

Chemical-Free Cleaning

With a little prestidigitation, ordinary tap water becomes a powerful cleaner and effective sanitizer. That means more environmentally friendly kitchens.

By Michael Sherer

Imagine one of your clients pouring ordinary tap water into a spray bottle and using it in place of chemical cleaners to effectively clean all the surfaces in his operation—countertops, tables, floors, walls, kitchen equipment, mirrors, sinks, even toilets.

But wait, there's more! With that same spray bottle of ordinary tap water, your client also can effectively kill 99.9 percent of the microbes that plague foodservice operations, from *E. coli* to *Salmonella* and even MRSA.

Sound like a late-night infomercial pitch? Too good to be true? There's more.

Put a system like this at a client's prep sink, and they can wash and sanitize produce, fish, eggs and more. Imagine, ordinary water turned into a miracle cleaner that gives operators safer food ingredients with a longer shelf life—crisper lettuce, better-tasting seafood and far fewer concerns about foodborne illness.

No way, you say?

What about using one of these miracle machines to supply bacteria-free water to your clients' ice machines? No more ice bin slime or off-tasting ice cubes. And, no fear of making customers or patients sick from contaminated ice.

Now how much would your clients pay?

We're not done yet. What if your clients could slash their purchases of cleaning chemicals by 50%? 80%? 95%? Now how much would your clients pay?

And what if your clients could tell their customers their operations are virtually chemical-free and environmentally friendly? How much would that be worth?

Fact is, FCSI voted a system like this as its Product of the Year back in 2007. Now, several

manufacturers have products on the market that can help your clients reduce their need for chemical cleaners and sanitizers. All use ordinary water, producing virtually no harmful by-products. But each system is slightly different, and some have broad applications while others are more targeted in what they can offer operators.

Science Behind The Magic

Systems that turn water into sterilizing or sanitizing solutions without the use of harmful chemicals have been around in the healthcare industry for decades.

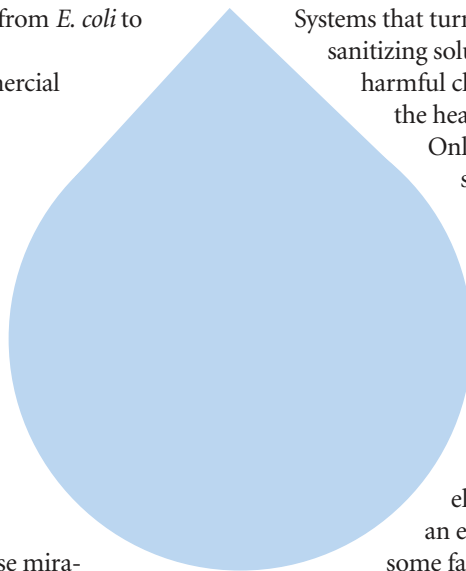
Only within the past 10 years or so, however, have these systems been adapted to the foodservice and retail food industries.

There are three basic types of systems that convert water to a grime-fighting, germ-killing solution. All use variations on the same principle of electrolysis, that is, applying an electric current to water in

some fashion to stimulate a non-spontaneous chemical reaction.

In one form of electrolysis using salt, water's basic components—hydrogen and oxygen—are converted to a more acidic version of water. Called hypochlorous acid, the solution is an effective sanitizer.

The electrolysis process also creates an alkaline version of water as a byproduct that is an effective cleaning agent. Models that use a membrane can produce both acidic and alkaline solutions in equal volume. Both hypochlorous acid and alkaline water (sodium hydroxide) are deemed safe on food contact surfaces in low concentrations, and they don't require rinsing with potable water, so they're environmentally friendly.



A second type of system uses ozone generators to dissolve ozone in water. Ozone is one of the most effective antimicrobials and oxidizing agents on the planet, effectively killing or destroying 99.999 percent of bacteria, viruses, molds, cysts and most other organic and inorganic contaminants virtually on contact depending on concentration and length of exposure.

The third type of electrolysis system breaks up water molecules into hydrogen and oxygen molecules and ionizes them, creating electrically charged bubbles in the water. These bubbles have either a positive or negative charge. The bubbles are attracted to dirt particles with the opposite charge. As they surround the dirt, they break its bond to a surface such as a countertop, making it easier to remove.

When this ionized water is charged with a weak electric field, it also kills germs by disrupting the germs' cellular structures. The charged water essentially becomes a sanitizing solution as well as an effective cleaning agent.

A Dash Of Salt

Around the longest, and the first approved by the FDA as a food-contact sanitizer, are the hypochlorous acid generators. There are several manufacturers producing these machines, but most are used in healthcare. Two notable foodservice suppliers are Sterilox, a division of PuriCore, and Hoshizaki America.

Both companies make systems that combine filtered water with pure salt. Electrolysis converts the brine to hypochlorous acid. Beyond that, however, there are differences between the two.

The Sterilox Food Safety System is designed to produce near-neutral pH (between 5 and 7) hypochlorous acid to be used for washing produce and other foods. The 2300 model produces consistent solution on demand at a rate of about 0.75 gal./min.

At a concentration of about 50 ppm, the solution works well as a sanitizing rinse for fresh produce, seafood and other foods, enhancing food safety and extending shelf life. At higher concentrations, around 200 ppm, the solution can be used as an FDA-approved food contact surface sanitizer. So operators can use it to wipe down counters and floors and sanitize utensils and cutting boards.

The unit is easy to use with essentially one-button operation. Tell it to fill a sink with 15 gals. of

50 ppm solution and it will automatically shut off when it's reached that amount. The unit also can be set to produce solution at different concentrations at the same time. In other words, an employee can fill up a sink with sanitizing rinse for produce and fill a bucket with food contact surface sanitizer at the same time.

The unit also has a storage tank with a capacity of more than 25 gals. to ensure an unlimited supply when demand is high. Units can cost from around \$10,000 to \$15,000 depending on bells and whistles included.

Hoshizaki offers three lines, ROX, JIX and HOX, all with slightly different functions. The line with the broadest application in most restaurants is the ROX system. It differs from the Sterilox system in two ways: it produces hypochlorous acid at a much lower pH level, and it uses a membrane in the electrolysis process which produces a high-pH solution with excellent cleaning properties.

Hoshizaki also makes ROX units in a range of sizes. A typical mid-scale restaurant would likely use the ROX-20 unit (there's one smaller model and several larger ones in the line). A control panel allows operators to select low, medium or high flow rates, which range from about 0.3 gal./min. to 0.75 gal./min. Motion sensors activate the flow nozzles; employees just wave a hand under a sensor for either the acidic or alkaline solution.

The advantage of the ROX is

Sterilox combines filtered water with pure salt. Electrolysis converts the brine to hypochlorous acid to be used for washing produce and other foods at one concentration, food contact surfaces at a higher concentration.





Hoshizaki's ROX produces both sanitizing rinse and alkaline cleaning solution through a membrane-based water electrolysis process.

that it produces both sanitizing rinse and the alkaline cleaning solution. The high-pH sodium hydroxide is an effective surfactant, breaking up oil and lifting dirt from surfaces, which means operators may be able to save a ton on cleaning chemicals. The low-pH sanitizing rinse can be used directly on produce and other foods and as a food contact surface sanitizer.

Both solutions can retain their effectiveness for up to three or four weeks before reverting back to regular water, so operators can back up normal output with storage tanks if they anticipate periods of higher demand.

Larger ROX systems designed for facilities like hotels, casinos and other large institutional venues must be vented to the outside because they could possibly produce small amounts of chlorine gas (which can be harmful).

Units range from \$2,000 to \$25,000, depending on size, with the ROX-20 coming in at around \$3,000-\$4,000, depending on options.

In addition to storage tanks, both manufacturers also either recommend or require treating incoming water with a water softener and filtration. That can add to the installation cost. Salt is an ongoing though nominal cost, and it usually lasts about a month before the units need more.

No Hole In This Ozone

Ozone generators are newer on the market, with a couple of manufacturers putting their toes in the water of the foodservice industry. As mentioned earlier, ozone is an effective germ killer and harmless in the proper concentration, so it can make a good sanitizer when dissolved in water. In general, 1 ppm of ozone in water has the same efficacy as about 5 ppm of chlorine.

One company focusing on foodservice is MVP Group Corp. in Montreal. For its GO3 units, the company has developed a patented process to generate ozone. The process uses an R/O (reverse osmosis) filter to purify the water, de-ionizes it to produce pure oxygen, then uses electrolysis to break up the oxygen molecules in water and recombine them into both ozone (O₃) and oxygen (O₂).

Ozone is pretty unstable, since the bond between O₂ and the third oxygen molecule is weak, so ozone dissolved in water usually reverts back to normal water within 20 to 30 minutes, making it both safe and environmentally friendly to use in foodservice kitchens. However, that means operators have to use it quickly for it to be effective, so MVP's GO3 models are all designed for on-demand point-of-use.

A compact wall-mounted unit, for example, (priced at about \$2,000), dispenses water with a 4 ppm concentration of ozone, and is designed for a 20-second hand-wash in a foodservice kitchen or restaurant restroom. The unit also has a side-mounted hose that dispenses water with a 2-ppm concentration for rinsing produce.

A larger wall-mounted unit designed more specifically for use at two-compartment prep sinks runs around \$10,000. At 4 ppm ozone concentration levels, the unit puts out about .66 gpm. Capacity at 2 ppm (the sanitizing rinse for produce) is about 1.3 gpm.

MVP Group's GO3 developed a patented process to generate ozone for cleaning and sanitizing. The company has several models including one for ice machines.



GO3 also has a unit specifically designed to provide water to ice machines (priced about \$4,000). Generating about 0.5 ppm of dissolved ozone, the water has just enough germ-killing efficacy to prevent bacterial growth in ice machines without altering the taste or odor of the ice itself. And unlike chlorine, which can badly corrode ice machine components, the ozonated water is perfectly safe.

San Jamar, well-known for its food safety products, has been test-marketing an ozone generator of its own, but isn't actively selling it until it has a chance to fully evaluate field results. The unit uses a corona discharge generator, which breaks up and recombines O₂ molecules into ozone from air rather than water. The resulting solution—once the ozone is dissolved in water—is a solution of ozone at 0.3 ppm (potentially requiring more contact time to effectively kill germs). The manufacturer says the lower ozone level keeps cost down, and allows the unit to operate well within OSHA guidelines for atmospheric ozone. Once testing is completed, the system will sell for about \$2,200 with a water-filter kit and housing included.

Ozonated water also can be used as a food contact surface sanitizer. The FDA has approved it only for direct contact with foods, not food contact surfaces, though, because ozone dissolved in water reverts very quickly back to the more stable oxygen (O₂) we all breathe.

Some of the GO3 units, though, can dispense water with a 1 ppm ozone concentration for food contact surface sanitizing. Employees can dispense into sanitizing buckets or spray bottles. If used immediately,

the solution will be as effective as any chemical sanitizer.

Too Good To Be True?

Many of these units are application-specific—vegetable sink, ice machine, restroom, for example—and most focus on food safety, particularly as it pertains to fresh produce. As mentioned,

a few do double duty by producing a food-contact surface sanitizer in addition to a sanitizing rinse for food. And the Hoshizaki ROX line has the added benefit of producing a cleaning solution in addition to a sanitizing solution. That could help operators save on chemical cleaning supplies in addition to chemical produce wash.

A new technology on the market promises to clean and disinfect every surface in a foodservice operation, and offers the added benefit of light-duty food contact sanitizing using ordinary tap water, all for under \$500.

Sounds like an infomercial claim, but users of the Ionator EXP unit from Activeion in Minneapolis say it really works. Here's how: The unit looks like a spray bottle, and you simply fill it with tap water. When you squeeze the trigger, water pumps into the electrolytic cell. The cell converts some of the water molecules into separate hydrogen and oxygen nanobubbles, each of which carries either a positive or negative charge.

As the water-and-bubble solution leaves the electrolytic cell on its way out of the nozzle of the bottle, it's charged with a high-voltage/low-current electric field.

When the solution hits a surface (food contact surface) the charged nanobubbles seek out dirt particles with the opposite charge. As they cover and surround oppositely charged dirt particles, the bubbles break the dirt particles' bond with whatever they're clinging to, making them easy to remove. That's the cleaning part.

The high-voltage electric field makes the solution deadly to microbes. While the electric current, not voltage, is far too weak to harm something as large as humans, it very effectively disrupts the cell walls of bacteria, viruses and other microbes, killing them within seconds (usually six). That's the sanitizing part.

Even better is that within about five minutes of being sprayed, the electric charge fades and the nanobubbles all are reabsorbed into the water, leaving absolutely no residue or byproducts.

The company's current foodservice model, the EXP, (priced at about \$380) is ideal for light-duty general purpose cleaning—tables, mirrors, bar areas, restroom sinks and toilets, and more. But it works well enough on oil and grease that operators could use it for many cleaning jobs in the back of the house except the toughest baked-on grease.

Activeion is working on an updated foodservice

The water cell in the Activeion sprayer converts water into hydrogen and oxygen nanobubbles for cleaning. A slight electric charge makes the spray a sanitizer as well.



model that it says will be able to make the claim of being a food contact sanitizer. Spray the ionator on produce, in other words, and in six seconds it will be sanitized, leaving nothing behind but water. The company also says the product's cleaning efficacy will be significantly improved for back-of-the-house use. And it will be more durable, lighter and more ergonomic. It should be available before the end of the year.

No, Ginsu knives don't come with them, but depending on your clients' application, one of these units is likely to help them improve food safety and save them money on chemical cleaning supplies.

*Editor's Note: At press time, we learned of two more non-chemical cleaning/sanitizing products. Laurel Hughes, principal, LJ Hughes Associates, guest reporting for the Ideas Well Done newsletter, says **EcoLogic Solutions'** eMachine, is a wall-mounted unit using ECA (electric chemical activation) technology to generate either a sanitizer/disinfectant or a detergent using purified salt, water and electricity. Read more*

Activeion Cleaning Solutions
www.activeion.com

Hoshizaki America
www.hoshizakiamerica.com/roxmachine.asp
 ROX, HOX, JIX

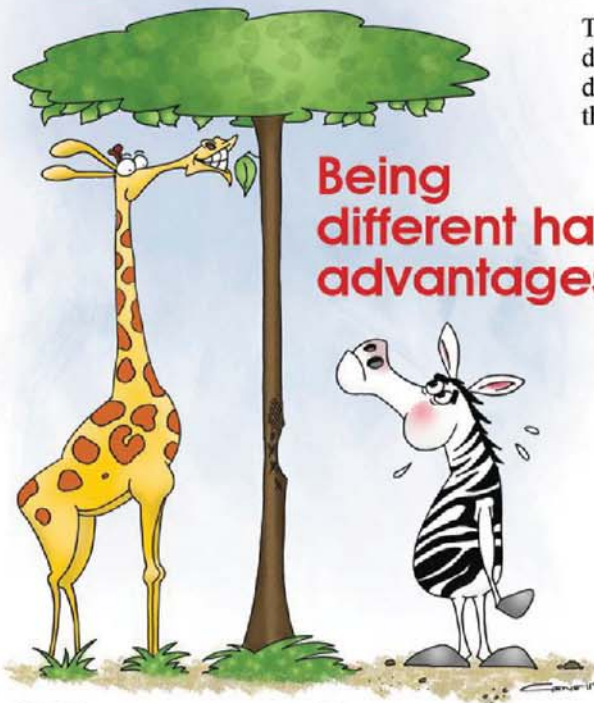
MVP Group Corp.
www.mvpgroupcorp.com
 GO3

San Jamar
www.sanjamar.com

Sterilox
www.sterilox.com

at www.ideaswelldone.com, June 15 edition. And another ozone-based system is available from **Element Ozone**, www.elementozone.com

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