



Client: Narcote LLC                      Date: July 2007  
Project: Prevention of Bed Bug Feeding Through Mattress Covers  
Project Code: narcoteBBfeed07  
Test Method: As described

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**Project Title:**

Evaluation of the Efficacy of Fabric Mattress Covers in Preventing Bed Bug (*Cimex lectularius*) Feeding

**Project Code:**

narcoteBBfeed07

**Products:**

BedCare Classic, All-Cotton, Organic Cotton, Economy, and Elegance

**Test Date(s):**

July 25, 2007

**Report Date:**

July 2007

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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.

Submitter: \_\_\_\_\_

Date: \_\_\_\_\_

Sponsor: \_\_\_\_\_

Date: \_\_\_\_\_

Study Director: \_\_\_\_\_

Date: \_\_\_\_\_



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### **Objectives:**

1. To determine the efficacy of various fabric mattress covers in preventing feeding activity of Bed Bugs (*Cimex lectularius*).

### **Treatments:**

1. 800 TU – solid fabric panel
2. 5050 TU – solid fabric panel

### **Materials and Methods:**

The following is the Snell Scientifics Testing Method for evaluating the efficacy of fabrics and closures as barriers to hematophagous arthropods. Further details related to this specific test are described following the test method summary. Select action items and illustrations have been removed from this standardized test method in an effort to make the report more precise and accurate to the test conducted. Any details removed from this test method were deemed irrelevant to the test conducted in this report.

#### Materials:

- ½ pint Glass Mason jars with lids and rings
- Cardboard pieces cut to provide harborage and clinging surfaces for bed bugs
- Scissors to cut fabric pieces to fit over Mason jar mouths
- Electrical tape to seal jars
- Log sheets to record data
- Digital camera and microscope to record images
- Digital countdown timer to measure feeding intervals
- CO2 tank to knockdown insects for observations



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## Methods:

### Fabric test:

- New ½ pint Mason jars are modified by removing metal insert in lid from ring that secures lid to jar
- Pieces of fabric to be tested are cut to fit over the mouth of the jar.
- Several (4-6) pieces of plain cardboard are cut ~1" x ~2.5" rectangles and placed in test jars so insects have harborage and a place to rest.
- ~200 Bed bugs of mixed stages from 1<sup>st</sup> instar to adult are removed from breeding container by appropriate means and transferred to test jar. These insects will not have been fed for a minimum of 7 days prior to testing
- Fabric piece is placed over the mouth of the jar and the sealing ring is screwed on. This prevents any insects from escaping and insures that the only exposure insects have is through the fabric.
- The jar of bed bugs is inverted and placed against the skin to provide the insects access to the host. Contact is maintained for a five (5) minute interval
- After five (5) minutes of exposure, the jar is removed from contact with the host and the skin where the jar was applied is visually observed for any sign of feeding activity
- The jar of insects is then gassed with CO<sub>2</sub> to make the insects easily accessible for observation.
- The insects are the observed for any sign of feeding, such as darkened or swollen abdomens.
- Any such signs are recorded as feeding activity on the data sheets.

Additional Testing Details Not Fully Described in Standard Protocols:

*Test Set-Up:* The evaluations in this test followed photographs in Appendix A.

*Replicates:*    Insect Stage Tested:    adults and mixed instars  
                  # of Reps:                      1  
                  # of Insects/Rep:        ~200

*Source of Test Specimens:*    Specimens taken from lab raised colonies fed *in vitro*

*Exposure of Test Specimens:* Test specimens were exposed to materials for entire duration of test.

*Conditions in Test Room:*    Temperature:    79 deg F                      Humidity:    44 %.



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<i>Arena details:</i>	size of arena:	½ pint Mason jar with lid
	arena material:	clear glass
	type of cover :	metal lid with all fabric insert
	Food/water:	none provided

*Confirming Pest Condition:*

All bed bugs were confirmed 'alive' 2 times prior to testing:

- 1) the insects were removed from the breeding container by transferring only live insects to testing arena,
- 2) after all insects were transferred to the arenas, they were confirmed to be moving before any attempts at feeding were made.

*Method Used to Evaluate Testing Results:*

Arena was opened and insects were examined under magnifying lenses to ascertain if feeding had taken place. The measure of feeding was any additional color or swelling of the insect's abdomen.

**Results / Discussion:**

The results of this test are illustrated in Table 1. This table illustrates the efficacy of the tested fabrics in preventing feeding by bed bugs of all life stages when presented with a human host.

At no time during the test was any bed bug of any life stage able to penetrate any of the fabrics tested.

The conclusion may be drawn from the results of these tests that all the fabrics presented for testing were effective in preventing all stages of bed bugs from penetrating and feeding.



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**Tables:**

**Table 1.**

Number of Bed Bugs ( <i>Cimex lectularius</i> ) of Each Life Stage Exhibiting Feeding Behavior in Test Arenas with Fabric Covers Exposed to Host (~200 Bed Bugs of Mixed Stages per Arena)			
Test Product	1st Instars	mid instars	Adults
800-TU	0	0	0
5050-TU	0	0	0

## Appendix A: Photographs

**Photograph 1:** Shows fabric lid on jar



**Photograph 2:** Shows fabric test lid sealed to jar with Bed bugs inserted

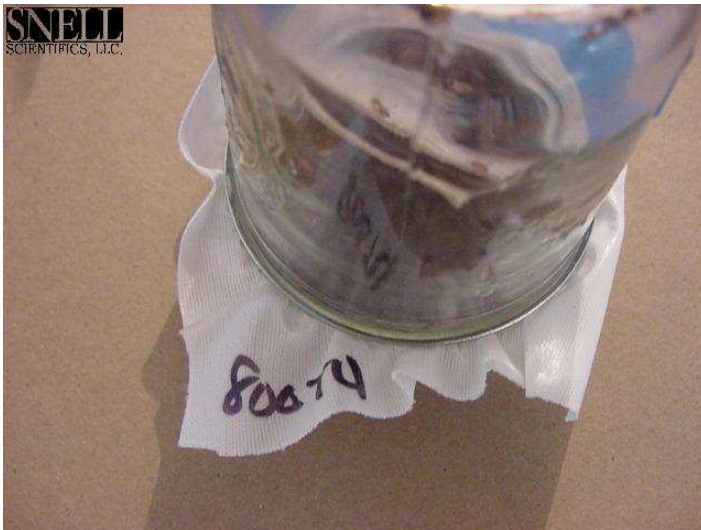




**Photograph 3:** Shows fabric test jar for Product 5050 TU with metal ring in place



**Photograph 4:** shows test product 800 TU on test jar



**Photograph 5:** shows test jars with Bed Bug population in place



**Photograph 6:** shows exposure method on arm





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## Appendix B: Raw Data

Test Title: Narcote BB fabric feeding Species: Bed Bugs Date: 7-25-07  
Panel Treatment Time: NA Insect Exposure Time (start time): NA  
Temp: 78.8 Humidity: 43.9% Log Location: Bite 1 BB -3  
Researcher: T. Smith TM #: \_\_\_\_\_  
Test Description Fabric feeding prevention test: Jelly jars are equipped with active bed bug populations  
Bed bugs used are unfed for at least 7 days. Jars equipped with test fabrics are  
held against skin to monitor for ability of feeding through fabrics  
Arena set up: Various fabrics placed on top of jelly jars and held in place by screwing lid over fabric.  
Fabrics are held to skin for 5 minutes and monitored for ability of bed bug feeding.

Test Product	# Fed		
	1st Instars	mid instars	Adults
800-Tu	0	0	0
5050-Tu	0	0	0

After 5 minute exposure for feeding, bed bugs were gased with CO<sub>2</sub>, removed from the jelly jar, placed in a small battery jar, and inspected for visual signs of fed bed bugs (ex. Red Abdomens)

T. Smith

7-25-07