UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

OFFICE OF
PREVENTION,
PESTICIDES
AND TOXIC
SUBSTANCES

March 8, 2011

MEMORANDUM

Subject: Revised Efficacy Review for EPA File Symbol 777-114, Sting
DP Barcode: 384398

From: Tajah L. Blackburn, Ph.D., Microbiologist
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Product Science Branch
Antimicrobials Division (7510P)

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Regulatory Management Branch I
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Applicant: Reckitt Benckiser, Inc.
399 Interpace Parkway
Parsippany, NJ 07054

Formulation from the Label:

Active Ingredient(s)	% by wt.
Alkyl (50% C_{14}, 40% C_{12}, 10% C_{16}) Dimethyl Benzyl Ammonium Chloride	0.26%
Other Ingredients	99.74 %
Total	100.00 %

I BACKGROUND

The product, Sting (EPA File Symbol 777-114), is an Agency-registered disinfectant (bactericide, virucide), sanitizer, fungistat, and deodorizer on hard, non-porous surfaces in household, institutional, commercial, food service, animal care, and hospital or medical environments. Marketing claims on the proposed label state that the product is a "one-step" disinfectant and sanitizer. The applicant is re-submitting virucidal data to support claims against Swine influenza A virus (H1N1) and 2009-H1N1 influenza A virus (Novel H1N1). At that time, the data was not reviewed. The applicant's letter indicates that the Agency has now agreed to review 2009 H1N1 data. Studies were conducted at ATS Labs, located at 1285 Corporate Center Drive, Suite 110, in Eagan, MN 55121.

This data package contained a letter from the applicant to EPA (dated October 27, 2010), EPA Form 8570-35 (Data Matrix), two studies (MRID 479273-01 and 479273-02), Statements of No Data Confidentiality Claims for both studies, and the proposed label (dated October 27, 2010).

Note: The laboratory reports describe studies conducted for the product, Formula 1435-014. A letter from the applicant to EPA (dated May 27, 2009) states that the product, Formula 1435-014, is the basic formulation of the product, Sting, which is the product for which registration is sought.

II USE DIRECTIONS

The product is designed for disinfecting and sanitizing hard, non-porous surfaces, including: appliance exteriors, bathtubs, changing tables, computer keyboards, computer mice, counters, cribs, diaper pails, doorknobs, exhaust fans, faucets, fixtures, floors, garbage cans, laundry baskets, light switches, non-wood cabinets, non-wood furniture, outdoor furniture, rails, remote controls, showers, sinks, sports equipment, tables, telephones, toilet exteriors, toilet seats, toys, urinal exteriors, vanity tops, and walls. The proposed label states that the product may be used on hard, non-porous surfaces including: aluminum, brass, ceramic, chrome, Corian, crystal, enamel, fiberglass fixtures, Formica, glazed ceramic, glazed porcelain, granite, laminate, linoleum, metal, plastic, Plexiglas, stainless steel, terra cotta, tin, and vinyl. Directions on the proposed label provided the following information regarding use of the product:

> As a disinfectant: Pre-clean surface. Use enough fresh wipes to thoroughly wet surface. Allow to remain wet for 10 minutes. Allow surface to air dry. Toss dirty wipe away.

III AGENCY STANDARDS FOR PROPOSED CLAIMS

Antimicrobial Products for Use on Hard Surfaces Using Pre-saturated or Impregnated Towelettes

Towelette products represent a unique combination of antimicrobial chemical and applicator, pre-packaged as a unit in fixed proportions. As such, the complete product, as offered for sale, should be tested according to the directions for use to ensure the product's effectiveness in treating hard surfaces. The standard test methods available for hard surface disinfectants and sanitizers, if followed exactly, would not closely simulate the way a towelette product is used. Agency guidelines recommend that a simulated-use test be conducted by modifying the standard test methods. Agency guidelines further recommend that instead of spraying the inoculated surface of the carrier, the product should be tested by wiping the surface of the carrier with the saturated towelette, and then subculturing the slides after a specified holding time. Performance standards of the standard test methods must be met. These Agency standards are presented in EPA Pesticide Assessment Guidelines, Subdivision G, §91-2(h), Pre-saturated or impregnated towelettes; and the April 12, 2001 EPA Memorandum, Draft Interim Guidance for Non-Residual Sanitization of Hard Inanimate Food Contact Surfaces Using Pre-Saturated Towelettes.

Virucides

The effectiveness of virucides against specific viruses must be supported by efficacy data that simulates, to the extent possible in the laboratory, the conditions under which the product is intended to be used. Carrier methods that are modifications of either the AOAC Use-Dilution Method (for liquid disinfectants) or the AOAC Germicidal Spray Products as Disinfectants Method (for spray disinfectants) must be used. To simulate in-use conditions, the specific virus to be treated must be inoculated onto hard surfaces, allowed to dry, and then treated with the product according to the directions for use on the product label. One surface for each of 2 different product lots of disinfectant must be tested against a recoverable virus titer of at least 10^4 from the test surface for a specified exposure period at room temperature. Then, the virus must be assayed by an appropriate virological technique, using a minimum of four determinations per each dilution assayed. Separate studies are required for each virus. The calculated viral titers must be reported with the test results. For the data to be considered acceptable, results must demonstrate complete inactivation of the virus at all dilutions. When cytotoxicity is evident, at least a 3-log reduction in titer must be demonstrated beyond the cytotoxic level.

Supplemental Claims

An antimicrobial agent identified as a "one-step" disinfectant or as effective in the presence of organic soil must be tested for efficacy with an appropriate organic soil load, such as 5 percent serum.

IV COMMENTS ON THE SUBMITTED EFFICACY STUDIES

1. MRID 479273-01 "Virucidal Efficacy of Pre-Saturated Towelettes for Hard Surface Disinfection," Virus: Swine Influenza A (H1N1) virus (Strain A/Swine/Iowa/15/30, ATCC VR-333), for Formula 1435-014, by Mary J. Miller. Study conducted at ATS Labs. Study completion date – June 15, 2009. Project Number A07714.

This study was conducted against Swine Influenza A (H1N1) virus (Strain A/Swine/Iowa/15/30, obtained from the ATCC, VR-333), using RMK cells (Rhesus monkey kidney cells; obtained from ViroMed Laboratories, Inc., Cell Culture Division, Minneapolis, MN; maintained in-house) as the host system. Three lots (Lot Nos. 1453-081A, 1453-081B, and 1453-082) of the product, Formula 1435-014, were tested according to ATS Labs Protocol No. REK01042709.SFLU.2 (copy provided). The product was received ready-to-use, as a pre-saturated towelette. The stock virus culture was adjusted to contain 5% fetal bovine serum as the organic soil load. Films of virus were prepared by spreading 0.2 mL of virus inoculum uniformly over the undersides of 2" x 2" areas of separate sterile glass Petri dishes. The virus films were dried for 20 minutes at 20.0°C at 50% relative humidity. Using sterile gloves, each towelette was folded in half lengthwise two times, then folded up once widthwise to form approximately a 2" x 2" square for use in testing. Each carrier was wiped back and forth twice with an individual saturated towelette, for a total of four passes. Five replicates for each batch were used. The carriers were allowed to remain wet while covered for 10 minutes at 20.0°C. Following exposure, 2.00 mL of test medium was added to each Petri dish, and the dishes were scraped with a cell scraper to re-suspend the contents. The virus-disinfectant mixtures were passed immediately through individual Sephadex columns, and diluted serially in Minimum Essential Medium supplemented with 1% heat-

inactivated fetal bovine serum, 10 µg/mL gentamicin, 100 units/mL penicillin, and 2.5 µg/mL amphotericin B. RMK cells in multi-well culture dishes were inoculated in quadruplicate with 0.1 mL of the dilutions. The cultures were incubated at 36-38°C in a humidified atmosphere of 5-7% CO_2. The cultures were scored periodically for 7 days for the presence or absence of unspecified cytopathic effects, cytotoxicity, and viability. Controls included those for dried virus count, cytotoxicity, and neutralization. Viral and cytotoxicity titers were calculated by the method of Spearman Karber.

2. **MRID 479273-02 "Virucidal Efficacy of Pre-Saturated Towelettes for Hard Surface Disinfection," Virus: 2009-H1N1 Influenza A virus (Novel H1N1, Strain A/Mexico/4108/2009, CDC #2009712192), for Formula 1435-014, by Mary J. Miller. Study conducted at ATS Labs. Study completion date – November 19, 2009. Project Number A08497.**

This study was conducted against 2009-H1N1 Influenza A virus (Novel H1N1, Strain A/Mexico/4108/2009, CDC #2009712192), using RMK cells (Rhesus monkey kidney cells; obtained from ViroMed Laboratories, Inc., Cell Culture Division, Minneapolis, MN; maintained in-house) as the host system. Two lots (Lot Nos. 1453-081B, and 1453-082) of the product, Formula 1435-014, were tested according to ATS Labs Protocol No. REK01100509.FLUA.2 (copy provided). The product was received ready-to-use, as a pre-saturated towelette. The stock virus culture was adjusted to contain 5% fetal bovine serum as the organic soil load. Films of virus were prepared by spreading 0.2 mL of virus inoculum uniformly over the undersides of 2" x 2" areas of three separate sterile glass Petri dishes. The virus films were dried for 20 minutes at 20.0°C at 50% relative humidity. Using sterile gloves, each towelette was folded to form approximately a 2" x 2" square for use in testing. Each carrier was wiped back and forth twice with an individual saturated towelette, for a total of four passes. The carriers were allowed to remain wet while covered for 10 minutes at 22.0°C. Following exposure, 2.00 mL of test medium was added to each Petri dish, and the dishes were scraped with a cell scraper to re-suspend the contents. The virus-disinfectant mixtures were passed immediately through individual Sephadex columns, and diluted serially in Minimum Essential Medium supplemented with 1% heat-inactivated fetal bovine serum, 10 µg/mL gentamicin, 100 units/mL penicillin, and 2.5 µg/mL amphotericin B. RMK cells in multi-well culture dishes were inoculated in quadruplicate with 0.1 mL of the dilutions. The cultures were incubated at 36-38°C in a humidified atmosphere of 5-7% CO_2. The cultures were scored periodically for 7 days for the presence or absence of unspecified cytopathic effects, cytotoxicity, and viability. Controls included those for dried virus count, cytotoxicity, and neutralization. Viral and cytotoxicity titers were calculated by the method of Spearman Karber.

V RESULTS

MRID Number	Organism	Results				Dried Virus Count
			Lot No. 1453-081A	Lot No. 1453-081B	Lot No. 1453-082	
479273-01	Swine Influenza A (H1N1) virus	10^{-1} to 10^{-6} dilutions	Complete inactivation			$10^{5.7}$ $TCID_{50}$/

MRID Number	Organism	Results				Dried Virus Count
			Lot No. 1453-081A	Lot No. 1453-081B	Lot No. 1453-082	
		$TCID_{50}$/0.1 mL	$\leq 10^{0.5}$	$\leq 10^{0.5}$	$\leq 10^{0.5}$	0.1 mL
479273-02	2009-H1N1 Influenza A virus	10^{-1} to 10^{-7} dilutions	Not Tested	Complete inactivation		$10^{6.25}$ $TCID_{50}$/ 0.1 mL
		$TCID_{50}$/0.1 mL	Not Tested	$\leq 10^{0.5}$	$\leq 10^{0.5}$	

VI CONCLUSIONS

1. The submitted efficacy data (MRID 479273-01 and 479273-02) do support the use of the product, Sting (also known as Formula 1435-014), as a disinfectant with virucidal activity against the following microorganisms on hard, non-porous surfaces in the presence of at least a 5% organic soil load for a 10-minute contact time:

Swine Influenza A (H1N1) virus (Strain A/Swine/Iowa/15/30, ATCC VR-333)

2009-H1N1 Influenza A virus (Novel H1N1, Strain A/Mexico/4108/2009, CDC #2009712192)

Recoverable virus titers of at least 10^4 were achieved. Cytotoxicity was not observed. Complete inactivation (no growth) was indicated in all dilutions tested.

VII RECOMMENDATIONS

1. The proposed label claims that the product, Sting, is an effective disinfectant against the following microorganisms on pre-cleaned hard, non-porous surfaces for a 10-minute contact time:

Swine Influenza A (H1N1) virus (Strain A/Swine/Iowa/15/30)
2009-H1N1 Influenza A virus (Novel H1N1, Strain A/Mexico/4108/2009)

These claims are acceptable .

2. The following recommendations were made in the previous DER (dated August 17, 2009, T. Blackburn);
   a. On page 5 of the proposed label, remove the claim "removes allergens at the source". This claim has not been demonstrated.

   b. On page 5 of the proposed label, remove the claim "removes X% of allergens". This claim has not been demonstrated.

   c. On page 4 of the Data Matrix, change "*S. auereus*" to read "*S. aureus*."

3. The following changes need to be made to the product label;

a. On page 6 of the proposed label, delete the new term, "all around" which could be used in conjunction with "Use" to read, "Use all around." The optional text implies that the product could be used on any surface which is a false statement.

   The same applies to the claim, "Kills germs** (all around)..." on page 9.

b. On page 9 of the proposed label, the statement "on hard non-porous surfaces" following the claim, "Effective against (the) Cold (and/ &) (flu) virus(es)" is not optional. Remove the parentheses from the claim.

   The same applies to the two following new claims for H1N1 and cold viruses also on page 9.

c. On page 10, clarify the claim, "(This product) meets efficacy standards for (hospital type) disinfectant (sanitizing) wipes." There is no category for hospital type sanitizing wipes.

d. On page 11, under disinfection directions, the applicant needs to add the following text, "Use enough wipes/towelettes for the surface to remain visibly wet for the entire 10 minute contact time."