

EFFICACY OF SOME INERT DUSTS AND THEIR MIXTURES ON SOME STORED PRODUCT INSECTS

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ABSTRACT

The present study were carried out under laboratory conditions of $28 \pm 1^{\circ}\text{C}$ and $70 \pm 5\%$ R.H. to evaluate the effectiveness of tricalcium phosphate (TCP) and diatomaceous earth dusts (DE) separately and mixtures against rice weevil; *Sitophilus oryzae* (L) and red flour beetle; *Tribolium castaneum* (Herbst). The results showed that the action of the two dusts and their mixtures depend on the concentration and period of exposure. *S. oryzae* was the more susceptible to the two tested dusts and their mixture compared to *T. castaneum*. All dual mixtures of TCP and DE were more effective to both tested insects at the all different concentrations and exposure periods except the mixture No. 3 (30% DE + 70% TCP) with *T. castaneum* which had the least effect after 2 weeks of exposure. Results obtained also showed that mixtures No. 3 had the highest percentage of mortality values compared to the other two mixtures. Results also showed that the all treatments had a significant effect on the percentages of germination and weight loss compared to control. The addition of DE to TCP can minimize the required amount of in insect control and decreases the cost of control.

So, the addition of DE to TCP can minimize the required amount of DE in insect control and decreases the cost of control where the DE agent is rarely available and expensive. In conclusion we recommend to use of DE, TCP and their mixtures in insect control of stored products where it is safe and cheap after further studies to ensure the obtained findings in the present study.

INTRODUCTION

Inert dusts such as ash, lime, various ground minerals and clays have a long history of use for grain protection (Ebling, 1971; Golob and Webley, 1980; Ross, 1981; Quarls, 1992a, b). There are several advantages to using inert dusts to control stored-product insect pests. In the United States, amorphous silicon dioxide (diatomaceous earth) is considered "Generally Recognized as a Safe" (GRAS) by US Food and Drug Administration and is a registered food additive, silica aerogels have been shown to have low mammalian toxicity ($3160 \text{ mg/kg LD}_{50}$, rat oral; Ebeling, 1971). Also, inert dusts do not affect backing quality (Desmarchelier and Dines, 1987; Aldryhim, 1990); and provide long lasting protection (La Hue 1965, 1978; White *et al.*, 1975).

Interest has revived in the use of inert dusts after neglect resulting from the outstanding success of chemical protectants. La Hu, 1978 showed a diatomaceous earth, kenite, added at 0.5 kg/t at 33°C , 40% rh. reduced multiplication of *S. oryzae* and *S. zeamais* to one quarter of that on untreated grain over a 6 months storage period.