



NON-GLP STUDY REPORT

Date: May 2019

Sponsor: Davis Manufacturing and Packaging Inc.

Study: Product Development

Sponsor Code: N/A

Test Method: 311

REPORT TITLE

Efficacy of the 012813-3-A-SNE Formulation when applied as Direct Spray Applications against Various Pest Species

STUDY

Product Development

SPONSOR CODE

N/A

EXPERIMENTAL START DATE

January 28, 2013

EXPERIMENTAL COMPLETION DATE

November 08, 2017

REPORT DATE

May 24, 2019

TEST FACILITY/AUTHORS

Eric Snell, Todd Smith, Troy Bettini, Patrick Standley, Brian Garrett, & Joshua Swatts
Snell Scientifics, LLC
188 Vega Road
Meansville, GA. 30256
770.358.4591
Email: esnell@snellsci.com

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STATEMENT OF NO DATA CONFIDENTIALITY CLAIMS

No claim of confidentiality, on any basis whatsoever, is made for any information contained in this document. I acknowledge that information not designated as within the scope of FIFRA §10(d)(1)(A), (B), or (C) and which pertains to a registered or previously registered pesticide is not entitled to confidential treatment and may be released to the public, subject to the provisions regarding disclosure to multinational entities under FIFRA 10(g).

Submitter: _____ Date: _____

Typed Name of Signer: _____

Typed Name of Company: Davis Manufacturing and Packaging, Inc.



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COMPLIANCE STATEMENT

This study was NOT conducted in compliance with Good Laboratory Practice Standards as described by EPA (40 CFR Parts 160 and 792), and was never intended for that purpose.

Test Facility Management:
05/24/19

Date: _

Eric J. Snell

Snell Scientifics, LLC.

Study Director:

Date: 05/24/19

Todd Smith

Snell Scientifics, LLC.

Sponsor:

Date: _

Submitter:

Date: _



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STUDY OBJECTIVE(S):

To determine the efficacy of the 012813-3-A-SNE formulation when applied as direct spray applications against various pest species.

TEST SUBSTANCE INFORMATION:

1. Controls - Untreated
2. 012813-3-A-SNE RTU (0.05% Clove Oil, 0.05% Cottonseed Oil)
3. 012813-3-A-SNE 1:39 Diluted Concentrate (0.01% Clove Oil, 0.01% Cottonseed Oil)

Competitive Products:

4. Garden Safe Houseplant & Garden Insect Killer (0.02% Pyrethrin, 0.20% Piperonyl Butoxide, Technical), EPA Reg. No. 478-125-39609, (Snell Code: 102412-4-B-SPE).
5. EcoSmart Organic Home Pest Control (2.0% 2-Phenethyl Propionate, 1.0% Clove Oil, 1.0% Rosemary Oil, 1.0% Peppermint Oil, 0.5% Thyme Oil, 050712-13-B-SNE).
6. 3oz/gal rate essentria™ IC3 Insecticide (10.00% Rosemary Oil, 5.00% Geraniol, 2.00% Peppermint Oil), Lot-56481, 103012-4-A-SNE – diluted 3ml/128ml water.
7. 1.30% Credo SC (3oz/gal dilution), (42.8% Imidacloprid), EPA Reg. No. 11556-146.
8. Gordon's™ Aqueous Fly Spray, (0.10% Pyrethrins 1.00% Piperonyl Butoxide), EPA Reg. No. 2217-782.

TEST SYSTEM INFORMATION:

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Trial	Test System	Strain	Stage/Age	Source
Household Pests				
CIMXLE	Bed Bug (<i>Cimex lectularius</i>)	"Cooper 2" Wild	Late Stage Nymphs / Adults	Reared
LEPISA	Silverfish (<i>Lepisma saccharina</i>)	Lab	Late Stage Nymphs / Adults	Collected/Reared
ARANSP	House Spider (<i>Aranea</i> spp)	Field	Adults	Collected
FORFAU	European Earwig (<i>Forficula auricularia</i>)	Lab	Late Stage Nymphs / Adults	Collected/Reared
TINEBI	Clothes Moth (<i>Tineola bisselliella</i>)	Lab	Adults	Reared
ATTGUN	Black Carpet Beetle (<i>Attagenus unicolor</i>)	Lab	Larvae	Reared
Flea/Tick/Mites				
RHIPSA	Brown Dog Tick (<i>Rhipicephalus sanguineus</i>)	Lab	Nymphs	Purchased
CTECFE	Cat Flea (<i>Ctenocephalides felis</i>)	Lab	Adults	Purchased
CTECFE	Cat Flea (<i>Ctenocephalides felis</i>)	Lab	Larvae	Purchased
CTECFE	Cat Flea (<i>Ctenocephalides felis</i>)	Lab	Eggs	Purchased
UROPSP	Poultry Litter Mite (<i>Uropodid</i> spp.)	Field	Mixed Stage Nymphs / Adults	Collected
PSORCU	Rabbit Ear Mite (<i>Psoroptes cuniculi</i>)	Field	Mixed Stage Nymphs / Adults	Infested Test Subject
DERMFA	House Dust Mite (<i>Dermatophagoides farinae</i>)	Lab	Mixed Stage Nymphs / Adults	Reared



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Cockroaches				
PERIAM	American Cockroach (<i>Periplaneta americana</i>)	Lab	80% Nymphs, 10% Adult Males, 10% Adult Non-Gravid Females	Purchased/ Reared
BLTTGE	German Cockroach (<i>Blattella germanica</i>)	Lab	80% Nymphs, 10% Adult Males, 10% Adult Non-Gravid Females	Purchased/ Reared
BLTTOR	Oriental Cockroach (<i>Blattella orientalis</i>)	Lab	80% Nymphs, 10% Adult Males, 10% Adult Non-Gravid Females	Purchased/ Reared
PERIFU	Smokey Brown Cockroach (<i>Periplaneta fuliginosa</i>)	Lab	80% Nymphs, 10% Adult Males, 10% Adult Non-Gravid Females	Purchased/ Reared
Stored Product Pests				
TRIBCO	Confused Flour Beetle (<i>Tribolium confusium</i>)	Lab	Adults	Reared
LASDSE	Cigarette Beetle (<i>Lasioderma sericorne</i>)	Lab	Adults	Reared
Plant Pests/Home Invaders				
BOISTR	Boxelder Bug (<i>Boisea trivittatus</i>)	Field	Mixed Stage Nymphs / Adults	Collected
MYZUPE	Green Peach Aphid (<i>Myzus persicae</i>)	Field	Mixed Stage Nymphs / Adults	Collected
BEMIAR	Silverleaf Whitefly (<i>Bemisia argentifolii</i>)	Field	Adults	Collected
HALYHA	Brown Marmorated Stink Bug (<i>Halyomorpha halys</i>)	Field	Adults	Collected
LEPTDE	Colorado Potato Beetle (<i>Leptinotarsa decemlineata</i>)	Lab	Adults	Purchased
HARNAX	Asian Lady Beetle (<i>Harmonia axyridis</i>)	Field	Adults	Collected
DIABUN	Spotted Cucumber (<i>Diabrotica undecimpunctata</i>)	Lab	Adults	Purchased
TETRUR	Two Spotted Spider Mites (<i>Tetranychus uricae</i>)	Lab	Mixed Stage Nymphs / Adults	Collected
Ants				
MONOPH	Pharaoh's Ant (<i>Monomorium pharaonis</i>)	Field	Workers	Collected
SOLEIN	Red Imported Fire Ant (<i>Solenopsis invicta</i>)	Field	Workers	Collected
LINEHU	Argentine Ant (<i>Linepithema humile</i>)	Field	Workers	Collected/ Reared



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Flies				
CALIVO	Blue Bottle Fly (<i>Calliphora vomitoria</i>)	Lab	Adults	Purchased
MUSCDO	House Fly (<i>Musca domestica</i>)	Lab	Adults	Purchased
SARCBU	Flesh Fly (<i>Sarcophaga bullata</i>)	Lab	Adults	Purchased
HAEMIR	Hom Fly (<i>Haematobia irritans</i>)	Resistant	Adults	Purchased
STOMCA	Stable Fly (<i>Stomoxys calcitrans</i>)	Lab	Adults	Purchased
DROSME	Red Fruit Fly (<i>Drosophila melanogaster</i>)	Lab	Larvae & Adults	Lab Reared
Mosquitoes				
ANPHQM	Common Malaria Mosquito (<i>Anopheles quadrimaculatus</i>)	Lab	Adult Females	Purchased
CULXFA	Southern House Mosquito (<i>Culex quinquefasciatus</i>)	Lab	Adult Females	Purchased
AEDSAE	Yellow Fever Mosquito (<i>Aedes aegypti</i>)	Lab	Adult Females	Purchased
Caterpillars				
PLUTXY	Diamondback Moth (<i>Plutella xylostella</i>)	Lab	Larvae	Purchased
SPODEX	Beet Armyworm (<i>Spodoptera exigua</i>)	Lab	Larvae	Purchased
TRIPNI	Cabbage Looper (<i>Trichoplusia ni</i>)	Lab	Larvae	Purchased
PSEPIN	Soybean Looper (<i>Pseudoplusia includens</i>)	Lab	Larvae	Purchased
Wasp/Hornets				
DOLIMA	Bald Faced Hornet (<i>Dolichovespula maculata</i>)	Field	Adults	Collected
VESPSA	Yellow Jacket (<i>Vespula spp.</i>)	Field	Adults	Collected
Poultry Beetles				
ALPHDI	Darkling Beetles (Lesser Mealworms) (<i>Alphitobya diaperinus</i>)	Field	Adults	Field



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MATERIALS AND METHODS:

The following is the Snell Scientifics Standardized Testing Method for evaluating the efficacy of pesticides when applied as direct spray applications against various arthropod species.

Direct Spray Study

311.1 **Materials:**

Test Arena Information:

- 311.1.1 Treatment Arenas: Direct Spray Evaluations - CPVC Cartridges with BioQuip 7250NSW or 7250C mesh. Fruit Fly Larvae Evaluation - 9oz SOLO cup with ½" rearing medium. The Test Arenas were used to contain the test systems during the test substance applications.
- 311.1.2 Post-Treatment Arenas: Various containers were used per species. The Post-Treatment arenas were used to contain the test systems in a clean environment after exposure to the test substance(s).
- 311.1.3 Food/Moisture: Various food and moisture items were used per species.

Test Equipment:

- 311.1.4 Volumetric Measuring Equipment: Graduated cylinders and/or beakers were used as needed in preparing and/or measuring the flow rates of the test substance(s).
- 311.1.5 Digital Balance(s): Balances were used as needed in preparing and/or weighing the test substance canisters before and after applications.
- 311.1.6 CO₂ and Regulator: A standard 20 pound CO₂ cylinder with regulator was used to anesthetize the test systems and sort them into the test arenas (prior to exposure to the test substances). The test systems were allowed to adequately recover from anesthetizing before being exposed to the test substance(s), and they were not anesthetized at any point following exposure to the test substance(s). Any additional transfers required after exposure to the test substances was conducted using methods that did not involve anesthetizing.
- 311.1.7 Intermediate Sorting/Transfer Containers: Additional sorting and transfer containers were used to aid in moving the test systems from the primary rearing/collection containers and into the treatment and/or post-treatment arenas.
- 311.1.8 Metronome/Timing Equipment: A metronome and/or other timing equipment were used as needed to assist in the timing when conducting the applications and/or when collecting the observations.

Application Equipment:

- 311.1.9 Application Equipment: Snell Disposable Trigger Sprayer, Paasche Airbrush, and/or Impact Jr. Pump-Up Foam Sprayer.

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312.2 Methods:

Test Design:

- 311.2.1 The evaluations of this study followed the photographs in the Appendix A: Photograph section of the report.
- 311.2.2 Each Treatment and/or Post-Treatment Arena was labeled with a test substance code and a replicate number. The arenas were positioned on a clean tray and grouped together per test substance type. The tray(s) with the Treatment and Post-Treatment Arenas were also labeled using the study name, trial name, and the study initiation date (as a duplicate means of ensuring accurate data collection).
- 311.2.3 The test systems were sorted into the Treatment Arenas using the appropriate methods based on the species type.
- 311.2.4 All of the test systems were confirmed to be of “good vigor” (alive) prior to exposure to the test substance(s).
 - 311.2.4.1 Only live test systems were selected for use in the study.
 - 311.2.4.2 After all test systems were transferred into the test arenas, they were confirmed to be alive and exhibiting normal behavior before continuing with the study.
- 311.2.5 The number of replicates conducted per test substance and the number of test systems evaluated per replicate were conducted using 3 replicates of 10 specimens per replicate (30 specimens per test substance) with most trials. The total number of specimens used per trial was dependent on the availability of the test systems, and therefore for certain trials, the replicates and number per replicate may have been slightly more or less than 30 per test substance.

Test Substance Preparation & Applications:

- 311.2.6 The test substance container(s) were clearly labeled with the test substance name.
- 311.2.7 The test substance(s) were adequately shaken prior to applications.
- 311.2.8 Direct Spray Evaluations - The applications were conducted using an application rate of 2 trigger pulls per replicate and/or 0.35mL from an airbrush. The applications were conducted by treating each replicate from a 6 and/or 12-inch distance away and by applying 2 trigger pull(s) (approximately 2 mL) per replicate using a mist setting or 0.35mL per replicate from an airbrush.
- 311.2.9 Fruit Fly Larvae Evaluation – The applications were conducted by treating the cup containing the medium and fruit fly larvae using a 1 second foam application with an Impact Jr. Pump-Up Foam Sprayer.

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Observation Methods:

- 311.2.10 The number of “Alive”, “Knockdown (KD)”, and “Dead” test systems per arena was recorded prior to applications (Pre-trt), and at 30 min, 1 hr, 2 hrs, 4 hrs, 24 hrs, and then daily as needed after applications (DAT). The adult emergence was documented for the fruit fly larvae.
- 311.2.11 The observations were collected by raising the test arenas and gently blowing air on the test systems to provoke movement, lightly prodding the test systems, or the test arenas were shaken/agitated to provoke test system movement.
- 311.2.12 The test systems were transferred from the Treatment Arenas into the clean Post-Treatment Arenas after the 1 hr. observation interval. The fruit fly larvae were not transferred after applications.
- 311.2.13 Definitions of “Alive”, “Knockdown (KD)”, and “Dead”:
- 311.2.13.1 Alive – Test System exhibited normal forward motion and/or the ability to fly.
 - 311.2.13.2 Knockdown (KD) – Test System exhibited some movement, but could not crawl and/or fly.
 - 311.2.13.3 Dead - Test System exhibited no movement, even when stimulated.

Environmental Conditions:

- 311.2.14 The test systems were tested under ambient laboratory conditions.

Rabbit Ear Mite Study

Materials

Test Arena Information:

- Treatment Arenas: Infested Rabbit Ears

Application Equipment:

- Application Equipment: Snell Disposable Trigger Sprayer.

Methods:

Test Design:

- The evaluations of this study followed the photographs in the Appendix A: Photograph section of the report.
- Naturally existing infestations of rabbit ear mites, *Psoroptes cuniculi*, in San Juan rabbits were used for this study.
- Each infested ear was treated as one replicate.
- Ear mites and ear crusts were confirmed prior to exposure to the test substance(s).

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Test Substance Preparation & Applications:

- The test substance container(s) were clearly labeled with the test substance name.
- The test substance(s) were adequately shaken prior to applications.
- The applications were conducted by treating each replicate evenly with 2 trigger pull(s) (approximately 2 mL) per replicate using a mist setting.
- Treatments were re-applied at 2 and 4 days after treatment.

Observation Methods:

- The presence of ear mites and the presence of ear crusts were recorded prior to applications (Pre-trt), and then at 2, 4, and 7 days after treatment (DAT).
- The observations were collected by visual inspection.

RESULTS / DISCUSSION:

Direct Spray Study

The results for the direct spray evaluations are shown in Tables 1-12. The tables are separated based on species similarity, and each table illustrates the average percent mortality of the evaluated species (test system) and/or the percent adult emergence (fruit fly larvae) at each observation interval for the untreated controls and the evaluated test substance. In addition to the percentages that are shown in the tables, the mortality and/or adult emergence rates for each trial (test system) were statistically analyzed using a t test for independent samples. The analysis was conducted using a one-tailed distribution and probability value of ≤ 0.05 to evaluate if any significant differences in mortality/adult emergence were recorded between the untreated controls and the test substance. For any trials that had competitive formulations tested, a second analysis was conducted using a two-tailed distribution and probability value of ≤ 0.05 to evaluate if any significant differences were recorded between the different test substances.

Of the 45 completed trials that were conducted for measuring the mortality associated with the 012813-3-A-SNE (1:9) treatment, 33 of the species recorded 100% mortality with the 012813-3-A-SNE treatment, while 8 more recorded $\geq 90\%$ mortality. The 012813-3-A-SNE treatment was also successful in preventing adult emergence of red fruit flies when used as a larval application. Significant differences in the mortality and/or adult emergence rates between the test specimens treated with the 012813-3-A-SNE formulation and the untreated controls were recorded with all of the evaluated species, with most species proving statistically different within 30 minutes after the applications. The 012813-3-A-SNE formulation also statistically outperformed EcoSmart Organic Home Pest Control (2.0% 2-Phenethyl Propionate, 1.0% Clove Oil, 1.0% Rosemary Oil, 1.0% Peppermint Oil, 0.5% Thyme Oil) and the 3oz/gal rate of essentria™ IC3 Insecticide (10.00% Rosemary Oil, 5.00% Geraniol, 2.00% Peppermint Oil) during the brown dog tick evaluation (Table 2), Gordon's™ Aqueous Fly Spray (0.10% Pyrethrins 1.00% Piperonyl Butoxide) during the horn fly evaluation (Table 7), and EcoSmart Organic Home Pest Control during the diamondback moth evaluation (Table 9).

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The results in Table 12 show evaluations that were conducted with the 1:39 dilution of the 012813-A-SNE formula. The table shows that 97% mortality was recorded with the flea larvae and 100% brown dog tick mortality was recorded when using the 1:39 dilution rate.

Rabbit Ear Mite Study

The results for the rabbit ear mite study are shown in Table 13, which illustrates the average number of days taken for the ear mite population to be eradicated (controlled) from the ear and the average number of days for significant ear crust reduction.

When treated with 012813-3-A-SNE, the ear mites were completely eradicated by 7 DAT. Significant ear crust reduction was also observed by 7 DAT. Ear crust reduction was considered significant when all of the large slivers of crust had fallen from the ear. Photograph 7 shows a fully infested ear, while photograph 8 shows an ear 7 days after treatment. Photograph 8 illustrates what was considered to be significant crust reduction.

CONCLUSION:

Direct Spray Study

It is evident from the results of the study that the 012813-3-A-SNE formulation provides adequate mortality against a wide range of pest species following direct spray application methods. The results show that the formulation is effective against multiple household pest species, fleas/ticks/mites, cockroaches, stored product pests, plant pests/home invaders, ants, flies, mosquitoes, caterpillars, wasp/hornets, and poultry beetles.

Rabbit Ear Mite Study

It is evident from the results of the study that the 012813-3-A-SNE formulation controls rabbit ear mites and resolves the ear crusts associated with rabbit ear mite infestations. Although ear mites are not a widespread problem with equines, *Psoroptes cuniculi* is a primary mite species that can infest equine ears, and therefore it could be inferred that the 012813-3-A-SNE formulation would control ear mites in equines.

Disclaimer: Snell Scientifics does not intend for the data or conclusions contained in this report to be construed as an endorsement of any of the test substances evaluated in this study. Unofficial changes made to the report, such as changing the

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test substance information, sponsor of the study, or the data will result in the invalidation of this report.

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TABLES:

Table 1.

Household Pests - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Bed Bug	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	77%	87%	87%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Silverfish	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
House Spider	Controls	0%	0%	0%	0%	5%	15%
	012813-3-A-SNE	0%	90%	90%	90%	90%	95%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
European Earwig	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Clothes Moth	Controls	0%	0%	0%	0%	0%	7%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	4 DAT	5 DAT	6 DAT	7 DAT	8 DAT
Black Carpet Beetle	Controls	0%	7%	20%	0%	7%	7%
	012813-3-A-SNE	0%	67%	87%	80%	80%	100%

Table 2.

Flea/Tick/Mites - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Brown Dog Tick	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
	Garden Safe Houseplant & Garden	0%	100%	100%	100%	100%	100%
	EcoSmart Home Pest	0%	70%	100%	93%	100%	100%
	essentria™ IC3 Insecticide	0%	73%	93%	100%	100%	91%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Cat Flea Adults	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	90%	90%	90%	90%	100%
Test System:	Test Sub.	Pre-trt	4 hr	24 hr	2 DAT	3 DAT	4 DAT
Cat Flea Larvae	Controls	0%	0%	0%	0%	0%	7%
	012813-3-A-SNE	0%	90%	90%	90%	90%	90%
Test System:	Test Sub.	Pre-Trt	24 Hr	2 DAT	3 DAT	4 DAT	5 DAT
Cat Flea Eggs		% Egg Eclosion					
	Controls	0%	0%	23%	87%	87%	87%
	012813-3-A-SNE	0%	3%	10%	40%	43%	43%
		% Larvae Mortality					
	Controls	N/A	N/A	0%	0%	4%	8%
Cat Flea Eggs	012813-3-A-SNE	N/A	0%	0%	8%	31%	31%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Poultry Mite	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	1 hr	2 hr	4 hr	24 hr	
House Dust Mite	Controls	0%	3%	3%	8%	7%	
	012813-3-A-SNE	0%	59%	83%	86%	100%	

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**Table 3.**

Cockroaches - Average % Mortality							
Test System:	Test Sub.	Pre-trt	1 hr	24 hr	2 DAT	3 DAT	4 DAT
American Cockroach	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	60%	63%	67%	77%	90%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	2 DAT
German Cockroach	Controls	0%	0%	0%	0%	0%	13%
	012813-3-A-SNE	0%	87%	83%	87%	90%	90%
Test System:	Test Sub.	Pre-trt	30 min	1hr	2 hr	4 DAT	5 DAT
Oriental Cockroach	Controls	0%	0%	0%	0%	3%	13%
	012813-3-A-SNE	0%	80%	90%	93%	97%	100%
Test System:	Test Sub.		30 min	2hr	2 DAT	3 DAT	4 DAT
Smokey Brown Cockroach	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	63%	87%	90%	93%	97%

Table 4.

Stored Product Pests - Average % Mortality							
Test System:	Test Sub.	Pre-trt	24 hr	2 DAT	5 DAT	8 DAT	9 DAT
Confused Flour Beetle	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	50%	60%	70%	77%	80%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Cigarette Beetles	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 5.

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Plant Pests/Home Invaders - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Boxelder Bug	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Green Peach Aphid	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Silverleaf Whitefly	Controls	0%	0%	0%	0%	0%	23%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	2 DAT
Brown Mar Stink Bug	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	53%	60%	60%	73%	80%
Test System:	Test Sub.	Pre-trt	1 hr	2 hr	24 hr	4 DAT	5 DAT
Colorado Potato Beetle	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	4%	88%	92%	96%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Asian Lady Beetle	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	23%	93%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	2 hr	4 hr	24 hr	2 DAT	3 DAT
Spotted Cucumber Beetle	Controls	0%	0%	0%	0%	11%	19%
	012813-3-A-SNE	0%	70%	78%	89%	85%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Two Spotted Spider Mites	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	100%	100%	100%	97%	100%



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Table 6.

Ants - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Pharaoh Ant	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	1 hr	2 hr	24 hr	2 DAT	3 DAT
Red Imported Fire Ant	Controls	0%	0%	0%	7%	10%	13%
	012813-3-A-SNE	0%	67%	67%	80%	93%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Argentine Ant	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 7.

Flies - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Blue Bottle Fly	Controls	0%	0%	0%	0%	7%	17%
	012813-3-A-SNE	0%	83%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
House Fly	Controls	0%	0%	0%	0%	3%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Flesh Fly	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	58%	29%	50%	58%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Horn Fly	Controls	0%	0%	0%	0%	0%	5%
	012813-3-A-SNE	0%	5%	50%	73%	78%	98%
	Gordons Fly						
	Spray	0%	0%	5%	30%	58%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Stable Fly	Controls	0%	0%	0%	13%	10%	17%
	012813-3-A-SNE	0%	97%	100%	100%	100%	97%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Red Fruit Fly Adults	Controls	0%	0%	0%	0%	2%	4%
	012813-3-A-SNE	0%	100%	100%	98%	96%	100%
% Adult Emergence							
Test System:	Test Sub.	6DAT	7DAT	8DAT	9DAT	10DAT	11DAT
Red Fruit Fly Larvae	Controls	13%	40%	58%	73%	90%	93%
	012813-3-A-SNE	0%	0%	0%	0%	0%	0%

Table 8.

Mosquitoes - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Common Malaria Mosquito	Controls	0%	0%	0%	0%	10%	40%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Southern House Mosquito	Controls	0%	0%	0%	10%	13%	40%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Yellow Fever Mosquito	Controls	0%	0%	0%	0%	0%	10%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%



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**Table 9.**

Caterpillars - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Diamondback Moth	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
	Garden Safe Houseplant & Garden	0%	100%	80%	80%	97%	100%
	EcoSmart Home Pest	0%	100%	83%	90%	100%	100%
	essentria™ IC3 Insecticide	0%	100%	93%	93%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Beet Armyworm	Controls	0%	0%	0%	0%	0%	20%
	012813-3-A-SNE	0%	97%	100%	100%	100%	100%
	Garden Safe Houseplant & Garden	0%	97%	100%	100%	100%	100%
	EcoSmart Home Pest	0%	93%	97%	97%	100%	100%
	essentria™ IC3 Insecticide	0%	93%	93%	93%	100%	100%
Test System:	Test Sub.	Pre-trt	3 hr	5 hr	24 hr	2 DAT	4 DAT
Cabbage Looper	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	53%	67%	83%	87%	90%
Test System:	Test Sub.	Pre-trt	1 hr	2 hr	4 hr	24 hr	2 DAT
Soybean Looper	Controls	0%	0%	0%	0%	0%	7%
	012813-3-A-SNE	0%	0%	0%	0%	93%	100%

Table 10.

Wasp/Hornet - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Bald Faced Hornet	Controls	0%	0%	0%	0%	0%	7%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Yellow Jacket	Controls	0%	0%	0%	0%	0%	13%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 11.

Poultry Beetles - Average % Mortality							
Test System:	Test Sub.	Pre-trt	3 DAT	4 DAT	8 DAT	12 DAT	15 DAT
Darkling Beetles (Lesser Mealworms)	Controls	0%	0%	0%	3%	3%	3%
	012813-3-A-SNE	0%	33%	40%	53%	80%	83%
	1.30% Credo SC Insecticide (3floz/gal rate)	0%	10%	17%	37%	57%	67%

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Sponsor Code: N/A

Test Method: 311

**Table 12.**

Percent Mortality or Pests										
Test System	Test Substance:	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr	2 DAT	3 DAT	4 DAT
Cat Flea Larvae	Control - Untreated	0%	0%	0%	0%	0%	3%	7%	17%	20%
	012813-3-A-SNE 1:39 Dilution	0%	50%	23%	33%	30%	73%	80%	83%	97%
Brown Dog Tick Nymphs	Control - Untreated	0%	0%	0%	0%	0%	17%			
	012813-3-A-SNE 1:39 Dilution	0%	17%	100%	100%	100%	100%			

Table 13.

Rabbit Ear Mites - AVG # Days for Mite Control		
Test System:	Test Sub.	Avg Days for Mite Control
Rabbit Ear Mite	Controls	Control not achieved
	012813-3-A-SNE	7
Rabbit Ear Mites - Average # Days for Significant Crust Reduction		
Test System:	Test Sub.	Avg Days for Significant Crust Reduction
Rabbit Ear Mite	Controls	Control not achieved
	012813-3-A-SNE	7

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Test Method: 311



APPENDIX A: PHOTOGRAPHS

Photograph 1. Example of Trigger Sprayer used for Applications



Photograph 2. Example of Bed Bugs in Post-Treatment Arenas



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Photograph 3. Example of CPVC Mesh Cartridge w/ German Cockroaches



Photograph 4. Brown Dog Ticks during Sorting



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Photograph 5. Blue Bottle Flies in Rearing Container



Photograph 6. Example of Mosquitoes in Post-Treatment Arena



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Photograph 7. Example of an Infested Rabbit's Ear with Ear Crusts



Photograph 8. Example of a Rabbits Ear 7 Days after Treatment with 012813-3-A-SNE

