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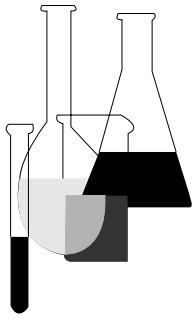
Product Performance Test Guidelines

OPPTS 810.3500
Premises Treatments



INTRODUCTION

This guideline is one of a series of test guidelines that have been developed by the Office of Prevention, Pesticides and Toxic Substances, United States Environmental Protection Agency for use in the testing of pesticides and toxic substances, and the development of test data that must be submitted to the Agency for review under Federal regulations.

The Office of Prevention, Pesticides and Toxic Substances (OPPTS) has developed this guideline through a process of harmonization that blended the testing guidance and requirements that existed in the Office of Pollution Prevention and Toxics (OPPT) and appeared in Title 40, Chapter I, Subchapter R of the Code of Federal Regulations (CFR), the Office of Pesticide Programs (OPP) which appeared in publications of the National Technical Information Service (NTIS) and the guidelines published by the Organization for Economic Cooperation and Development (OECD).

The purpose of harmonizing these guidelines into a single set of OPPTS guidelines is to minimize variations among the testing procedures that must be performed to meet the data requirements of the U. S. Environmental Protection Agency under the Toxic Substances Control Act (15 U.S.C. 2601) and the Federal Insecticide, Fungicide and Rodenticide Act (7 U.S.C. 136, *et seq.*).

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OPPTS 810.3500 Premises treatments.

(a) **Scope**—(1) **Applicability.** This guideline is intended to meet testing requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. 136, *et seq.*)

(2) **Background.** The source materials used in developing this harmonized OPPTS test guideline are OPP guidelines 95–11 Premises treatments and 95–30 Acceptable methods (Pesticide Assessment Guidelines, Subdivision G: Product Performance, EPA report 540/9–82–026, October 1982).

(b) **Overview.** This guideline is concerned with the efficacy data guidance for invertebrate control pesticides used against pests of premises. Commercial and industrial pesticide formulations used for premises treatments include, but are not limited to, liquid or pressurized products for spray treatments and pastes, powders, and granules for baits.

(c) **Definitions.** The following definitions are of special importance in understanding this guideline:

The term *crack and crevice treatment* means the application of small amounts of insecticide into cracks and crevices in which insects hide or through which they may enter the building. Such openings commonly occur at expansion joints, between different elements of construction, and between equipment and floors. These openings may lead to voids such as hollow walls, equipment legs and bases, conduits, motor housing, junction or switch boxes.

The term *food handling establishment* refers to any place, other than a private residence, in which food is held, processed, prepared, and/or served. Food areas include those used for receiving, serving, storing (dry, cold, frozen, raw), packaging (canning, bottling, wrapping, boxing) and preparing (cleaning, slicing, cooking, grinding) food; for edible waste storage; and for enclosed processing systems (mills, dairies, edible oil extractors, and evaporators).

The term *general treatment* is application to broad expanses of surfaces such as walls, floors, and ceilings or as an outside treatment.

The term *non-food areas* refers to premise areas such as garbage rooms, lavatories, floor drains (to sewers), entries and vestibules, offices, locker rooms, machine rooms, boiler rooms, garages, mop closets, and storage (after packaging).

The term *premises* refers to the spaces within structures, their walls (both inside and outside), and the immediate adjacent surrounding grounds. Such structures include households (e.g., houses, apartments); commercial, industrial and institutional buildings; agricultural structures (e.g., barns); and food-handling establishments.

The term *spot treatment* is application to limited areas on which insects are likely to occur, but which will not be in contact with food or utensils and will not ordinarily be contacted by workers. These areas may occur on floors, walls, and bases or undersides of equipment. For this purpose, a ''spot'' will not exceed 2 square feet. Spot treatments must be limited to 20% of the lower wall and floor surfaces. The 2 square foot ''spots'' cannot be contiguous.

(d) **General considerations.** The testing of a pesticide product for use in households should follow the same procedures as are appropriate for its commercial use.

(1) **Site selection.** The uniqueness of each application site or structure, and the fact that identical sites or structures will usually not be available, should be recognized.

(2) **Number of trials.** Under controlled conditions in the laboratory, at least 5 trials are usually necessary. A minimum of 5 large-scale field trials are generally needed, but the number of trials can vary somewhat due to the accessibility of infestations, fluctuations in pest population pressures, behavior, and other important considerations in the biology of the target pest.

(3) **Test species.** Test invertebrates should be representative of flying and/or crawling species against which the test product is to be used. A pest population may be difficult to estimate or to sample, and it will often be necessary to limit testing to the laboratory, or to develop a system of estimating the extent of an infestation in the field. The pests to be controlled often cannot be distinguished as separate entities and will frequently need to be grouped according to control methods, geographical locations, infested premises, life stage or form, type of damage and other factors. Therefore, testing may need to be directed at the most important pest or pests, life stage or pest complex, or at the species most resistant to a particular pesticide.

(4) **Exposure period.** The duration of exposure to the test product is important in order to achieve maximum control, and data must be reported in terms of time length, such as 12-, 24-, or 48-hour exposure periods.

(5) **Temperature and humidity.** The temperature and humidity at the time the product is tested should be recorded, since these factors are important relative to the activity of the pest population, and the degradation of the active ingredient(s).

(6) **Residual considerations.** The amount of pesticide residue deposited on treated surfaces is critical to the effectiveness of many treatments against crawling pests. The amount of residue deposited should be determined under actual or simulated use conditions, and the method(s) of de-

termination must be submitted with the test data. The types of surfaces to which residual pesticides are applied must be reported since surface type has a pronounced effect on the amount of active residue available to pests. In general, the following absorptive and non-absorptive surfaces should be tested for crawling pests: vinyl tile or linoleum, stainless steel, painted and unpainted wood and ceramic tile.

(7) **Application techniques and equipment.** The application technique should reflect the claims proposed on the label, whether crack and crevice, spot, general, space spray, contact spray or total release. Insecticides to be evaluated in or around dairy barns, horse barns, stables, poultry houses and yards, and other agricultural structures may be applied as sprays, dusts, and baits to stanchions, walls, floors, manure, bedding, and other areas where the target insects may rest or breed.

(e) **Test methods and suggested performance standards.** These suggested standards are determined on the basis of results obtained from laboratory and simulated or actual field tests in which the efficacy of the test product is compared with that of official test pesticides such as the official test pressurized spray (OTPS), from the Chemical Specialties Manufacturers Association (CSMA), untreated controls, or a registered standard. The performance standards are the same for household, commercial and industrial, agricultural, structural and food handling establishment treatments.

(1) **Non-residual aerosols and space sprays**—(i) **Flying insects.** The product should demonstrate efficacy equal to, greater than, or within 5 percentage points of the OTPS when tested according to the CSMA Aerosol and Pressurized Spray Insecticide Test Method for flying insects or the ANSI-ASTM E653–78 Standard Method for Testing Effectiveness of Aerosol and Pressurized Space Spray Insecticides Against Flying Insects.

(ii) **Crawling insects**—(A) **Contact spray.** The product should be tested against the proposed target pest and demonstrate performance equal to, greater than, or within 10 percentage points of the OTPS when tested according to the CSMA Cockroach Aerosol Method or the ANSI-ASTM E654–78 Standard Method for Testing the Effectiveness of Aerosol and Pressurized Spray Insecticides Against Cockroaches.

(B) **Space spray.** There are no official test methods for space sprays. However, the following general considerations apply to pesticides applied as space sprays for crawling insects, as most of these insects are not exposed at the time of application.

(*1*) The room size and dosage must be consistent with label claims and directions.

(*2*) Replication is necessary to provide reliability.

(*3*) Controls should be utilized for comparison.

(*4*) As some products may knockdown but not kill a high percentage of insects, mortality must be recorded at 1 and 24 hrs. post-treatment.

(*5*) Usually German cockroaches are used in testing. When dosage rates are very small, a larger species, such as American or Oriental cockroaches, may also be necessary. Resistant strains should be utilized if the pesticide has a history of resistance problems. Last instar nymphs and adults are recommended for all species.

(*6*) A product registered for the use pattern should be used as a positive control.

(*7*) The containers or enclosures for holding the roaches should be representative of those areas which commonly shelter roaches (underneath refrigerators, stoves, sinks, cabinets and in certain wall voids).

(*8*) The number of specimens should be sufficient to provide accurate statistical evaluation of the results. Perhaps the greatest problems have arisen with respect to paragraph (e)(1)(ii)(B)(7) of this guideline. Note that open containers or those with unobstructed holes in the top area are not representative of covered or enclosed situations.

(2) **Residual sprays**—(i) **General.** Efficacy data for residual sprays should indicate the appropriate dosage and the utility of the formulation when used as directed. Usually, laboratory testing is performed to establish the effective dosage range, determine if the formulation is repellent to the point of adversely affecting performance of the product, and to evaluate the effects of the various substrates upon which deposition is to occur. Field studies are then necessary to confirm the performance of the compound under actual use conditions.

(ii) **Sprays**—(A) **Crawling insects**—(*1*) **Laboratory testing.** Laboratory testing should evaluate the proper dosage range utilizing treated panels representative of field substrates. Usually these include such items as painted and unpainted wood, glass, formica, chipboard or particle board, stainless steel, concrete, and vinyl tile. Such treated panels should be aged under conditions similar to field situations and challenged with the target insect at regular intervals to determine the duration of efficacy. Additionally, choice box testing or some other method of evaluation must be performed to determine if a high degree of repellence is likely to affect field performance. All laboratory testing should utilize both untreated and positive controls to determine the relative vigor of the laboratory populations.

(*2*) **Field testing.** Field testing for crawling insects involves utilizing sites and methods of application essentially the same as those to appear on the proposed label. Evaluation is based upon pre- and post-application counts of living insects. For example, cockroaches are normally counted

by flashlight, trapping, or flushing agents. Untreated areas or sites should be used as controls if possible, and a positive control should also be used in the testing.

(B) **Flying insects**—(*1*) **Lab tests.** Laboratory tests for residual applications to control flying insects are usually done in screen cages with one side replaced by the treated panel. Such testing should evaluate the appropriate dosage range (usually mg active ingredient per square foot), and the degree of repellency exhibited by the formulation.

(*2*) **Field testing.** Field tests should utilize the proposed sites of application. Counts may be made by visual observation, fly speck cards, black light traps, or other suitable methods.

(3) **Baits**—(i) **General.** The important factors relating to testing bait products are to:

(A) Establish the proper dosage and intrinsic attractancy of the formulation in ''free-choice'' laboratory tests.

(B) Evaluate the utility of the product under actual-use conditions.

(ii) **Laboratory testing.** The most important factor involved in lab testing is to provide a free-choice alternative food source to the test insects. This may be laboratory dog chow for insects like cockroaches, or sugar based material for houseflies. The formulation should demonstrate acceptable toxicity in competition with the alternative food source.

(A) **Cockroach bait test-method**—(*1*) **Introduction.** This is a suggested test procedure for cockroach baits to be used to control cockroaches in homes, warehouses, food establishments, etc. The following outline is a suggested series of laboratory and field tests. The important factors are to establish the proper dosage and intrinsic attractancy of the formulation in ''free-choice'' laboratory tests and to evaluate the utility of the product under actual-use conditions.

(*2*) **Test protocol**—(*i*) **Choice box laboratory test**—(*a*) **Enclosures (4) constructed out of plywood.** Dimensions approximately 2' x 4' x 4''. Tops are either made of plexiglass or the sides are greased or teflon coated to prevent escape. Each enclosure is divided into two halves by a line drawn or painted down the center giving two 2' x 2' areas. In each side are placed a cardboard hide (12'' x l2'' x l2'' ht. is suggested) and water. In three of the enclosures, one side is treated with the proposed dosage of bait (gm. per unit area) and on the other side an equal amount of Purina Dog Chow (R) is placed. Some of the bait and dog chow may be placed in the hides. In the remaining box only Purina Dog Chow is used as a control. Each box receives 50 last instar nymph or adult German cockroaches, *Blatella germanica,* placed either along the center line or 25 in each side. Boxes are kept in areas providing a normal day/night

photoperiod or a minimum of 8 hours darkness each day. Roaches are counted at 1, 3, 5, 7, 10, 14 and 21 days and the percent mortality can be derived from Abbott's formula. A table of results and the counts for the individual boxes should be submitted. Consumption may indicate that additional bait is necessary to give acceptable mortality. If all the bait is consumed, then additional bait or dog chow may be added as necessary. Such additions must be recorded and reported. Testing may need to be repeated in situations where definitive results are not obtained.

(*b*) Ovicidal and chemosterilant action-trials may be designed to indicate either a chemosterilant effect or toxicity to the eggs carried by the female. For chemosterilants, the laboratory choice box test should be continued for as many days as necessary to collect significant numbers of oothecae. Upon deposition, these should be collected from the boxes, and kept in separate containers. Percent eclosion should be recorded for treated boxes and compared to the controls. To enhance deposition, a high number of non-gravid adult females should be used at the beginning of the test. No gravid females should be used at the initiation of a test for chemosterilant effects. For oothecal toxicity, only oothecae-bearing females should be used. The oothecae are again collected and percent eclosion compared to the control group.

(*ii*) **Field trials—An experimental use permit may be required.** Once the appropriate dosage has been discovered in the laboratory testing, the product must be field tested to be registered. Field testing usually involves apartment houses, but food establishments or other areas with heavy infestations may also be used. The most popular methods of infestation assessment are via flashlight inspection or trapping. After the pretreatment counts are made, and application has been completed, additional comments are usually initiated on a weekly basis. Along with cockroach numbers, the degree of sanitation and any other pertinent details should be reported. Comparison treatments (i.e., a registered standard bait material) should be used as a point of reference.

(*3*) **Modifications.** Most testing laboratories make modifications in protocol specifications as facilities dictate. For this reason we suggest that protocols be prepared and submitted for EPA review prior to the initiation of testing. Such protocols should be submitted to the product manager for the proposed product.

(iii) **Field testing.** Testing under actual use conditions should demonstrate utility of the product when used in situations where a continuous source of pest insects is available. The product should demonstrate both mortality and a reduction in the overall population over time. Measurement techniques are essentially the same as for residual sprays.