

Surface germicidal effects of ozone for microorganisms.

Li CS, Wang YC.

In this study the influences of microorganism species, relative humidity, and ozone dosage on ozone surface disinfection were evaluated. Bacterial and fungal cultures were spread on agar plates and exposed to ozone. The selected microorganisms included *Escherichia coli*, *Bacillus subtilis*, *Candida famata*, and *Penicillium citrinum*. Results showed that microorganism survival fraction and ozone dosage (ozone concentration times exposure time) have an exponential relationship. Results also indicated that *E. coli* was the most sensitive organism to ozone exposure. *E. coli* required only very low ozone doses of 2-2.5 and 3.5-4 mg to obtain 50 and 80% inactivation, respectively. In addition, *P. citrinum* was more resistant than *E. coli* and required ozone doses of 40-60 and 60-120 mg to obtain 50 and 80% inactivation. In addition, spores of *B. subtilis* were observed to be the most resistant organism, requiring ozone doses of 40-75 and 145-150 mg to obtain 50 and 80% inactivation. Yeast was less resistant than *P. citrinum* and *B. subtilis*, requiring ozone doses of 10 and 15-19 mg to obtain 50 and 80% inactivation. It was clearly indicated that the ozone dose differences for 80% microorganism inactivation could be as high as 40 times between *B. subtilis* and *E. coli*. Ozone surface germicidal efficiency increased as relative humidity increased, which could be related to more radicals generated from ozone reaction with more water vapor at higher relative humidity. It was concluded that ozone should be highly effective and provide a reliable safety factor in treating contaminated surface. In addition, workers might need to wear suitable respiratory protection at high ozone level operation.