

Nisakorn Intiam 2006: Effect of Modified Atmospheres on Mortality of *Platydemus waterhousei* Gebien (Coleoptera: Tenebrionidae) Reared on Dried Ling-Zhi Mushroom *Ganoderma lucidum* (Fr.) Karsten. Master of Science (Biology), Major Field: Biology, Department of Zoology. Thesis Advisor: Associate Professor Boonguea Vajarasathira, Ph.D. 72 pages ISBN 974-16-2766-1

Four modified atmospheres conditions: 100%CO₂ (G1), 80%CO₂: 20%N₂ (G2), 60%CO₂: 40%N₂ (G3), and 100%N₂ (G4), were tested against all stages of *Platydemus waterhousei* for varying exposure times at 25.7±4.9°C, 56.5±11.6% rh, and under a 12:12 (L:D) natural photoperiod. The regression equation of probit mortality on logarithm of exposure time for each stage of *P. waterhousei* exposed to a certain atmospheres is presented. Most probit regression lines corresponded with observed mortality data (χ^2 -test, $p>0.05$). The evaluation of egg, larval, pupal, and adult mortality was noted and causes of lethality were also discussed. The probit regression equations were used to compute the lethal time (LT) values.

The relative toxicities of four modified atmospheres to the eggs, larvae, pupae, and adults were determined by comparing the LT₅₀ values. The relative toxicity of modified atmospheres to eggs was G2>G1>G4>G3. Therefore eggs were more sensitive to the gas mixtures, 80%CO₂: 20%N₂ than to either CO₂ or to N₂ alone. The relative toxicity of modified atmospheres to larvae, pupae, and adults was G1>G2>G4>G3. Thus these stages were more susceptible to 100%CO₂ than to the mixtures of gas and to 100% N₂.

Based on the LT₅₀ values, the relative susceptibility of *P. waterhousei* to G1 and G4, in descending order, was adult>egg>larva>pupa. The sensitivity of four stages to G3 was adult>egg>larva>pupa. However, susceptibility of all stages to G2 was egg>adult>larva>pupa.

The maximal mortality (99%) of eggs, larvae, pupae, and adults when exposed to G2, 80%CO₂: 20%N₂, required 53.16 hr. In addition, the maximal control of all stages could be achieved by exposing to 100%CO₂ with longer exposure time, 90.37 hr. The G1 (100%CO₂) is recommended for controlling this insect because it is easier to apply and its application cost was cheaper. Besides, this procedure is considered environmentally safe because it leaves no toxic residue.

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