

7h

PIGMENT COATED MICA FLAKES

The Pathogenic Action Resulting From Inhalation Exposure

Male CRCD Rats

MR-582, H-2979, P-121

The proposed use for coated mica flakes is as a pigment in paints, inks, and plastics. The flakes are in the form of a golden-colored powder with the following composition: muscovite mica 67.2 per cent, TiO_2 31.5 per cent, and Cr_2O_3 , 1.3 per cent. Traces of impurities arise from TiO_2 and include alumina, iron oxide, sulfates, and various inorganic compounds. The powder melts at $1000^\circ C$. It is acid in reaction and possesses a specific gravity of approximately 3.00. It is insoluble in water, acetone, ethanol, and vegetable oil. Exposure of employees and consumers may occur by ingestion, inhalation, or skin contact.

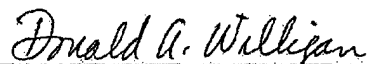
Four rats were caused to inhale the coated mica flakes suspended in dry air at a concentration of 20.1 milligrams per liter. All rats survived the four-hour exposure period without symptoms. They were killed for study fourteen days later. The prevalence and severity of changes observed at necropsy are recorded in Table 1. Organ weights, and organ-body weight ratios are presented in Tables 2 and 3, respectively.

Comment

The slight to moderate irregular congestion which was observed in the lungs of all animals, and the focal atelectasis and sub-pleural plaques occurring separately in two, may either represent effects of irritation from the

inhaled flakes or reflect the presence of enzootic murine pneumonitis. No significant difference in weight of the lungs was noted when compared with control animals.

Further indications that an ingredient of the mica flakes pigment may be biologically active are inferable from the deviations in the weights of the pancreas, adrenals, and thymus. Weight of the pancreas was moderately decreased in two rats and that of the thymus was moderately decreased in all four instances, while the adrenals showed a slight increase in weight in two instances. Since it seems unlikely that the mica particles could have travelled to these organs and because titanium dioxide is biologically inert, it is suspected that the chromic sesquioxide may be responsible for these changes. This problem may be resolved by histologic study.


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DAW:ljm
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TABLE 1

P. I. J. W. **Prosecutors:** A. E. S.

* Muscovite mica	67.2%
TiO ₂	31.5%
Cr ₂ O ₃	1.3%

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TABLE 2

ORGAN WEIGHTS

Haskell No: 2979 Material: Coated Mica Flake Pigments Excipient: _____
 MR No: 582 Species: Male CRCD Rats Test: ALC/Dust Procedure: Inhalation/
 Ref. No: 121 Experiment Period: 8/16/61 - 8/30/61 T.I. J. W. Pros _____

Dose Mg/L	Animal No.	Sur- vival Days	Body Weight		Brain	Heart	Lungs	Liver	Pancreas	Stomach	Spleen	Kidneys	Testes	
			Init.	Final										
20.1	48020	14	315	370	2.03	1.19	1.90	16.31	0.55	1.54	0.63	3.34	3.28	0.
	48021	14	270	340	1.99	1.19	1.75	12.71	0.86	1.55	-	3.02	3.00	0.
	48022	14	310	369	1.92	1.29	1.76	17.16	1.05	1.73	0.95	3.27	3.49	-
	48024	14	310	416	2.00	1.22	1.86	14.34	1.05	1.65	0.63	2.90	3.15	0.
Averages				374	1.96	1.22	1.82	15.13	0.88	1.62	0.74	3.14	3.23	0.
Control														
No Exposure				376	1.99	1.15	1.94	16.60	1.08	1.76	0.80	2.95	3.14	0.

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COATED MICA FLAKE PIGMENTS

Haskell No. 27³⁷~~97~~ MR-582

TABLE 3

Differences in Per Cent Between Organ-Body Weight Ratios
Exposed Versus Control Groups

Organ	ORGAN-BODY WEIGHT RATIOS		
	GROUP		Per Cent Difference
	Exposed*	Control*	
Brain	52	53	-1.8
Heart	33	31	+6.4
Lungs	49	52	-5.7
Liver	405	441	-8.1
Pancreas	24	29	-17.2
Stomach	43	47	-8.5
Spleen	20	21	-4.7
Kidneys	84	78	+7.6
Testes	86	84	+2.3
Adrenals	1.4	1.2	+16.6
Thymus	17	24	-29.1

* Value 10^{-4}

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