

BY STEFANIE SCOTT

Sanitizing solutions

Pacific Ozone's mission is to develop solutions "for the benefit of people and the environment" through the use of ozone, which can be used for sanitization and disinfection, and also saves energy. Ozone is an oxidizer that kills common food-borne pathogens on both surfaces and in liquids. Ozone also benefits the environment because it works in cold temperatures, which saves energy, the company says.

Ozone is a triatomic version of oxygen using three oxygen atoms to form the ozone molecule (O₃), says Bob Smith-McCollum, vice president of marketing. It is formed when energy from ultraviolet light or electrical discharge breaks the O₂ bonds, forming single oxygen atoms that recombine with O₂ molecules to form ozone.

The application of ozone within the beverage industry can be used in three ways. The first way is when ozone is injected into the water that comes into beverage plants to purify it before it goes through the bottling and filling process. The second is clean-in-place (CIP) systems in which ozone is used between runs to clean filling equipment. The third way ozone can be used is to sanitize bottled water. The ozone, acting as an oxidizer, sanitizes the finished product to eliminate the potential for contamination in the bottling process.

Pacific Ozone, once known as Pacific Technology, was founded by Peter Landgraf, inventor of a proprietary corona discharge reactor cell (Floating Plate Technology). In 1996, Brian and Karen Johnson acquired the company and realized that the FPT could take ozone to new levels. Brian Johnson invited Chris Rombach to join the company as president in 2006.

Making good water better

Ozone has the potential to be used in beverage plants before the filling process begins, Smith-McCollum says.

"Ozone can cause metals in the water to aggregate and that can remove iron and manganese," Smith-McCollum says. "It can also remove odor that might be caused

by hydrogen sulfide and organic compounds in the water. It breaks up organic molecules very easily — breaks them down into smaller components."

Ozone currently is not being used by beverage processors for this purpose, but Smith-McCollum says he sees potential for ozone to "polish" incoming municipal water in a beverage plant before entering the production process.

"You get a certain quality from city water, but then you want to clean that up to make it even better," he says. "Ozone can be a part of that process. It does a polishing effect where it removes tastes and odors really well."

Rombach says beverages are one the greatest potential markets for ozone technology.

Clean that machine

Ozone also can be an important part of keeping a processing facility clean, Smith-McCollum says. It replaces hot water, steam and chemicals to save water, energy and time, he says.

Ozone is particularly useful in CIP systems, as well as clean-out-of-place and surface sanitization applications, Smith-McCollum says. It rinses and sanitizes simultaneously, which saves water.

One of the trends in the beverage industry is the proliferation of flavors, which requires a high level of cleaning between runs. Adding ozone to sanitization systems cleans tanks and lines faster and more effectively than traditional cleaning systems, Smith-McCollum says.

"Ozone-injected water can improve the effectiveness of CIP because it is a powerful oxidant that works well at reduced temperatures," he explains. "High-temperature CIP processes require significant energy and time to ramp the entire system up to the target temperature and cool down at the end of the process. Ozone-injected water can replace chlorinated sanitizers, peracetic acid and hot water rinse in traditional CIP protocol."

"There is a system of tanks and pumps and electronically controlled valves that pump different cleaners through the entire system in a loop and then returns it back



to the tank," he says. "Ozone can take the place of one of the last steps, which is the sanitizing step. The benefit is that it can sanitize and rinse the tank, the stainless steel transfer line and the piping at the same time."

The company has installed technology for major beverage companies such as Pepsi, Coca-Cola, Cadbury Schweppes, Nestlé and DS Water.

Capping it off

The final step for ozone in beverage plants works for bottled water to purify the processed water. A low dose can be used to sanitize the bottle and eliminate anything that may have gotten into the water from air gaps in the filling process.

Ozone is a powerful disinfectant that carries no undesirable byproducts, Smith-McCollum says. It works faster than traditional sanitation technologies, has a broad application potential and is certified organic and kosher.

"Ozone reverts back to oxygen and it leaves no residue behind," Rombach says. "You have no idea that ozone has been put into the system."

"You wouldn't ozonate a flavored product because [ozone] is a strong oxidizer so it's going to kill the flavor and the color," Smith-McCollum adds. "You can also take that ozonated processed water and you can use it to rinse bottles and caps."

The ozone gas can be dissolved into water to form a naturally powerful oxidizing and disinfecting agent. Oxidation occurs when ozone molecules come in contact

with oxidizable substances, including microorganisms.

Bottled water has a lengthy shelf life because injection of ozone is part of the process, Smith-McCollum says.

Rombach says one of the biggest challenges the company encounters is misinformation regarding ozone and how the system can be implemented.

"Ozone does do many things extremely well, but it does not do everything," he says. "One of our primary missions is to simply educate and provide the right solutions."

Smith-McCollum says that making sure the design of the ozone system is fully functional also is another challenge. The ozone system must integrate four elements: oxygen/feed gas preparation, ozone generation, dissolving the ozone into water and monitoring and controlling the system.

With the need for both effective sanitation and energy reduction, ozone is a system that beverage companies should be paying attention to, the company says.

"We believe that our ozone systems can improve sanitation efficacy while reducing the consumption of water, energy and chemical load," Smith-McCollum says. "It can purify the processed water, it can be used to sanitize equipment and process systems and it can be used in bottled water for the final sanitization step in bottling. We're very excited about the potential upside that we see in the beverage industry." —Pacific Ozone Technology Inc., 610 Egret Ct., Benicia, Calif. 94510; 707/747-9600; pacificozone.com.