International Workshop on Food Safety
in a Sustainable Postharvest System of Agricultural Products
October 16-18, 2007 Kahramanmaras Sütçü Imam University
Kahramanmaras/TURKEY

COMPARISON OF SUSCEPTIBILITY OF TWO STORED PRODUCT INSECTS, *Ephestia kuhniella* (Zell.) and *Tribolium confusum* du Val. TO GASEOUS OZONE

Ali A. ISIKBER[1] and Serdar ÖZTEKIN[2]

[1]*Faculty of Agriculture, Department of Plant Protection, Kahramanmaras Sütçü Imam University, 46060 Kahramanmaras, Turkey*
[2]*Faculty of Agriculture, Department of Farm Machinery, Çukurova University, 01330 Adana, Turkey*

E-mail: isikber@ksu.edu.tr

In this study susceptibility of two stored product insects, *Ephestia kuhniella* (Zell.) and *Tribolium confusum* du Val. to gaseous ozone was tested. The toxicity of gaseous ozone at a high initial concentration of 19.4 mg/L for a 2-h exposure period against all life stages of *E. kuhniella* and *T. confusum* was studied. Susceptibility of all life stages of *E. kuhniella* and *T. confusum* to ozone fumigation for a 5h of exposure period in presence of two kg of wheat was also tested. Toxicity data for empty space ozone treatments indicated a remarkable difference in susceptibility between life stages of *E. kuhniella* and *T. confusum*. For *E. kuhniella,* empty space ozone treatment resulted in complete mortalities of adults, pupae and larvae, while only 62.5 % of the eggs were killed. For *T. confusum*, ozone treatment resulted in very low mortalities of the adults, pupae and eggs, ranging from 4.2 to 14.1 % while the only larvae stage had a high mortality (74%). Toxicity of ozone treatment indicated that susceptibility among all life stages of *T. confusum* was different from those of *E. kuhniella*. The adults and pupae of *E. kuhniella* were the most easily killed, followed by the larvae and finally the eggs, which were the most tolerant. On the other hand, adults, eggs and pupae of *T. confusum* were the most tolerant to ozone treatment, while the larvae were easy to kill. Generally *T. confusum* was more tolerant to ozone treatment than *E. kuhniella*. For every half-hour flushed ozone fumigation for 5-h in presence of commodity there was a significant difference in the mortalities of adults, larvae, pupae and eggs of *E. kuhniella* and *T. confusum* placed in top and bottom of two kg of wheat. These results indicated that gaseous ozone could have a problem of penetration into commodity. Toxicity data for every half-hour flushed ozone fumigation in presence of commodity also indicated a remarkable difference in susceptibility between life stages of *E. kuhniella* and *T. confusum*. While every half-hour flushed ozone fumigation resulted in almost complete mortality of all life stage of *E. kuhniella* placed in top position of two kg of wheat, eggs of *E. kuhniella* placed in bottom position of two kg of wheat were hard to kill. In the case of *T. confusum*, larvae placed in bottom position of two kg of wheat were easily killed, whereas eggs, pupae and adults of *T. confusum* were still tolerant. These findings indicate that ozone treatment resulted in a remarkable difference in susceptibility between life stages of *E. kuhniella* and *T.*

confusum. It appears that lepidopterous stored product insects are generally more susceptible to ozone gaseous that coleopterous ones.

Key words: Ozone gaseous, *Ephestia kuhniella*, *Tribolium confusum*, susceptibility, toxicity