

STANDARD NORWAY RAT/ROOF RAT ANTICOAGULANT TECHNICAL ANDCONCENTRATED DRY BAIT LABORATORY TEST METHOD

OPP Designation: 1.221 (5-6-76)

1. Scope

1.1 This method is designed to determine effectiveness of dry bait anticoagulant technical and concentrated rodenticide products used for control of Norway rats and/or roof rats. It is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. The conduct of, reporting of, and recordkeeping for studies conducted according to this method must conform with the U.S. Environmental Protection Agency's "Good Laboratory Practice Standards" (40 CFR, Part 160).

2. Test Animals

2.1 All rats used in this test shall be Norway rats (Rattus norvegicus), wild-type (wild-caught or from a wild-type Norway rat colony) or albinos (Wistar strain preferred), or wild-type roof rats (R. rattus). Subjects shall be healthy, active, and sexually mature, and shall fall within the following weight classes (in grams) within seven days prior to start of test:

	<u>Minimum</u>	<u>Maximum</u>	<u>Maximum acceptable differences in average weights between sexes</u>
Laboratory rats	150	300	50
Wild-type Norway rats	150	400	65
Roof rats	100	225	40

Animals shall be weighed no more than three days before the start of the bait-exposure phase of the study. Animals that survive the study shall be weighed again at the end of the post-exposure follow-up period. Animals dying during the study shall be weighed when they are found dead.

2.2 Ectoparasite control with registered insecticide (or acaricide) products labeled for use on laboratory rats is permissible if applied externally to both test and control animals not less than seven days prior to start of test, if applied at rates not exceeding those permitted by the registered label, and if the pesticide is not known or believed to potentiate the effects of anticoagulant rodenticides.

3. Apparatus

3.1 Rats should be placed individually in screen-bottom, all-metal cages designed to hold laboratory rats and having bottom surface areas of 500 to 2000 cm² (0.538 to 2.15 ft²).

3.2 Metal or ceramic feeders, designed so that test rats may not nestle or wallow in diet, should be used.

4. Pretest Holding Conditions

4.1 All rats used in this test method must be held, sexes separate, for observation in the laboratory for a period of at least one and not more than four weeks prior to testing. During the last seven days of this period, animals must be held under laboratory conditions (i.e., temperature, humidity, lighting, etc.) comparable to those of the animal testing room if not actually in the testing room. The test animals must not be fasted prior to testing. Water and a commercial rat diet must be available to them at all times. Do not use the standard OPP rat and mouse challenge diet for pretest feeding.

5. Holding and Test Conditions

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| 5.1 Temperature | 20 to 25° C. Strong air currents from heaters or air conditioners shall not blow directly onto test animals. |
| Relative humidity | 50 to 55%. |
| Light | 12 h artificial light per day, not to exceed 2153 lx (200 ft candles) at cage location. Total reversing of the natural photoperiods of the test animals by timed lighting is not recommended. |

5.2 The standard OPP rat and mouse challenge diet shall be composed of:

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| Cornmeal (whole yellow ground corn) | 65% by weight |
| Rolled oat groats (ground) | 25% by weight |
| Sugar (10X powdered or confectioners, 95% + purity) | 5% by weight |
| Corn oil (95% + purity) | 5% by weight |

Combine dry ingredients together, add oil, and thoroughly mix. Be certain that the mixing utensils are clean of contamination before preparing diet.

5.2.1 The whole (not degerminated) yellow ground corn shall be from the most recently available crop and shall be reasonably freshly ground. Seventy-five percent (+ 5%) of the ground corn shall pass through a No. 10 screen (10 meshes to the inch) and 50% (+ 10%) shall be retained by a No. 20 screen (20 meshes to the inch). The remainder may be either larger or smaller than the screens mentioned.

5.2.2 The oats shall be steam rolled oat groats (oat seed with the hulls removed) coarsely ground after the rolling process. Seventy-five percent (+ 5%) of the ground oats shall pass through a No. 5 screen (5 meshes to the inch) and 50% (+ 10%) shall be retained by a No. 20 screen (20 meshes to the inch). The remainder may be either larger or smaller than the screens mentioned.

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5.2.3 The corn oil shall be of the type available as cooking oil, undiluted with other oils, and shall not be rancid.

5.2.4 The standard OPP rat and mouse challenge diet may be stored under refrigeration if it is to be used within three days of preparation. If it is to be held for longer periods, the diet shall be packaged in plastic containers [2.2 to 4.5 kg (5 to 10 lb) per container], tightly closed or sealed, and maintained at -18 C or below until it is to be used. Challenge diet shall be at room temperature when offered to test or control animals. Batches of challenge diet shall not be prepared and stored for longer than six months.

5.3 Test baits made from technical or concentrated products should be formulated by adding the product to a mixture of ingredients suitable for comprising the "non-toxic" portion of baits used to control Norway rats or roof rats. Baits meeting criteria in tests run according to this method should be prescribed on end-use product labels which bear bait mixing and application directions. The bait recipes provided in 5.3.1., 5.3.2., 5.3.3., and 5.3.4. have been found to be appropriate for preparing baits from concentrate products that are to be mixed with "non-toxic" materials at a ratio of 1 part concentrate to 19 parts other bait materials. Concentrations of active ingredients in test baits should conform to levels previously accepted for dry rat baits made from the same active ingredient.

5.3.1

Rolled oat groats (ground)	65% by weight
Cornmeal (whole yellow ground corn)	20% by weight
Anticoagulant concentrate	5% by weight
Sugar (10X powdered or confectioners, 95% + purity)	5% by weight
Corn oil	5% by weight

5.3.2

Rolled oat groats (ground)	45% by weight
Gram cracker meal	25% by weight
Anticoagulant concentrate	5% by weight
Sugar (10X powdered or confectioners, 95% + purity)	10% by weight
Corn meal (whole yellow ground corn)	10% by weight
Corn oil	5% by weight

5.3.3

White millet	30% by weight
Wheat flour	25% by weight
Lecithin-mineral oil (50:50 mixture)	5% by weight
Anticoagulant concentrate	5% by weight
Rolled oat groats	25% by weight
Sugar (10X powdered or confectioners, 95% + purity)	10% by weight

5.3.4

White millet	35% by weight
Corn oil	5% by weight
Corn meal (whole yellow ground corn)	44% by weight
Anticoagulant concentrate	5% by weight
Brewers yeast flakes (human food quality)	1% by weight
Sugar (10X powdered or confectioners)	7.5% by weight
Powdered milk (human food quality)	2.5% by weight

5.3.5 When technical anticoagulants are being tested with baits made according to the recipes prescribed above, dilute and mix toxicant with corn-starch (baits 5.3.1, 5.3.2., and 5.3.3.) or dried whey (bait 5.3.4.) to prepare an intermediate concentrate of the appropriate active ingredient strength for a 1:19 dilution with the remaining bait materials.

5.3.6 Combine dry ingredients together, add oil and thoroughly mix. Be certain the mixing utensils are clean of contamination before preparing diet. The corn, oats and corn oil shall comply to the specifications given in sub-sections 5.2.1, 5.2.2, and 5.2.3 for the OPP rat and mouse challenge diet. The white millet and gram cracker meal shall pass the same size specifications as for oats in 5.2.2 above.

5.3.7 When chlorophacinone or any other anticoagulant normally used at 0.005% is available in a mineral oil solution at a concentration of 0.28%, mix 20 cc of concentrated oil per kilogram of bait. Delete the oils and increase the meal by 8%.

5.3.8 Technical grade toxicant normally used at 0.005% concentration should be premixed at the rate of 0.1 g of technical to 99.9 g of cornstarch (baits 5.3.1., 5.3.2., and 5.3.3.) or other diluent (dried whey for bait 5.3.4.) using the dry dilution method. Technical grade material normally used at 0.025% can be mixed at the rate of 0.5 g of technical to 99.5 g of cornstarch or other diluent also using the dry dilution method. These newly formed concentrates can then be further mixed by combining them with one of the OPP baits described in section 5.3, or with any other appropriate bait, at the rate recommended on the label (usually 1:19).

6. Procedure

6.1 A test group consists of a minimum of 20 rats (10 males, 10 females), individually caged. Include one untreated control group of 20 rats (10 males, 10 females), individually caged, in each test. If a series of tests is being conducted at the same time on the same species, only one untreated control test group need be included. Acclimate all animals to test conditions for three days prior to exposure to toxicant, immediately following pretest holding period (4.1).

6.2 Water must be available to each animal at all times. Glass water bottles equipped with ball-type watering tubes are recommended. Gravity fed automatic or open-cup type waterers are not recommended.

6.3 The rodenticide-treated food and the standard OPP rat and mouse challenge diet are each offered to test rats in separate containers (3.2) on opposite sides of the front of the cage. At least 40 grams of rodenticide-treated food and 40 grams of challenge diet must be available, in separate containers, to each test group animal per day. The control group must be offered only the OPP rat and mouse challenge diet. At least 40 grams of challenge diet should be available in each food container per day for control group subjects. The two containers must be identical in type and size. The food offered in each container should be equal and consistent throughout the test. The gross weight of each container and its contained food must be determined daily and returned to the starting weight by addition of the given food. If food becomes fouled by urine or feces, replace food in each container. Record each day the quantity of each food consumed by each rat during the preceding 24 h. Weighing accuracy must be at least to the nearest 0.5 gram. Spilled food shall be recovered and weighed to establish exact food consumption data. Where food spillage is damp it shall be dried to approximately its original moisture content before weighing.

6.4 Reverse the position of the bait and standard OPP rat and mouse challenge diet containers in the cage every 24 h to offset possible feeding position preference of the rats. The test rats must have a free choice between treated and untreated food.

6.5 Animals on test should not be subjected to undue or unnecessary stress from noise or human activities (i.e., movement). Human activity within the animal test room shall be minimal.

7. Test Period

7.1 Maintain test period for 15 days, even if all animals in test group(s) die within less than 15 days.

7.2 Remove dead rats daily, or more frequently as observed.

7.3 Remove toxicant-treated food at the end of the 15-day bait-exposure period, leaving and maintaining the untreated food.

7.4 More than a 10% mortality in the control group negates the test, even if a 100% mortality had been achieved in the test group.

7.5 This laboratory efficacy test should be replicated at least once.

8. Test Period Follow-Up

8.1 Maintain observation of surviving test group and control group rats for a minimum of five days following the bait-exposure period.

8.2 Continue feeding OPP rat and mouse challenge diet and recording amounts consumed daily.

8.3 Describe unusual activities of test and control rats in report of test and posttest periods.

9. Calculation and Evaluation of Results

9.1 Record date, weight, and sex of each rat dying during the test and of survivors in both the test and control groups, and amount of treated and untreated food consumed during the test and posttest periods. Report all data collected, including initial and final weights of test and control group subjects. Include copies of all "raw" data sheets as well as typed numerical summaries of test results. Indicate the composition of the bait prepared for the test, including the amount of each ingredient that was used and the percent of the bait comprised by each ingredient.

9.2 The product is considered to have performed satisfactorily if a minimum of 33% of the food consumed by the test animals was the bait treated with the toxicant, if at least 90% of the test group animals die during the 20-day test, and if no more than 10% of the control group subjects die during the 20-day test.

9.3 The test report must include reports of chemical analyses of the technical or concentrate product used, the test bait made from the technical or concentrate product used, and the challenge diet for the active ingredient claimed to be in the technical or concentrate product. These tests must be conducted according to methods acceptable to the U.S. Environmental Protection Agency.