



Ain Shams University

Faculty of science

Entomology Department

**Toxicological and biological evaluation of some  
natural and chemical agents on *Callosobruchus  
maculatus* (F.) (Coleoptera : Chrysomelidae) and  
*Rhyzopertha dominica* (Fabr.) (Coleoptera: Bostrichidae)**

**A Thesis**

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(Entomology)**

**by**

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## ABSTRACT

The objective of this thesis was to investigate the efficacy of gaseous ozone treatments on the susceptibility of two stored-product insects, *Callosobruchus maculatus* and *Rhyzopertha dominica*. The obtained results determined the concentration of ozone exposure time–mortality relationship for all the stages of *C. maculatus* and *R. dominica* that were exposed to 1000 ppm ozone. *C. maculatus* gave more sensitivity to ozone than *Rhyzopertha dominica*. All immature stages of *R. dominica* were highly susceptible (highest reduction in progeny) than *C. maculatus* stages which were the least susceptible at all tested exposure times. In conclusion, testing the tolerance of two tested species, the order was eggs > pupae > larvae. At different depths of ozone cylinder (top, middle, and bottom), the life stages of *C. maculatus* adults showed degrees of tolerant in comparison with *R. dominica* adults which gave high susceptible also, data showed that young larvae of *C. maculatus* and old larvae and pupal stages of *R. dominica* gave 100% reduction in samples placed in top position after 8 hrs. of exposure times. The total number of bands in untreated samples in adults *R. dominica* were 7 bands appeared. There were 3 common bands, The alternation in the Sodium dodecyl sulfate (SDS) electrophoretic patterns that occurred as a result of treatment by ozone gas in *C. maculatus* adults were more obvious than that resulted after treatment with *R. dominica* adults. Results indicated that As compared to control, treatments with the ozone gas caused identical electrophoretic alterations in the phenolperoxidase pattern. They caused the disappearance of the 2<sup>nd</sup> type of the phenolperoxidase enzyme. There was 1 common band (r1) with  $R_f$  0.148. This the mean of band frequency 0.75. As compared to control, treatments with the ozone gas caused no change in the peroxidase pattern. The results showed no

side effects on the physical and biochemical properties (total proteins, total carbohydrates, fat, crude fiber, ash content oil, and Moisture) of wheat grain and faba bean seeds after treatment with gaseous ozone. Exposure to gas ozone did not affect the baking quality of bread which was scored "good" for all acceptability parameters. Toxicological evaluation of the lambda-cyhalothrin insecticide on some pours and non-pours substrates against *C. maculatus* and *R. dominica* adults. Residual activity of lambda-cyhalothrin insecticide gradually decreases with increasing storage periods.

**Key words:**

wheat grains,

faba bean seeds,

*Callosobruchus maculatus*,

*Rhyzopertha dominica*.

Ozone,(Sodium dodecyl sulfate )SDS electrophoretic,  
baking quality,

and lambda-cyhalothrin insecticide

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