Clean Technology for Food Service Operations

In 2001, the Food and Drug Administration (FDA) approved ozone as an antimicrobial agent for direct food contact. Since that time, the worldwide food processing industry has steadily and effectively integrated ozone into various areas of its operations. As ozone technology continues to advance, a new generation of ozone products for the food service industry has emerged.

Heightened Awareness of Food-Borne Illness

The Centers for Disease Control and Prevention (CDC) estimates that food-borne diseases cause approximately 76 million illnesses, 325,000 hospitalizations and 5,000 deaths in the U.S. each year. These numbers are derived from home-cooked meals, restaurant service, institutional meals (i.e. prisons, military, hospitals) and from social gatherings such as church and neighborhood functions.

Think back to some of the mainstream headlines the food industry endured over the last year: a Salmonella outbreak with Peter Pan and Great Value peanut butters; an E. coli outbreak at Taco Bell and Taco Johns in 2006; and the 2006 North American E. coli outbreak in bagged spinach, which left three people dead and 198 ill.

These high-profile events, and many more like them, have opened consumers’ eyes to the fragility of our nation’s food supply. They also have food safety and quality assurance managers looking for innovative technologies that will help protect their customers. In addition to implementing higher standards with suppliers, managers of the food service industry are looking for new ways to add an additional barrier against contamination and keep their brands out of the headlines.

The U.S. restaurant industry enjoyed sales of $537 billion in 2006, and that figure is forecasted to increase 5% in 2007. Currently, there are more than 935,000 restaurants nationwide serving 70 billion meals a year and employing 12.8 million people, second only to the government as the largest employer. Innovative ozone suppliers are developing products to service this ever-expanding market, bringing a proven solution to this specific application.

Ozone Solutions in Food Processing

Because of the long list of benefits ozone delivers, the most recognizable brands in the food processing industry are using it in many aspects of their operations. Ozone is the most powerful broad-spectrum microbiological control agent available. It is 50 times more effective than chlorine and kills bacteria 3,000 times faster. Ozone is effective against E. coli, Salmonella, and all known bacteria, viruses, yeast, molds and mildew.

Seafood processors are now embracing ozone as a primary sanitizer to increase the shelf life of their products, eliminate odors and effectively sanitize with no residual taste or odor. For the same reasons, produce companies and meat processors are also using ozone to replace chlorinated treatments as a primary disinfectant.

From bottling plants to slaughterhouses and from dairies to infant formula manufacturers, a broad range of food processing companies are making investments in ozone equipment for plant sanitation to replace the use of traditional chemical disinfectants and to drastically reduce hot water costs. Wineries are rinsing their valuable oak barrels with ozone, and beverage companies are investing in ozone equipment to streamline their CIP processes, reduce downtime and limit hot water usage, energy consumption and carbon footprint.

Treating a facility’s water with ozone is common in the food industry. From treating product water in bottled water plants to disinfecting process water loops
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water usage and increase water quality.

Overcoming Past Limitations

Until recently, the use of ozone technology primarily focused on industrial applications due to the size, cost and complexity of the equipment needed to produce high volumes and concentrations of ozone. In order to harness this natural cleaning agent for commercial use, ozone must be produced on site as needed, and an ozone generator must be present.

Ozone is generated when oxygen is charged with electricity and converted to ozone. For most applications, the ozone gas is then effectively injected into water. Ozone lasts only about 30 minutes in distilled water at 20°C, but the effectiveness does not end at that point. The residual continues to provide benefits until it is entirely dissipated. For industrial operations, an ozone generator, a pump and contacting vessels and tanks are required to effectively integrate ozone.

As ozone technology continues to advance, a new generation of ozone products for the food service industry has evolved. Ozone applications for food service operations require far less volume than that needed for sanitizing plants, disinfecting large volumes of produce and treating process water loops.

One specific technology that fits well with low-flow applications is electrolytic ozone production. Electrolytic ozone technology creates ozone from the oxygen in the water supply stream. Through hydrolysis, the electrolytic ozone process separates oxygen from hydrogen in a side-stream of the supply water and produces ozone from that oxygen. The resulting ozone gas is then effectively mixed with the main water stream, creating a steady flow of high-concentration ozonated water ready for disinfection and sanitation. Using electrolytic technology allows some manufacturers to create compact, yet complete, ozone systems for light commercial applications. These products are unique in that they can generate highly concentrated ozonated water for low-flow applications and are easy to install, operate and maintain, making this industrial sanitation and disinfection technology available for point-of-use (POU) applications such as food service.

Delivering Food Service Solutions

The food service industry is beginning...
to realize that the long list of benefits ozone offers to its suppliers is also available for its own operations. While ozone offers similar benefits to food service operations, it is not a panacea for all food safety issues. As with any ozone application, understanding the technology and applying it appropriately is the key to realizing the benefits ozone can bring to an operation.

**Hand sanitation.** Managers in all areas of the food industry, from growing and processing to food service and grocery, understand that hand hygiene is the first line of defense against food-borne illnesses. Virtually every hazard analysis and critical control points plan highlights hand washing as a critical control point. Compact and complete POU ozone systems are now available for hand sanitation stations.

**Produce wash.** Despite the best efforts of managers in the food service and food processing industries, food-borne illness associated with fresh produce continues to make the headlines and heighten awareness of consumers. Unlike meats, produce is most often served raw and cannot simply be sanitized through high cooking temperatures. Using ozonated water to wash produce adds an effective antimicrobial process at the final stage of the food supply chain.

**Surface sanitation.** Ozone is the most powerful broad-spectrum microbiological control agent available and is a clean technology approved for organic food processing. These qualities make ozone a very effective and healthy sanitizer in commercial kitchens and food service areas. Sanitizing cutting boards, cleaning work surface areas and disinfecting knives and cooking utensils with ozone can go a long way to eliminate cross-contamination.

**Accepted Clean Technology**

Past the point of an emerging technology, ozone is a widely accepted sanitizer and disinfectant. The food industry is just one sector that has embraced the benefits ozone has to offer. Applications outside of the food industry include: groundwater remediation; cooling tower applications; process water disinfections; high-tech manufacturing; final disinfection of operating rooms; and municipal water treatment.

As the use of ozone in the food processing industry continues to expand, innovations in the ozone industry are making this clean technology available to the growing food service industry. Companies are employing ozone as a

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