

## **THE EFFECTS OF TEMPERATURE ON RESIDUAL EFFICACY OF CYFLUTHRIN WETTABLE POWDER**

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The pyrethroid insecticide cyfluthrin is used as a residual surface treatment in processing plants and indoor food warehouses and can be considered as an alternative to methyl bromide fumigation. The toxicity of most organophosphate insecticides generally increases as temperatures increase. In contrast, toxicity of pyrethroids often decreases as temperatures increase, although results can vary depending on chemical structure, the target species, the specific insecticide, and the temperature range. The objectives of this test were to determine: 1) the effect of temperature on knockdown and survival of red flour beetles exposed on concrete treated with 9.5 mg per ft<sup>2</sup> 20% [AI] cyfluthrin wettable powder (WP), and 2) effects associated with residue aging.

Adult red flour beetles were exposed for 0.5, 1, or 2 hours on concrete treated with cyfluthrin in incubators set at 20, 25, 30, or 35 °C, removed from the treated surface, and classified as either knocked down or running. Beetles were put in Petri dishes and returned to the same incubators in which they were exposed, and after 1 week the beetles that were upright and running after 1 week were considered to have survived exposure to cyfluthrin. Tests were repeated on the same treated dishes with new beetles every 2 weeks for 8 weeks.

There was no difference in knockdown or red flour beetles among the temperatures. Knockdown generally increased as exposure interval increased and decreased as residues aged. There was no difference in survival at the 3 exposure intervals, but survival increased as temperature increased and as residues aged (Figure 2). By week 6 survival at 20, 25, or 30° was > 90%. There was considerably less survival at 20° compared to the other temperatures.

The results of this study show that the indoor temperature could affect the residual efficacy of cyfluthrin WP when it is used to disinfest flour mills, processing plants, and food warehouse. As temperature increases, red flour beetles can apparently recover from knockdown. The toxicity of cyfluthrin appears to be negatively correlated with temperature.

