Title Mortality of *Tribolium confusum* J. du Val (Coleoptera: Tenebrionidae) in controlled atmospheres at different oxygen percentages

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Citation Journal of Stored Products Research,Volume 45, Issue 1, 2009, Pages 10-13

Keywords Controlled atmosphere; Lethal exposure time; Anoxia; *Tribolium confusum*

Abstract

Since the 1990s an ecologically friendly alternative to insecticide treatments for controlling stored-product insect pests has been available: the methods of modified and controlled atmospheres, which involve reducing the quantity of oxygen (O_2) in the air in order to kill insects by anoxia. This study examines the effect of treatments with controlled atmospheres, considering the time necessary to obtain total mortality of insects at percentages of O_2 higher than those normally used in controlled atmospheres and estimating the possible positive influence of a temperature increase in order to compensate for the effects of the reduced anoxia.

Adult populations of *Tribolium confusum* J. du Val were treated at various O_2 percentages (1, 3, 5, 6, 7, 8 and 10%) and temperatures (23, 26, 29, 32, 35, 37 and 40 °C). The relative humidity was very low (<18%) in all the treatments considered.

Lethal exposure times varied from less than one day to a week (longer times were not considered).

A multiple regression procedure was applied to the experimental data, considering the time necessary to obtain total mortality as the dependent variable. The analysis provided a good fit to the experimental data and indicated a positive correlation with the percentage of O_2 and an inverse one with temperature.