appropriate distance and use of an ideal disinfectant, such as slightly acidic hypochlorous water, with a proper concentration would potentially reduce the chance of transmission of infections and diseases outbreaks.

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Expert Recommendations for the Use of Hypochlorous Solution: Science and Clinical Application.

More advanced hypochlorous acid (HOCl) solutions, based on electrochemistry, have emerged as safe and viable wound-cleansing agents and infection treatment adjunct therapies.

Based on in vitro studies, the **antimicrobial activity of HOCl** appears to be comparable to other antiseptics but **without cytotoxicity**; there is more clinical evidence about its safety and effectiveness.

With regard to the resolution of infection and improvement in wound healing by adjunct HOCl use, **strong evidence was found for use in diabetic foot wounds; moderate evidence for use in septic surgical wounds; low evidence for venous leg ulcers, wounds of mixed etiology, or chronic wounds; and no evidence for burn wounds**.

The panel recommended HOCl should be used in addition to tissue management, infection, moisture imbalance, edge of the wound (the TIME algorithm) and aggressive debridement.

The panel also **recommended intralesional use of HOCl or other methods that ensure the wound is covered with the solution for 15 minutes after debridement**.

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Effects of a low concentration hypochlorous Acid nasal irrigation solution on bacteria, fungi, and virus

CONCLUSIONS: A low concentration HOCl solution can be used as an effective nasal irrigation solution

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Direct Electric Current Treatment under Physiologic Saline Conditions Kills *Staphylococcus epidermidis* Biofilms via Electrolytic Generation of Hypochlorous Acid

CONCLUSIONS: Our results are consistent with electrolytic generation of hypochlorous acid, a potent disinfectant, at the anode leading to biofilm killing.

IF DESIRED, ASK FOR THIS SAME DOCUMENT REGARDING HOCL, BUT HAVING THE FULL TEXT OF RESEARCH STUDY / PAPER / FEEDBACK … 26 PAGES
