Bio/dynamics Inc.

Division of Biology and Safety Evaluation

PROJECT NO. 78-7184

AN ACUTE INHALATION TOXICITY STUDY OF T-2305 CoC IN THE RAT

Submitted to: 3M Company
St. Paul, Minnesota 55101

Attention: Frank Griffith, Ph.D.

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I. GENERAL

An experiment was performed to investigate the acute inhalation toxicity of a dust of T-2305CoC in rats. The test material, received from 3M Company, was labeled "3M Company; T-2305CoC" and was in the form of a fine white powder.

II. EXPERIMENTAL

The test material was sieved through a 60-mesh sieve and hand packed into the large diameter cylinder of a Wright dust-feed mechanism (gear ratio 1:6). Dry air, at a flow rate of 16.0 liters per minute, was passed through the dust-feed mechanism to generate the desired concentration. The resultant dust-laden air was passed, undiluted, into the 32.2-liter glass exposure chamber housing the test animals. The exposure lasted for 1.0 hour.

The packed cylinder, cutting blade, and nozzle were weighed before and after the exposure. The weight loss was equal to the amount of material consumed during the exposure. The nominal concentration was determined by dividing this weight loss by the total air flow through the chamber during the exposure.

The test animals consisted of five male and five female Sprague-Dawley rats obtained from Charles River Breeding Laboratories, Wilmington, Massachusetts. On the day of exposure (Day 0-January 23, 1979) the pre-exposure weights ranged from 211 to 264 grams. The animals were observed prior to exposure to insure that they were free from abnormalities. Observations for abnormal signs were made at 15-minute intervals during the exposure, upon removal from the chamber, hourly for four hours post-exposure, and daily thereafter for 14 days.

II. EXPERIMENTAL (cont.)

Individual body weights were recorded on Day 0 (prior to exposure), Day 1, Day 2, Day 4, Day 7, and Day 14 (terminus). On Day 14, all animals were sacrificed (ethly ether) and blood samples were drawn from the dorsal aorta of all animals. These samples were spun for serum, pooled according to sex, and sent to the sponsor packed in dry ice for analysis. Gross necropsy examinations were also performed at this time.

III. RESULTS AND DISCUSSION

During the exposure, a total of 17.90 grams of test material was delivered in a total volume of 960 liters of dry air, yielding a nominal exposure concentration of 18.6 milligrams per liter. The chamber atmosphere appeared cloudy for the duration of the exposure and the chamber walls became coated with the test material. A second exit tube was added to the exposure chamber after the first half-hour of the exposure, when the first tube became obstructed with the test material.

Five minutes after the exposure was initiated, all the rats that could be observed through the dust cloud exhibited excessive lacrimation and salivation, decreased activity, labored breathing, and gasping. At ten minutes into the exposure, most of the rats also had their eyes closed. At 20 minutes, some rats exhibited mucoid nasal discharge and at 30 minutes, some rats exhibited irregular breathing in addition to all the abnormalities previously mentioned. Upon removal from the chamber, red nasal discharge (ten of ten), yellow staining of the ano-genital fur (nine of ten), dry rales (six of ten), red material around the eyes (five of ten), excessive salivation (four of ten), excessive lacrimation (one of ten), and body tremors (one of ten) were observed in the rats. Excessive salivation and lacrimation and body tremors had abated by the

III. RESULTS AND DISCUSSION (cont.)

one hour post-exposure observation and the rats did not exhibit red material around the eyes after the two hour post-exposure observation. Red nasal discharge (ten of ten), yellow staining of the ano-genital fur (six of ten), and dry rales (five of ten) were still seen at the four hour post-exposure observation.

During the 14-day observation period, excessive lacrimation (six of ten, one observation each), excessive salivation (three of ten), mucoid nasal discharge (ten of ten), yellow staining of the ano-genital fur (four of ten), dry rales (eight of ten), dry red material around the nose (two of ten), and moist rales (one of ten) were observed in the rats. These observations were generally scattered in appearance.

Individual body weights and necropsy observations are presented in Table 1. Weight gains appeared normal. Necropsy examinations revealed lung discoloration in eight of ten rats, which is a higher than normal incidence than that which is normally observed in Sprague-Dawley rats in this type of exposure.

IV. CONCLUSION

A one-hour inhalation exposure to a dust of T-2305CoC, at a nominal exposure concentration of 18.6 milligrams per liter, did not produce mortality in Sprague-Dawley rats. Immediate effects of the test material were excessive lacrimation and salivation, decreased activity, labored breathing, gasping, closing of the eyes, mucoid nasal discharge, irregular breathing, yellow staining of the ano-genital fur, and dry rales. The incidence of the lung discoloration at necropsy indicated a possible residual effect of the material at 14 days post-exposure.

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Table 1
An Acute Inhalation Toxicity Study
of T-2305 CoC in the Rat

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Individual Body Weights and Necropsy Observations

Animal Number	Sex	Body Weights (g) Day 0	Day 1	Day 2	Day 4	Day 7	Day 14	Necropsy Observations*
10	M	234	210	201	208	222	264	B. lungs mottled red and pink with red and white foci on all lobes.
11	M	246	215	205	229	254	303	B. lungs mottled pink and tan with dark red foci on all lobes.
12	M	248	224	212	233	253	306	B. lungs mottled orange and white.
13	M	241	205	196	207	236	315	B. lungs mottled orange and tan.
14	M	264	242	234	244	281	328	B. lungs mottled tan and dark pink with light tan and brown foci on all lobes.
20	F	232	201	199	233	242	257	B. lungs mottled pink and tan.
21	F	216	204	208	217	229	255	N.O.A.
22	F	234	205	199	223	240	240	B. lungs mottled orange and tan.
23	F	216	201	206	210	223	234	B. lungs mottled brown, dark pink, and tan.
24	F	211	192	196	212	226	237	N.O.A.

* N.O.A. - no observed abnormalities

Key: R = right; L = left; B = bilateral.