9-17

KINETICS OF INACTIVATION OF *SALMONELLA ENTERITIDIS* BY OZONE

by SANDHYA DAVE, J.G. Kim, Y. Lou, And A.E. Yousef
Dept. Of Food Science And Technology, The Ohio State University, 2121 Fyffe Road, Vivian Hall, Columbus, Ohio 43210, USA

Recently, an expert panel recommended ozone as Generally Recognized As Safe (GRAS) substance for applications in food processing in the USA. Past studies confirmed that ozone inactivates a variety of Gram-negative bacteria. Therefore, it is possible that ozone also will be effective in inhibiting *Salmonella enteritidis*, a pathogen that was found in some raw foods including poultry and meat products. Determine the minimum ozone concentration required to inactivate a large population of *Salmonella enteritidis* at the stationary phase.

Overnight cultures of *Salmonella enteritidis* were pelted by centrifugation, transferred to clean ozone-demand-free test tubes, and suspended in cold saline solution. Cold, sterile water was ozonated at different levels and mixed with *Salmonella enteritidis* cell suspension. After 120 min treatment, *Salmonella enteritidis* was enumerated by using Xylose Lysine Desoxycholate (XLD) agar medium.

Absorbance readings of ozonated water, measured by the spectrophotometer at the wavelength of 258 nanometers, were 0.000, 0.045, 0.087, 0.147, 0.291, 0.614, 0.985, and 1.934. Equivalent concentrations of ozone (ppm) were calculated using a model correlating concentration, measured by a chemical method, and Absorbance at 258 nm. Initial count of *Salmonella enteritidis* in cell suspension was 1.0×10^7 cfu/mL. A minimum of 1.51 ppm ozone (Absorbance of 0.087) was sufficient to inactivate *Salmonella enteritidis* to $<1.0 \times 10^1$ cfu/mL.

As the results indicate, low concentrations of ozone (1.51 ppm) are effective in inactivating *Salmonella enteritidis* at the stationary phase of the growth. Therefore, ozone is potentially useful in the processing of poultry and meat products to inactivate *Salmonella enteritidis*.

Note: The reduction of Salmonella in this report is greater than a 6 log reduction, meaning that more than 99.9999% of the Salmonella was destroyed by the ozone.