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Test Method for Anti-House Dust Mite Properties of Textiles under Long-Term Test Conditions

1. Purpose and Scope

1.1 This test method is for the evaluation of the degree of anti-house dust mite activity in a long-term testing environment for textiles treated at the manufacturing level for this purpose.

2. Principle

2.1 Test and control specimens are inoculated with the test organism and nutrients. After six weeks of incubation, sufficient time for mite colonies to flourish under optimal conditions, the dust mites are recovered from the specimens by heat extraction. Results are expressed as per cent reduction on the treated sample versus the untreated control.

3. Terminology

3.1 **activity**, n.—*of an anti-dust mite agent*, a measure of the effectiveness of the agent.

3.2 **anti-house dust mite agent**, n.—any chemical which kills (acaricide) or repels house dust mites.

4. Safety Precautions

NOTE: These safety precautions are for information purposes only. The precautions are ancillary to the testing procedure and are not intended to be all inclusive. It is the user's responsibility to use safe and proper techniques in handling materials in this test method. Manufacturers MUST be consulted for specific details such as Safety Data Sheets and other manufacturer's recommendations. All OSHA standards and rules must also be consulted and followed.

4.1 This test should be carried out by persons with training and experience in the use of acarological techniques.

4.2 CAUTION: Although house dust mites are not considered to be a direct hazard to humans, their fecal pellets have been demonstrated to be a potential potent allergen for those susceptible to asthma. Therefore, every necessary and reasonable precaution must be taken to eliminate this risk to the laboratory personnel and to personnel in the associated environment. Where appropriate, wear protective clothing and respiratory protection that prevents penetration by the matter.

4.3 All work should be conducted using standard safe laboratory practices.

4.4 All chemicals should be handled with care.

4.5 An eyewash/safety shower should be located nearby for emergency use.

4.6 Exposure to chemicals used in this procedure must be controlled at or below levels set by governmental authorities (e.g., Occupational Safety and Health Administration's [OSHA] permissible exposure limits [PEL] as found in 29 CFR 1910.1000; see web site: www.osha.gov for latest version). In addition, the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) comprised of time weighted averages (TLV-TWA), short term exposure limits (TLV-STEL) and ceiling limits (TLV-C) are recommended as a general guide for air contaminant exposure which should be met (see 12.1).

5. Limitations

5.1 The method cannot be used to determine the specific mode of action of a given acaricide treatment.

5.2 The method should not be used to predict the performance of a finished article if the test specimen will go through additional processing steps or represents only a component of the final article.

5.3 While this test method provides some insight into the effect of different textile treatments in controlling the ability of mites to successfully establish breeding colonies, direct conclusions cannot be made with regard to a treatment removing or reducing allergens.

5.4 This test method does not allow recovery of house dust mite eggs. However, it does provide a good measurement of the effectiveness of anti-dust mite treatment on a breeding mite colony.

6. Materials

6.1 Test Organisms

6.1.1 Test mites: *Dermatophagoides pteronyssinus* or *D. farinae*. Any other species suitable to a given country or region can also be used.

6.2 Maintenance of House Dust Mite Stock Cultures

6.2.1 Dust mite colonies should be maintained at $25 \pm 1^\circ\text{C}$ ($77 \pm 1^\circ\text{F}$) and 73-76% relative humidity on TetraMin Tropical Flakes (see 12.2).

6.2.2 Before use, the flakes should first be ground with a mortar and pestle, then sieved so that the particle size is between

500–750 μm .

6.2.3 Care must be taken to ensure that stock cultures of mites used for testing have not previously been exposed to chemicals or treatments that might have some interaction with the mites.

7. Specimens

7.1 Test Specimens.

7.1.1 Prepare a minimum of three test specimens by cutting them to fit snugly in the bottom of a 10 cm diameter glass or polystyrene Petri dish. This can accurately be done by tracing around the dish on the sample, or by using a suitably sized die. For loose fibers, sufficient material to cover the bottom of the Petri dish should be used.

7.1.2 Petri dishes or other test chambers of larger or smaller size can be substituted where desired. The size of the test specimen should change accordingly to ensure a snug fit of the sample in the bottom of the dish.

7.2 Control specimens.

7.2.1 A minimum of three specimens of the same fiber type and construction as the test specimen but containing no anti-mite finish (negative control) should also be prepared.

7.2.2 In addition, an internal lab control previously determined to support dust mite colonies should be included for each test. The purpose of this internal control is to provide validation that the mite colony has developed at the expected rate on a known sample over the course of the six weeks test.

7.3 Sterilization of Specimens.

7.3.1 Specimens may be sterilized when there is potential for fungal growth on the specimen over the test period due to the presence of spores. The method of sterilization used will depend on the sample composition and finish, as well as the particular anti-house dust mite treatment. Report method of sterilization, if used.

8. Procedure

8.1 Test Setup.

8.1.1 Distribute 50 mg of the ground/sieved nutrient mixture on each test specimen. The mixture can be applied through a sieve to enable an even distribution of the material.

8.1.2 To prevent mites from escaping, the sides of the container can be coated with petroleum jelly. A heavy layer of