

## **What is Ozone?**

Ozone is created with an Oxygen molecule ( $O_2$ ) is split by a major energy source, and now the  $O_1$  molecule can react with another Oxygen molecule ( $O_2$ ) to form Ozone ( $O_3$ ). These major energy sources can be (1) lightning, the lightning shears the Oxygen molecule and Ozone forms which is the fresh, clean spring rain smell after a thunder and lightning storm and (2) sunlight, in which the sun's high-energy ultraviolet light (UV) splits the Oxygen molecule in the stratosphere.

## **Ozone used as a Oxidant and Disinfectant**

Ozone ( $O_3$ ) is one of the strongest oxidants and disinfectants available, ranking ahead of hydrogen peroxide, bleach, and iodine, without leaving any residue or odor. Ozone is nature's way of purifying air and water. It is colorless and occurs naturally in the air we breathe everyday. Ozone is also one of the food sanitizing ingredients and processes being used in food safety. Ozone has a distinctive smell that has been used to purify water since 1893. It can also be used in air conditioning for sanitation and to deodorize along with many medical applications. The first time ozone was used in food preservation was in the early 1900 in a Cologne meat packing storage.

The U.S. Environmental Protection Agency, in conjunction with the Safe Drinking Water Act of 1991, confirmed that ozone was effective in ridding water of hazardous pathogens, including chlorine-resistant *Cryptosporidium* (USDA gov/publications/agoutlook/June1998). Gaseous ozone is also listed as an alternative disinfectant for water-sensitive produce (USDA *Guide to Minimizing Microbial Food Safety Hazards for Fresh Fruits and Vegetables*). The flexibility of Ozone spans various industries and is well documented as a very effective disinfectant that leaves no residue.

Ozone is used for the purposes of disinfection in the treatment of wastewater to substantially reduce the number of microorganisms in the water to be discharged back into the environment.

## **OZONE EFFECTS ON SPECIFIC BACTERIA AND VIRUSES**

Bacteria are microscopically small, single-cell creatures having a primitive structure. The bacteria body is sealed by a relatively solid-cell membrane. Ozone interferes with the metabolism of bacterium-cells...A sufficient amount of ozone breaks through the cell membrane, and this leads to the destruction of the bacteria.

Viruses are small, independent particles, built of crystals and macromolecules. Unlike bacteria, they multiply only within the host cell. They transform protein of the host cell into proteins of their own. Ozone destroys viruses by diffusing through the protein coat...resulting in damage of the viral RNA.