

Report

Laboratory Assays with SayByeBug Original and Three New Formulations Against Bed Bugs

By

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Background: Due to changes in registration requirements by the EPA making it easier to manufacture, label, and sell “natural” or herbal insecticides, there has been a great increase lately in such products on the market. This study was initiated to examine the effectiveness of four such products SayByeBug Formulas O, B, C, and D against bed bugs. Note: Formula D was only tested for residual effects.

Location and time of study: This work was performed in the Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, REDACTED FOR PRIVACY

Source of insects: A mixed-sex population of adults of the common bed bug, *Cimex lectularius*, was obtained commercially. This strain of bed bug is widely used in research and often referred to as the Ft. Dix or “Harold Harlan” strain.

Methods: In this study, insecticides were evaluated against bed bugs in two different ways: the products were evaluated by **direct contact** with the insecticides and then evaluated by **residual** exposure, i.e., a surface was sprayed and then 24 hours later, bed bugs were allowed to crawl on the surface.

For the **direct contact** test, bed bugs were placed in petri dishes in groups of ten and treated with the insecticide sprays exactly as directed on their labels (SayByeBug products O, B, and C were used undiluted), two puffs of spray from a plastic bottle at a distance of 12 inches for each dish of bed bugs. Water was used as a control, and Crossfire® was included as a standard, again two puffs from 12 inches. Three replicates of each (four pesticide treatments and control) were included in the tests, for a total of 150 insects used. All bed bugs were observed for mortality up to 1 hr. Further, to assess “time to kill” (in these same sprayed bed bugs), bed bug mortality was also recorded at 5 min, 10 min, 15 min, 20 min, 45 min, and 60 min. Results were recorded and entered into an Excel spreadsheet and a graph produced.

For the **residual test**, small hexagonal ceramic tiles, 4.3 cm in diameter were sprayed with each treatment (Formulas O, B, C, and D and also Crossfire as a standard), placed inside petri dishes, and allowed to dry 24 hours. For a control, ceramic tiles sprayed with water were included. Then ten live bed bugs were placed directly on the tiles and allowed to walk around on them. Three replicates of each (five pesticide treatments and control) were included in the tests, for a total of 180 insects used. All bed bugs were observed for mortality at 1 hr, 2 hr, 24 hr, 72 hr, and 96 hr after the exposure to the dust or dried product residue. Results were recorded and entered into an Excel spreadsheet and a graph produced.

Results: In the **direct spray** test, almost all control bed bugs were alive at 1 hour, allowing for excellent comparisons with the treatment groups. The standard insecticide (Crossfire®) easily killed 100% of bed bugs within an hour after spraying. (Figure 1). The SayByeBug Original Formula (O) was a close second, killing almost 90% of treated bed bugs within 1 hr, but the new Formula C killed 100% at 1 hr. When calculated by time-to-kill, Formula C killed 100% of bed bugs within 15 minutes – this is almost as effective as the standard product, Crossfire. (Figure 2). In the **residual test**, most bed bugs in the water controls remained alive allowing for good comparisons of the data. Crossfire® insecticide killed 100% of bed bugs by 24 hours after exposure to ceramic tiles which had previously been treated with the product (Figure 3), while all the other products showed almost no residual effectiveness on bed bugs.

Figure 1. Effectiveness of SayByeBug Formulas O, B, C, and Crossfire insecticide when directly sprayed on bed bugs. Note: SayByeBug Formula D was not tested for direct spray efficacy.

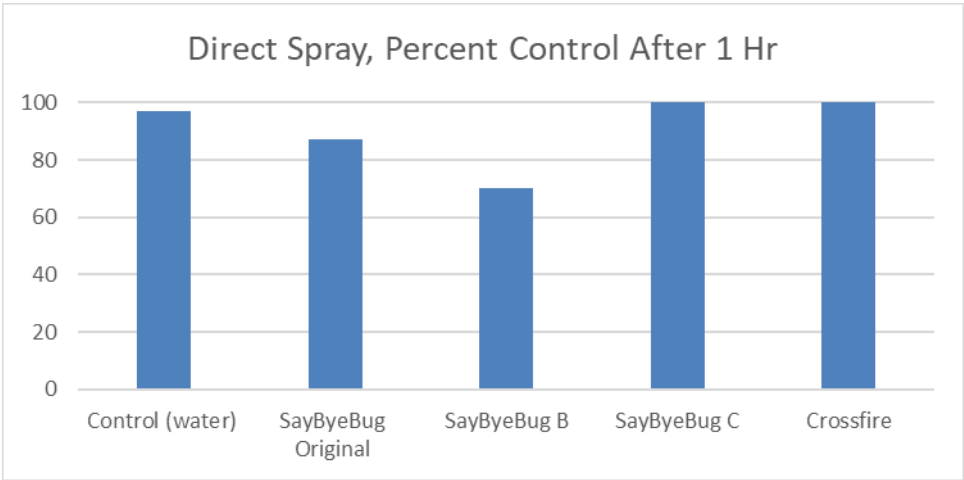


Figure 2. Time until death after direct spraying with products.

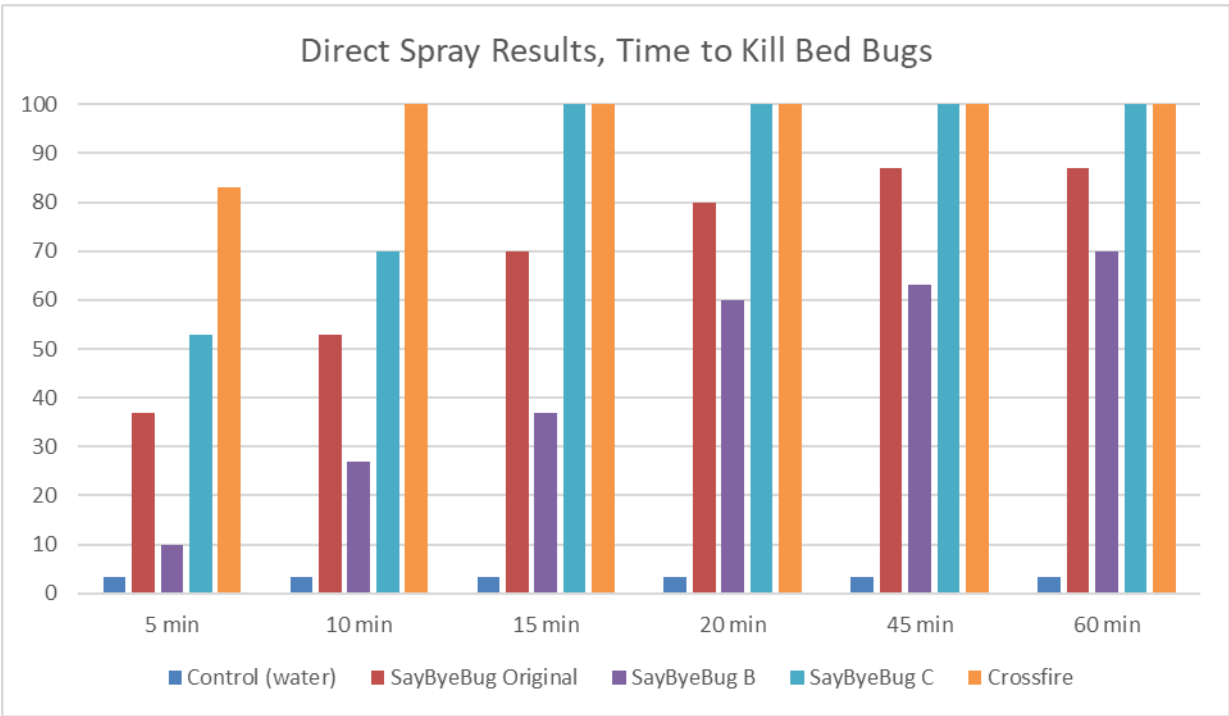
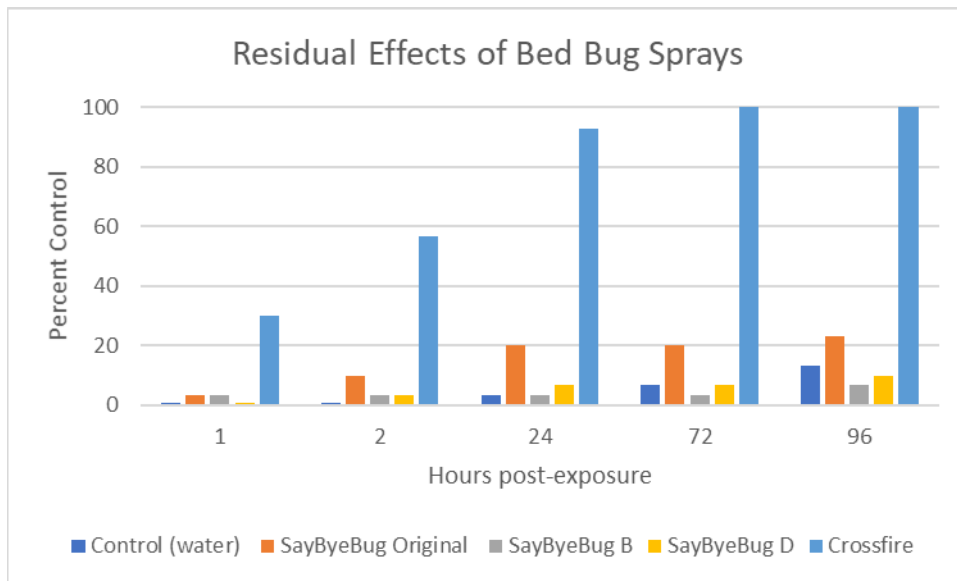


Figure 3. Residual effects of SayByeBug Formulas O, B, C, and D and Crossfire insecticide bed bugs. Each product was sprayed on ceramic tiles, then after 24 hrs bed bugs were placed on the tiles for an additional 1 hr, 2 hr, 24 hr, and 96 hr.



Conclusions: All of the SayByeBug Formulas have some insecticidal properties against bed bugs when used as a contact spray. Results with adult bed bugs showed efficacy (and sometimes quickly) of the products. In fact, SayByeBug Formula C killed 100% of bed bugs within 15 minutes, and this was almost as good as the standard insecticide Crossfire. One thing should be noted however: the claim “kills bed bugs on contact” is true and can easily be said for this product, however, many substances may also kill bed bugs on contact. As for residual effect, we found no evidence that any of the SayByeBug Products significantly kill bed bugs beyond the initial direct spray time frame. That is, after the products have dried, they show little or no effectiveness.