… exclaiming … Oh! *HOCL* is synonymous with *infection control*

We actually had one recipient make the above remark when viewing this issue of **HOT TOPICS**.
Perhaps you will draw the same conclusion. If so, you will love our ***Aquaox Infection Control System***™

Superiority of Hypochlorous Acid (HOCL) compared to Hypochlorite Ion (OCL-)

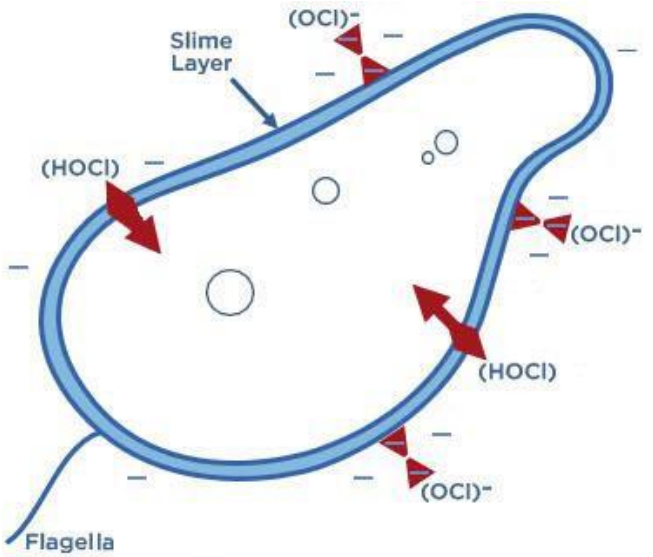
Hypochlorous acid (HOCL) is 80-300 times ***more effective*** and ***kills microorganisms faster*** than hypochlorite ions (OCl-).

Hypochlorous acid (HOCl) is electrochemically neutral. Hypochlorite ions (OCL-) are electrochemically negative and form Free Available Chlorine (FAC). The transformation to FAC enables disinfection … with each substance exhibiting distinct behaviors.

The cell walls of pathogenic microorganisms are *negatively* charged by nature. Thus, the *negative* charge of the hypochlorite ion (OCL–) is repulsed by the negative charge of the pathogenic microorganism cell wall … making (OCL–) a weak disinfectant.

Conversely, the neutral hypochlorous acid (HOCL) molecule very easily penetrates pathogenic microorganism cell walls … making (HOCL) a very effective disinfectant.

Hypochlorous acid (HOCL) penetrates slime layers, cell walls and protective layers of microorganisms. The microorganisms either die or suffer from reproductive failures.



…pH neutral hypochlorous acid (HOCL) penetrates cell walls of pathogenic microorganisms.
…negatively-charged hypochlorite ions (OCL-) cannot.

'The truth is, it sure is rewarding to learn!'

As a **disinfectant**, hypochlorous acid (HOCL) is much stronger and more reactive than hypochlorite ion (OCL-). Hypochlorous acid (HOCL) splits into hydrochloric acid (HCl) and an oxygen atom, which in itself is a powerful disinfectant.

Hypochlorous Acid (HOCL) Guarantees Optimal Disinfecting

The disinfecting properties of chlorine (CL2) in water (H2O) are founded on the formation and oxidizing power of oxygen and hypochlorous acid (HOCL) and occurs when pH is between 6 and 7.

Hypochlorous acid (HOCL) is produced onsite by AQUAOX™ with a pH of 6.5. At this pH, more than **90%** of the Free Available Chlorine (FAC) is hypochlorous acid (HOCL), with less than 10% hypochloriteion (OCL-) and does not form chlorine (CL2) that gasses off.

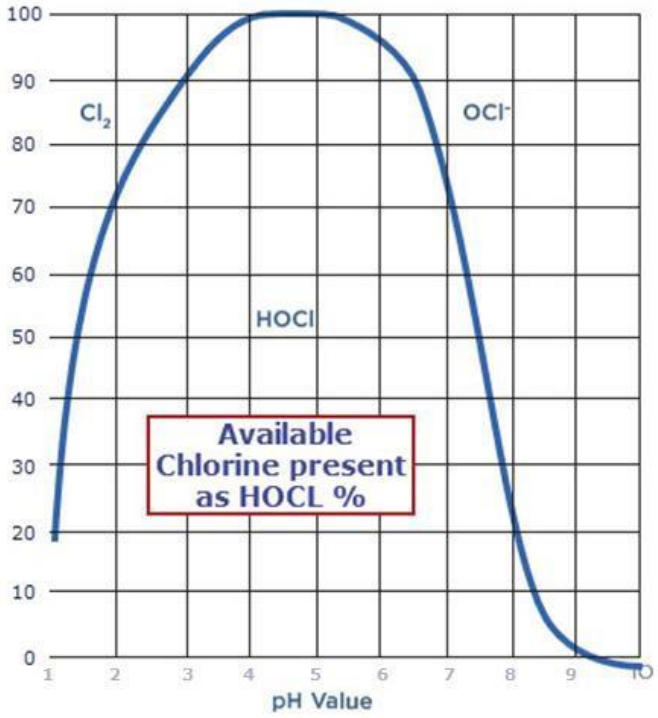
Disinfection efficacy is determined by the pH.

Ideally, disinfection happens between 5-7 pH – the optimal level for hypochlorous acid (HOCL) to be present.

Free Available Chlorine ["FAC"]

Free Available Chlorine is chlorine that is present in the form of hypochlorous Acid (HOCL), hypochlorite ions (OCL-) or as dissolved elemental chlorine. FAC includes all chlorines that are not combined with ammonia (or other nitrogenous compounds) to form chloramines. It is 'free' in the sense that it has not yet reacted with anything, and "available" in the sense that it can and will react if needed.

The maximum level of **hypochlorous acid** (HOCL) is between 4 to 5.5 pH. HOCL decreases when the pH is either below 4 and above 5.5



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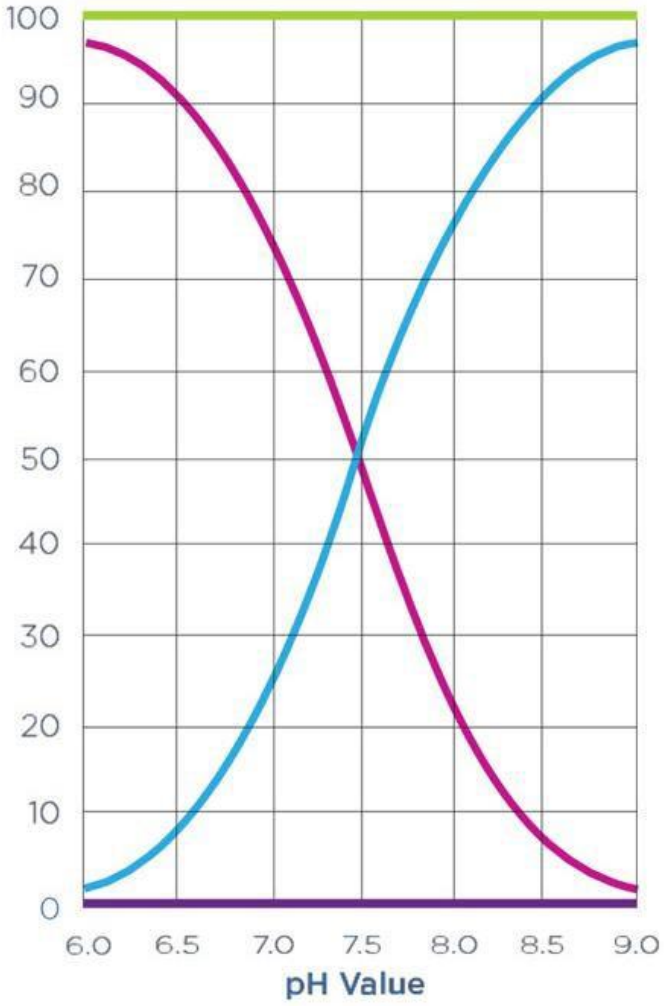

A pH value of 6 to 7 is the most effective and the safest pH-range, due to absence of chlorine gas. Therefore when Free Available Chlorine (FAC) is mentioned, it is assumed that Free Available Chlorine (FAC) solely consists of hypochlorous acid (HOCL) and hypochlorite ion (OCL-)

Free Available Chlorine compounds with regard to pH [Hypochlorous acid **pink** & hypochlorite ion **blue**]

PPM & HOCL EFFICACY – WHAT SCIENCE DID NOT TEACH US

Please join in for this fantastically educating statement:

When measuring the disinfecting power of bleach compared to the disinfecting power of either Aquaox AX-525 (525 ppm HOCL) or AX-275 (275 ppm HOCL), both Aquaox solutions are far more effective than undiluted bleach, which has 52,500-60,000 ppm, but only 10 ppm (0.0001% HOCL) of Free Available Chlorine (FAC).

At 12 pH, undiluted bleach has no disinfecting power. When diluting bleach with 6.5-8.5 pH water, bleach is further weakened by the evaporation (bleed-off) of chlorine gas, comparatively making Aquaox solutions even more effective than diluted bleach. **

HOCL is the effective disinfection agent.

The numbers speak for themselves:

AX-525 has 0.0525% HOCL or 525 ppm HOCL

AX-275 has 0.0275% HOCL or 275 ppm HOCL

BLEACH has less than 0.002% HOCL or only 20 ppm HOCL

Summarizing the comparison against AX-525 and AX-275:

While bleach is stronger (read *harsher*) at pH 12 . . . when diluted, bleach has relatively little disinfection strength at less than 0.002% (20 ppm) HOCL.

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O.K., class, let's go one more step in the explanation.

To understand the chemistry of bleach compared to other solutions, one has to think differently because science taught us to think in chemical concentrations.

That's why we need to think of bleach as being 94.75% water, rather than a 5.25% chemical concentration. So, when diluting bleach to a 0.02% concentration (or 200 ppm), bleach is actually 99.98% water, which explains why bleach is far less effective than Aquaox electrolyzed solutions.

FACT: 200 ppm diluted bleach solution is 80-100 times less effective than 200 ppm electrolyzed solution. As part of Aquaox' proprietary electrolyses process, nanobubbles are introduced into its solutions which greatly increases its bioactivity, surface area-to-volume ratio and decreases the viscosity and surface tension for greater cleaning/disinfecting capabilities.

Clorox instructions say to dilute (with water) … to lower both the pH and ppm.

When (pH 12) bleach is diluted with (pH 6.5-8.5) water, the pH is reduced and the solution releases HOCL (no longer available to disinfect).

Swimming pools are kept between pH 7.2 to 7.6 because . . .
HOCL evaporates when the pH is too low.
HOCL is not sufficiently effective when the pH is too high.

What is exciting about Aquaox electrolyzed solution is that 200PPM electrolyzed solution is 100% of the volume is re-structured by electrolysis to make it that much more effective.

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COMPARISON TO BLEACH

AQUAOX™ Disinfectant 275 < compared to > commercially available bleach

The strength of ***Free Available Chlorine*** (FAC) in "Disinfectant 275" is pre-set at 275 ppm FAC. To make 275 ppm FAC solution from commercially available **bleach** (**NaOCL**) requires water (H2O), and that creates two problems.

Diluting small volumes of bleach with water's naturally different pH lowers the bleach pH and changes the (concentration) properties of ***hypochlorous acid*** (HOCL) and ***hypochlorite ion*** (OCL-).

With *electrolyzed water*, on the other hand, ***hypochlorous acid*** (HOCL) disinfecting properties are kept stable to keep its disinfecting properties as high as **300** times that of bleach.

Hypochlorous acid (HOCL) in closed-bottle Aquaox solutions will not evaporate and will not cause severe corrosion like chlorine. Evaporation of ***Chlorine*** should be avoided because when exposed to air, it can be very explosive. That is another reason why Aquaox solution is produced and remains stable between 6 and 7 pH, with no chlorine present.

SAFETY

When acidifying ***sodium hypochlorite*** (NaOCL) to produce ***hypochlorous acid*** (HOCL), these weak organic acids have the possibility of adverse reaction (discharge gaseous chlorine and raise toxicity levels), all of which limits their use.

Sodium hypochlorite (NaOCL) solutions tend to have a high pH, but AQUAOX™ uses a unique method of non-reagent synthesis of ***hypochlorous acid*** (HOCL) at a pH range of 6 to 7.

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At less than pH 4, HOCL converts to toxic gas (Cl) that bleeds out of solution.

What differentiates Aquaox-generated HOCL is the presence of nanobubbles in which HOCL is stabilized at pH 6.5 – no off-gassing. When bottled, it is important to know that Aquaox pH stays above 4.5 for at least 24 months, keeping submerged the HOCL-filled nanobubbles. preventing HOCL to convert into HCL and Cl thus preventing off-gasing and loss of free-available-chlorine (disinfecting power)

Other observations:

When diluting bleach to create HOCL, a buffer needs to be added to keep pH above 4.

NaOCL is lost when the pH is below 7.

Bleach is toxic, corrosive, irritates skin/eyes/respiratory, destroys metal, burns holes in and discolors clothing.

THE QUESTION:

Do you really want bleach (or even ‘green’ chemicals) in your face … or do you prefer odorless, safe and healthy Aquaox solutions that are highly effective disinfecting solutions and revert to ordinary water for safe discharge into the environment? If others had the same choice, what would your employees, customers, members, patients, students want to have in their environment?

The socially conscious decision is yours.

In your situation, you can be ahead of the curve to benefit from favorable public relations, improved patient satisfaction scores, higher productivity, reduced slips & falls, lower insurance rates, safer environment and even lower operating costs.

Additionally, adopting the ***Aquaox Infection Control System***™ puts your organization in a competitive advantage … instead of being behind the curve.