

Title Susceptibility of stored product insects to high concentrations of ozone at different exposure intervals

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Citation Journal of Stored Products Research, Volume 47, Issue 4, October 2011, Pages 306-310

Keywords Ozone; *Sitophilus zeamais*; *Tribolium castaneum*; *Sitophilus oryzae*; *Plodia interpunctella*

Abstract

Ozone is a highly reactive gas with insecticidal activity. Past studies have indicated that ozone technology has potential as a management tool to control insect pests in bulk grain storage facilities. The objective of this study was to determine the efficacy of short periods of exposure to high ozone concentrations to kill all life stages of red flour beetle (*Tribolium castaneum* (Herbst)) (Coleoptera: Tenebrionidae), and Indianmeal moth (*Plodia interpunctella* (Hübner)) (Lepidoptera: Pyralidae), adult maize weevil (*Sitophilus zeamais* (Motsch.)) (Coleoptera: Curculionidae) and adult rice weevil (*S. oryzae* (L)) (Coleoptera: Curculionidae). Insects were treated with six ozone concentrations between 50 and 1800 ppm. The specific objective was to determine minimal time needed to attain 100% mortality. The most ozone-tolerant stages of *T. castaneum* were pupae and eggs, which required a treatment of 180 min at 1800 ppm ozone to reach 100% mortality. Eggs of *P. interpunctella* also required 180 min at 1800 ppm ozone to reach 100% mortality. Ozone treatments of 1800 ppm for 120 min and 1800 ppm for 60 min were required to kill all adult *S. zeamais* and adult *S. oryzae*, respectively. The results indicate that high ozone concentrations reduce the treatment times significantly over previously described results. Our results also provide new baseline information about insect tolerance to ozone treatment.