

Cimi-Shield - Efficacy Studies Summaries:

Overview –

This summary is drawn from five (5) studies first began in February 2009 with the last being completed in January 2012. Four of the six studies are lab tests. Two studies are field tests conducted at two (2) separate locations over a twelve-month period with one of the two studies a follow-up test at one of the field locations to test residual lethality where Cimi-Shield had been applied one year previous.

Each study attempted to determine the truth of a specific hypothesis and was intended to answer certain questions about the product's proper regulatory classification and performance capability. All of the studies were independently performed by the American Academy of Entomological Science and each is certified by the Academy's director, Dr. Jeffrey K. Brown.

Efficacy is understood to mean that the products produce the results provided for in their label when applied according to label directions and that it is at the same time in conformity to all applicable US Environmental Protection Agency regulations.

A copy of any report will be provided upon request. When asking for a copy of the report, please indicate the report by its "date" and provide your email address.

- I. **February 9, 2009** - The Questions to be Resolved where;
 - A) Do the products comply with applicable FIFRA (Federal Insecticide, Fungicide and Rodenticide Act) regulation's Section 25(b) being of "minimal risk inert ingredients as referred to as '4A' under Pesticide Registration Notice 2000-6"? In addition, is the active ingredient compliant with 40 CFR section 152.25(g) of Title 40, a Generally Recognized As Safe (GRAS) ingredient?

In order that these questions are answered, Applied Science Labs provided quantities of all active and inactive ingredients for analysis. The ingredients were then combined according to proprietary formula and again analyzed to determine if in combination the formed element remained in conformity.

The test concluded that it did.

"... elements are exempt under EPA regulation commonly referred to as 25(b) and are found on a list of elements commonly referred to as the '4A List' and are Generally Recognized As Safe (GRAS)."

"I have combined each of these elements according to the instructions and formula that have been provided. These elements retain their chemical integrity in combination and do not combine to form any subsequent element that would not be Generally Recognized As Safe (GRAS). Or that does not comport with USDA 21 CFR 178.3400, Parts 182 and 184 as exempt food grade proteins."

- B) When used according to label directions is the product lethal to the insect pests specified?

Following label directions it was applied to “...wild strains of house flies, Musca domestica, peri-domestic American cockroaches, Periplaneta americana, and ants of the family Formicidae, of which we observed 100% mortality within 2 minutes with house flies, within 5-10 minutes with American cockroaches depending on life stage (adult females took longer to cause mortality) and within 5 minutes with ants. Bed Bugs, Cimex lectularius, 100% mortality within 5-10 minutes depending on life stage.”

- C) Does the product provide illumination under black light where applied?

Samples were sprayed and left to dry in ambient temperature “...the following was observed with 100 lumen 350 nm black light in a darkened room: each sample of painted plywood, raw plywood, ceramic tile, carpet, cotton fabric, and glass exhibited a glowing of the residual left behind on the test substrates.”

- II. **Report of March 14th, 2009** – The Questions to be Resolved were

- A) Will the Academy Certify that the product is nontoxic to mammals, of no harm to the environment and lethal to the identified target insects?”

“It is nontoxic to mammals. It is not harmful to the environment. It is lethal as to the identified target insects.”

- B) To what specific insect pests does this Certification apply?

“This Report is limited in its scope to the target insects which are identified as Cimex lectularius (Bed Bug), Periplaneta americana (American Cockroach), Blatella germanica (German cockroach), Ctenocephalis felis (fleas), Diplopoda (Millepede), Chiopoda (Centipede), Lepisma (Silverfish), and Formicidae (Ants).”

- C) Is the Material Safety Data Sheet (MSDS) form accurate?

“...all ingredients in your product are safe and non-toxic to humans and other animals as explained in your Material Safety Data Sheet (MSDS).”

- D) Is the product qualified as “Exempt” under current EPA regulations and will therefore not require registration?

“In our estimation your product will not need EPA registration as all of your components are presently categorized as exempt and there are no restrictions as to means of transport under DOT regulations.”

- E) Upon what standards does the Academy base its Certification?

“The Academy’s Certification, this report and our conclusions are based upon (1) theory and technique that can or has been tested; (2) theory and technique that has been subjected to peer review; (3) a known or potential rate or error; (4) the existence and maintenance of standards controlling the technique’s operation; and (5) general acceptance in the scientific community. As you have provided the raw components of your product together with your proprietary instructions as to the method and conditions of combination of components whose chemistry is already familiar to us, we have completed our evaluation according those portions of the GLP’s as are appropriate and necessary.”

III. **Report of July 23rd, 2010** – The Question to be Resolved was

- A) Because 50% of infestation is in the form of hidden and untreated eggs what is the effect of residual lethality on emergent nymphs and instars?

“Nymphs mortality was observed at between one (1) to two (2) hours; first and second instar nymph mortality at sixty (60) % within 1.5 hours after exposure. Fifth instar nymph and adult mortality were observed between four (4) to six (6) hours after exposure; fifty (50) % within 4.5 hours.”

IV. **Report of November 10th, 2011** – Field Study of One (1) Year

This report consisted of a single treatment at each of two (2) public facilities, one a public museum, designated “Facility A” and the other a private commercially operated hospitality facility, designated “Facility B.”

Both facilities had been previously treated with conventional toxins by licensed pest control operators.

Control was not achieved by these standard methods. Facility A continued to be infested with *Dermestidae Anthrenus spp.*, carpet beetles and Facility B continued to be infested with *Cimex lectularius*, bed bugs.

Approximately six months after these unsuccessful applications the Academy oversaw the testing reported.

Application was made according to label directions and the sites were monitored for a period of one (1) year with periodic monthly reporting.

The Questions to be Resolved were

- A) Did application provide control?

“Cimi-Shield was effective against carpet beetles, Anthrenus spp., and bed bugs, Cimex lectularius. When spraying bed bugs with the test substance Cimi-Shield knock down was completed as to all visually observable bed bugs in the treated area. Cimi-Shield was also a successful killing agent to

the extent that the treated area remained materially free of carpet beetles and bed bugs for the subsequent eleven (11) months.”

“Immediately following application at Facility ‘A’ the carpet beetles were observed for knockdown. Follow up observations and collections were completed at intervals of 0.5 hours, 1.0 hours, 24 hours, 48 hours, one month and every subsequent month for the next twelve (12) months.”

“Immediately following application at Facility ‘B’ the bed bugs were observed for knockdown. Follow up observations and collections were completed at intervals of 0.5 hours, 1.0 hours, 24 hours, 48 hours, one month and every subsequent month for the next twelve (12) months.”

B) Did the U.V. markers continue to be observable?

“After 1.0 hours UV marker was observed with 350 nm ultra violet black light.” UV marker continued to be observed with 350 nm ultra-black light.”

C) Were the Facilities subject to continued invasion?

“The noted periodic inspections of the facility (Facility A) and insect traps revealed that some adults continued to ‘invade’ the facility as it was not sealed to the outside.”

“Facility B continued in commercial operation and was subject to periodic use by guests and was serviced according to the regular daily housekeeping services.”

D) Was there evidence of residual lethality?

“Carcasses gave evidence of residual kill at each subsequent periodic monthly inspection.”

E) Was there material re-infestation?

“No material re-infestation has been revealed in any subsequent periodic monthly inspection.”

“The failure to adequately seal Facility ‘A’ permits ingress of carpet beetles where the residual agent of CIMI-SHIELD as seen under black light has continued to provide evidence of its lethality as carcasses are observed and most heavily concentrated in areas closest to poorly sealed or unsealed thresholds and around door casings.”

“There were no reports by guests at field Facility ‘B’ of any evidence of infestation in the periods between the 24 hour intervals of periodic inspection in treated areas for twelve (12) months.”

“As to Facility ‘A’, Cimi-Shield was immediately effective against carpet beetles, Anthrenus spp., and remained effective over the next twelve (12) months to the extent that no further material infestation was present.”

“As to Facility ‘B’, Cimi-Shield was immediately effective against bed bugs, Cimex lectularius, and remained effective over the next twelve (12) months to the extent that no further material infestation was present.”

- F) Was any odor present in any treated area, did any stains appear or were there any signs that application had caused damage or spotting?

“No odor was present, no stains or damage to any materials was observed.”

- G) In how many rooms at Facility B was the product tested and were records kept of the periodic inspections of those rooms?

Twenty (20) guest rooms were selected. Of these eleven (11) were known to have current infestation and nine (9) uninfested guest rooms shared common walls with the infested rooms.

Table 1 (Hospitality Facility) provides a twelve (12) month record as regards the treatment and inspection of these rooms. *Cimi-Shield* was used as to infested rooms and *Cimi-Protect*, the preventive formula, a derivative of *Cimi-Shield*, was used as to the neighboring but infested rooms. (Table 1 is attached to this Summary)

- V. **Report of January 30th, 2012** - Field Study of One (1) Year Follow up

The Question to be Resolved is

- A) Is there residual efficacy twelve (12) months after application upon re-introduced bed bugs?

Rooms at Facility ‘B’, the commercially hotel/motel facility were divided into two groups, Group A and Group B. “Group ‘A’ consists of rooms previously treated... Group ‘B’ are the untreated rooms, not part of the prior Project and with no prior report of infestation.”

“Rooms in both Groups remained in continuous service and have subjected to regular housekeeping and inspection, including periodic bed bug dog inspection”

“Room 1 was randomly chosen from Group ‘A,’ the previously treated rooms.”

*“As to Room 1 from Group ‘A’, having been previously treated with *Cimi-Shield* and where UV light confirmed sufficient residual element still in place and having had no intervening treatments or material occurrence of infestation *Cimi-Shield* was proven effective against re-introduced bed bugs, Cimex lectularius, where treatment had occurred more than twelve (12) months previous.”*
(See Table 2 attached to this Summary)

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Table 1 (Hospitality Facility)

Monthly periodic on site monitoring of Bug Dome traps and once a year inspection with trained bed bug dogs physical inspection provide the following:

Room #	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Spt	Oct	Nov
1 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0
2 Cimi-Protect		0	0	0	0	<u>M</u>	0	0	0	0	0
3 Cimi Knock-Out	<u>M</u>	0	0	<u>M</u>	0	0	0	0	0	0	0
4 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0
5 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0
6 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0
7 Cimi-Protect	0	<u>M</u>	0	0	0	0	0	0	0	0	0
8 Cimi-Protect	0	0	0	0	0	0	0	0	0	0	0
9 Cimi-Protect	0	0	0	0	0	0	0	0	0	0	0
10 Cimi-Protect	0	0	0	0	0	0	0	0	0	0	0
11 Cimi-Protect	0	0	0	0	0	0	0	0	0	0	0
12 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0
13 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0
14 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0
15 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	<u>M</u>	0	0	0	0
16 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0
17 Cimi-Protect	0	<u>M</u>	0	0	0	0	0	0	0	0	0
18 Cimi-Protect	0	0	0	0	0	0	0	0	0	0	0
19 Cimi-Protect	0	0	0	0	0	0	0	0	0	0	0
20 Cimi Knock-Out	<u>M</u>	0	0	0	0	0	0	0	0	0	0

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Results: Mortality was observed and recorded for the treated and control Room 1 in the following table.

Table 2: Mortality of treated carpeting with Cimi-Shield on bed bugs one (1) year prior to the test versus control.

Table 2

Mortality

Group 'A' Room 1 Treated

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9	Hour 10	Hour 11	Hour 12	Hour 13
0	0	0	0	3*	0	0	0	4	3	2	0	1

Group 'B' Room 2 Control

1**	0	0	0	0	0	0	0	0	0	0	0	0
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*three (3) nymphs were dead

**we are assuming that the researcher damaged the bed bug with forceps while removing from the travel container before placing in the arena.

Conclusions

The test substance *Cimi-Shield Knock-Out* was complete as to all visually observable bed bugs in the test area.

Cimi-Shield Knock-Out was an effective preventative against bed bugs, *Cimex lectularius*, twelve (12) months after application per label directions.

Studies Performed By:

American Academy of Entomological Sciences

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