ON THE EFFICACY OF SULFURYL FLUORIDE AGAINST STORED PRODUCT PEST MOTH AND BEETLES

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ABSTRACT

Sulfuryl fluoride (SO_2F_2) is a pesticidal fumigant mainly applied in the control of termites. In this work, the efficacy against eggs, larvae, pupae, and adults of eight species of stored product pest insects was studied.

Each insect sample was exposed for 24, 48 or 72 hours to concentrations ranging from 11.7 g/m^3 to 35 g/m^3. Concentrations of SO_2F_2 were measured using an infrared absorption spectrometer.

Complete control of adults of all tested species and of all larval stadiums and of pupa of the grain weevil *Sitophilus granarius*, the confused flour beetle *Tribolium confusum* and the meal-worm beetle *Tenebrio molitor* was achieved at 13 g/m^3 within a 24 hour exposure period. Some individuals of the drugstore beetle *Stegobium paniceum* and *Trogoderma inclusum* continued development to the adult stadium, but no reproduction occurred. The saw-toothed grain beetle *Oryzaephilus surinamensis* survived and reproduced at 18.6 g/m^3 for all tested fumigation times. The Indian meal moth *Plodia interpunctella* survived and reproduced at 18.2 g/m^3 within 24 and 48 hour exposure times. *Sitophilus granarius* and the Mediterranean flour moth *Ephestia kuehniella* produced progeny within six weeks after fumigation for 24 hour with 26.5 g/m^3 and 23.5 g/m^3, respectively. Complete control of eggs of *Sitophilus granarius* was achieved at 35 g/m^3 within a 24 hour exposure time. This result suggests that the eggs are the most tolerant stadium of these species towards SO_2F_2 as known from treatment of wood destroying insects.

The possible practical rate in order to control all stadiums of stored product insect pests should be either a rather high dose of about 80 g/m^3 (e. g. for *Sitophilus granarius* considering a practical leak rate of 2.4 per day) or more than one treatment with about 30 g/m^3 (e. g. *Ephestia kuehniella*, second treatment six weeks after the first treatment).