

# Insecticidal Effect of Low Oxygen Treatments Against Different Stored Product Beetles in Real World Applications - Abstract

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## Summary

We evaluated low oxygen treatment, through the increase of nitrogen in two different commercial facilities structures (chambers and silos) against phosphine resistant and susceptible populations of three different beetle species: *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae), *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae) and *Oryzaephilus surinamensis* (L.) (Coleoptera: Silvanidae). Different temperatures and exposure times were evaluated with the oxygen level to be lower than 1%. Vials with insects and commodity (different commodity per species) were placed in different locations inside each treatment and insect mortality was measured after the termination of each treatment. Then, the vials were kept in ambient conditions at 25 °C and 65 % relative humidity and 65 days later progeny production was measured. In general, complete mortality was recorded in chambers and some survival was recorded in silos. Progeny production was low for most of the treatments. Temperature, exposure time and structure are the key parameters for the control of stored product insects. The results indicate that low oxygen is effective for all insect species tested, regardless of their resistance status to phosphine, and can be further adopted as an alternative method to mitigate resistance in stored product beetles.

## Keywords

Low oxygen, nitrogen, silos, chambers, mortality

## Acknowledgements

This research has been co-financed by the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH – CREATE – INNOVATE (project code: T2ΕΔΚ-05327).



Proceedings of HAICTA 2022, September 22–25, 2022, Athens, Greece  
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CEUR Workshop Proceedings (CEUR-WS.org)