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EFFICACY OF SULFURYL FLUORIDE AGAINST EGGS AND ADULTS OF *TRIBOLIUM CASTANEUM* IN COMMERCIAL FLOUR MILLS

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ABSTRACT

The effectiveness of sulfuryl fluoride against the eggs and adults of the red flour beetle, *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae), was studied during five fumigation trials in four commercial flour mills. Mill volumes ranged from 8,495 to 28,317 m³. Outdoor weather parameters such as wind speed and direction, ambient temperature, humidity, and barometric pressure were monitored using a weather station installed on the roofs of mills. The ambient air temperatures within mills were also monitored. Adults and eggs of *T. castaneum* in plastic vials with 5 g of flour were placed in 15 locations on each mill floor to assess insect mortality. On each mill floor, fumigant concentrations were recorded every hour during the 24 h exposure period. Temperatures inside mills during fumigation ranged from 21.4 to 36.9°C. The achieved concentrations over time (Ct products) varied among the mills and ranged from 630.3 to 1,357.6 g-h/m³. Ct product variation among mill floors across the ranged from 28.4 to 692.4 g-h/m³. In all the fumigation trials, there was 100% adult mortality irrespective of varying mill temperatures. Temperatures in the mill during fumigation played an important role only in *T. castaneum* egg mortality. When mill temperatures were below 25°C, egg mortality was about 80% and at temperature below 23°C, egg mortality was about 10%.The eggs that survived fumigation successfully completed development to adulthood.

Key words: flour mills, fumigation, methyl bromide alternative, sulfuryl fluoride, red flour beetle, *Tribolium castaneum*, egg mortality, adult mortality, efficacy assessment