

EFFECTIVENESS OF 1.8-CINEOLE (EUCALYPTOL) AGAINST *PLODIA INTERPUNCTELLA* (LEPIDOPTERA: PYRALIDAE)

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Abstract In recent years, different essential oils, distilled from various plant species, have been used to replace chemical pesticides. 1.8-cineole (eucalyptol) has been considered as insecticide; such active ingredient is present in a number of vegetal species and it reaches the greatest concentration in the leaves of different species of *Eucalyptus* spp.. There are several references concerning fumigant toxicity exercised by this active ingredient against many species of stored product insects, except for *Plodia interpunctella*. In this study fumigant toxicity of 1.8-cineole, in solution pure at 99%, has been tested on eggs, larvae (II and IV instar) and adults of *P. interpunctella*.

The active ingredient was placed on a filter paper disk (\varnothing : 6 cm) afterwards put inside a glass jar (1,7 l). Groups of 100 eggs and 20 individuals (mixed population) of II instar larvae, 20 males and 20 females of IV instar larvae and 20 adults were used for each test. The individuals were exposed to the active ingredient for 24 hours.

Tests were carried out in thermostatic room ($26 \pm 1^\circ\text{C}$; $60 \pm 5\%$ r.h.; photoperiod 16L:8D). The percentage of mortality was recorded after 24 hours of exposure and after 24 hours and 48 hours after the treatment. Mortality data also include dying individuals. Five replications were carried out for each test.

The 1.8-cineole dose response bioassay data were subjected to probit analysis for determination of DL_{50} and DL_{95} . Abbot's formula was used to control mortality when necessary.

It was observed that 1.8-cineole at the concentration of $80 \mu\text{l/l}$ air did not show insecticide activity against the eggs of this species. II instar larvae were the most susceptible to the treatment compared to the IV instar ones; in fact, after 48 hours from the end of the treatment, 95% of mortality of II instar larvae was recorded at the concentration of $23.67 \mu\text{l/l}$ air while for the IV instar ones it occurs respectively at the concentration of $56.83 \mu\text{l/l}$ air for females and of $57.97 \mu\text{l/l}$ air for males. The concentration values to obtain 50% of mortality of IV instar larvae females were higher than the ones observed for males (DL_{50} females: $42.79 \mu\text{l/l}$ air after 24 hours and $40.53 \mu\text{l/l}$ air after 48 hours; DL_{50} males: $40.24 \mu\text{l/l}$ air after 24 hours and $37.45 \mu\text{l/l}$ air after 48 hours). Adults result to be the most susceptible stage to the treatment; 95% of mortality was observed for both sexes at the concentration of $12 \mu\text{l/l}$ air.

Although further investigations are necessary to study the possible use of 1.8-cineole in stored product warehouses, this active ingredient could be used against larvae and adults of *P. interpunctella*.