

## SECURE BED BUG LABORATORY TESTING

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Dr. JOHN M. HARLIN – Dr. Xing-Hai Zhang

Live bed bugs were exposed in a controlled laboratory environment under rigorous conditions to allow for rapid evaporation to test both 'kill on contact' as well as duration of effectiveness for 24 hours in open containers exposed to low relative humidity of 40% and room temperatures of 22 C (72 F).

Clear liquids from **Secure Bed Bug Killer** and a leading bed bug spray using a **Pyrethroid (Cypermethrin)** were used to coat the base of 250 ml beakers with 0.3 ml of the sprays. The base diameter of the beaker is 5.3 cm (2.09 inches). The thin film coating the base of the beaker was dispersed at 0.011 ml/cm<sup>2</sup> for each spray. Three repeats were performed for each test with static results.

### RESULTS

#### DURATION TEST

BED BUG FORMULA 1-20-2023

Duration results for Secure Bed Bug Killer (0.011 ml/cm<sup>2</sup>)



T = 0 Instant Kill



T = 1 hr



T = 2 hr



T = 21 hrs

After 1 hour with drying the additional 2 bugs added were paralyzed and dead in 2 minutes

After 2 hours drying the additional 2 adults added were dead in 2 minutes infants died immediately

After 21 hours the additional 10 adults and infants were dead in 17 minutes

Identical side by side test was performed with 0.011/cm<sup>2</sup> with Leading **Cypermethrin Product and Secure Bed Bug Killer**. Synthetic pyrethroids, like cypermethrin, have a longer residual effect than natural pyrethrum. It kills bugs by affecting their nervous system.

However, bed bugs are quickly developing resistance to pyrethroids; and pyrethroids affect the nervous systems of mammals so it is toxic to pets, and children. Peer reviewed research of repeated pyrethroid use have shown cognitive damage in adults.

Tuesday 4/18/2023 at (0.011 ml/cm<sup>2</sup>) **Secure Bed Bug Killer (plant based active ingredients)**

T = 0 (instant kill)

T + 1.5 hours (100 % instant kill)

T + 4 hours (100 % kill in 1 minute)

Tuesday 4/18/2023 at (0.011 ml/cm<sup>2</sup>) **(cypermethrin product)**

T= 0 (instant kill)

T + 1.5 hours (80 % immediate kill, subsequent after 10 minutes 100% kill)

T + 4 hours (0% kill)

A similar test was conducted at the Department of Biological Sciences, Florida Atlantic University (FAU). However, the FAU testing used filter paper at the base of the container where 0.03 ml of the liquids was placed in the center of 10 cm plastic cups. The filter paper was treated with the clear liquids of both the Cypermethrin Product and Secure Bed Bug Killer.

The use of filter paper simulates mattress materials and carpeting around bedding areas. The same procedures were used as that on the glass material in that the containers were left open exposed to evaporation to determine the efficacy after various time periods and potential evaporation.

Five bed bugs were placed on the paper circle. The reactions of the bugs to these pesticides were recorded for a period of 48 hours. At least three repeats were performed for each pesticide. For duration the unlidded cups were open to 24 C temperature for 24 hours for example, then 5 bugs were placed on each of the paper circles.

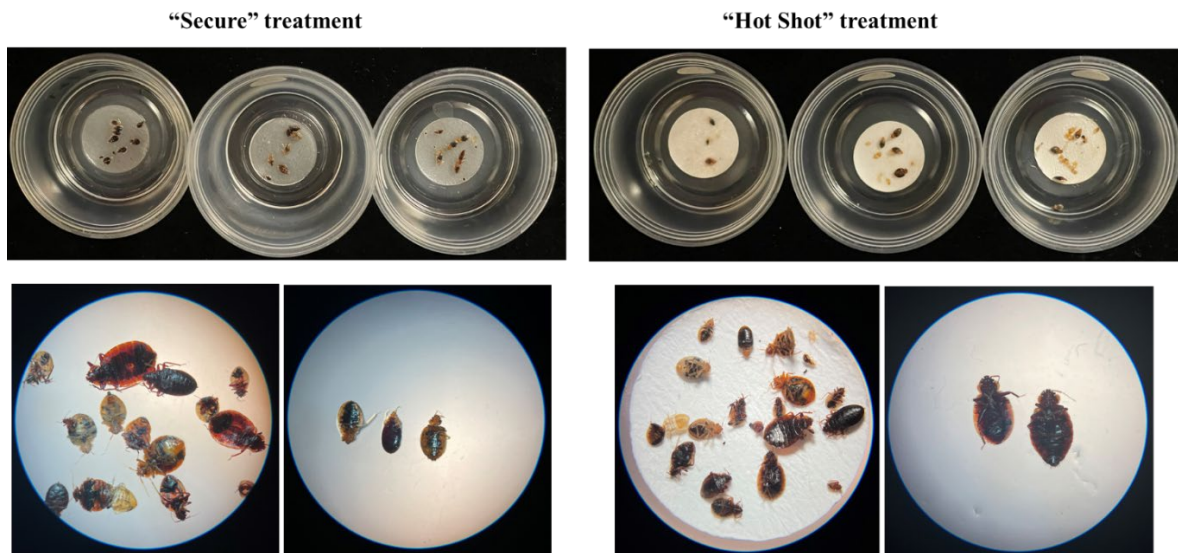
Instant response tests demonstrated **that all 22 bed bugs introduced to the Secure Bed Bug Killer were paralyzed 5 minutes** after contact with the pesticide. **They remained dead after 24 hours examination.**

For the **Cypermethrin Product 15 of 18 bugs** were paralyzed after 5 minutes, **but they were not dead**. Movement was seen in some of these bugs after 24 hours.

**Table 1.** Instant response of bed bugs to pesticides upon contact\*

Pesticide	Number of bed bugs before contact with pesticide	Number of bed bugs at time after contact with pesticide		
		5 minutes paralyzed	20 minutes appeared dead	24 hours re-alive
Secure	22	22	22	0
Hot Shot	18	15	18	2

\*Cypermethrin Product (Hot Shot)



**Duration Testing**

The pesticide-soaked paper circles were left open for 24 hours, then bed bugs were introduced.

## RESULTS

Three hours later 7 of the 38 bugs with Secure (only 18%) were alive. Whereas 14 of 23 bugs (61%) Hotshot treatment were alive. Twenty-four hours later none of the Secure bugs were alive and all of the 14 bugs in the Hot Shot treatment were alive.

Figure 2.

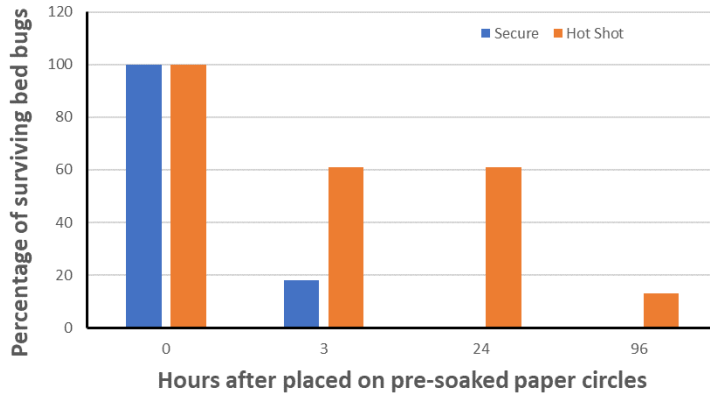
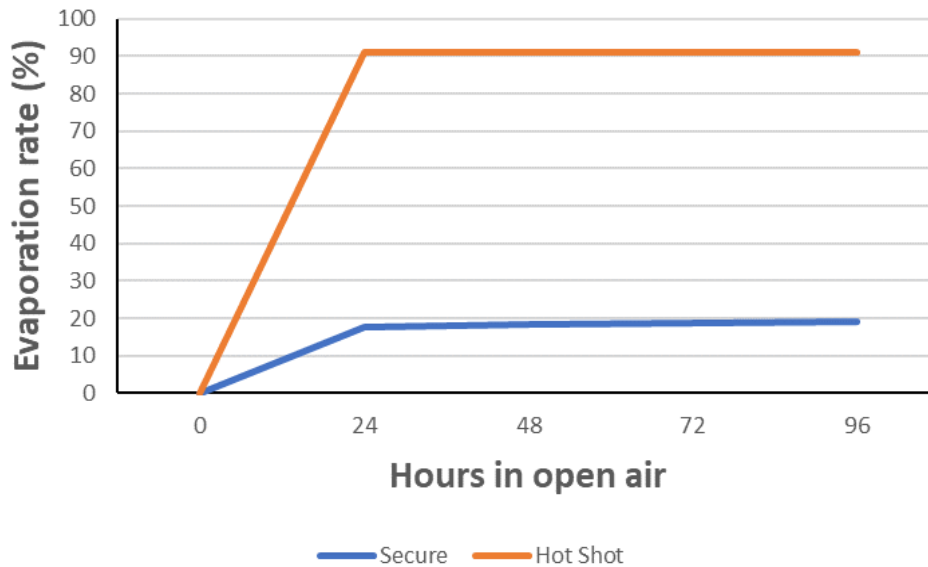


Figure 2. Percentage of bed bugs survived in contact with paper circles soaked with pesticide 24 hours prior. None of the bugs survived with “SECURE BED BUG KILLER” after 48 hours (24 hour-contact time), whereas “HOT SHOT BED BUG KILLER WITH EGG KILL” lost most of its potency 24 hours after use.

## EVAPORATION TEST

A weighing boat and a paper circle were weighted, following by adding 0.3 ml either “Host Shot” or “Secure”, and weighted again. left open to air for 24 hours. Eight repeats were tested for each pesticide. The boats with pesticide-soaked paper circles were left open in the air for 24 hours. The boats were weighted. Within 24 hours, 91% of “HOT SHOT” was evaporated, whereas only 17.6% of “Secure” was evaporated. By the 96<sup>th</sup> hour in the open air, 91.1% of “HOT SHOT” was evaporated, whereas only 19.2% of “Secure” was evaporated, which suggests that within 24 hours, almost all applied “HOT SHOT” was evaporated while over 80% of “Secure” still remained after 96 hours (Figure 3).



Hot Shot (Cypermethrin) quickly evaporated on glass fibre paper circles. On the other hand Secure (plant based) did not evaporate for days remaining active.

## SUMMARY

Secure Bed Bug Killer had both a HIGHER KILLING RATE AND MUCH LONGER EFFICACY AT KILLING BED BUGS PERMANENTLY with no chance of becoming “re-alive.”