ARCCLOR - Younger [illegible]

YOUNGER LABORATORIES

Biochemists . . . Pharmacologists . . . Analysts

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SAINT LOUIS, MO., 63129

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Certificate of Analysis

June 30th, 1969

SUBJECT -

Toxicological Investigation Of: Brominated Aroclor 1221 (OR 16832)

Monsanto Sample Number 64

Monsanto Project Number Y-69-54

STUDY CONDUCTED FOR -

Monsanto Company, St. Louis, Missouri

COPY

EXPERIMENTAL PROCEDURE -

A) Oral LD_{50} (Rats, Mixed Sex)

The undiluted compound was fed by stomach tube to Sprague-Dawley strain albino male and female rats.

After the approximate Minimum Lethal Dose was determined, groups of male and female rats were fed in increasing doses at increments of 0.1 fractional log intervals at four levels designed to blanket the toxicity range thereby supplying data for calculation of the LD_{50} which was done according to a modification of the method of E. J. de Beer.

Observations were made for toxic symptoms and the viscera of the test animals were examined macroscopically.

The data are shown in Table I.

B) Skin Absorption MLD (Rabbits, Mixed Sex)

The undiluted compound was applied in increasing doses at increments of 0.2 fractional log intervals to the closely clipped, intact skin of New Zealand white male and female rabbits.

The treated areas were covered with plastic strips and the animals held in wooden stocks for periods up to twenty-four hours, after which time they were assigned to individual cages.

Observations were made for toxic symptoms and the viscera of the test animals were examined macroscopically.

The data are shown in Table II.

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EXPERIMENTAL PROCEDURE - (Continued)

C) Skin Irritation (Rabbits, Mixed Sex)

The undiluted compound was applied to the clipped, intact skin of albino male and female rabbits and removed after twenty-four hours. The application was covered with plastic strips to retard evaporation and avoid contamination.

Observations were made over a period of several days for irritation.

The data, scored according to the method of Draize, Woodard and Calvery (Journal of Pharm. and Exp. Therapeutics, Volume 82, December, 1944) are shown in Table III.

D) Eye Irritation (Rabbits, Mixed Sex)

0.1 Milliliter of undiluted sample was placed in the conjunctival sac of the right eye of each of three albino male and female rabbits and observations made over a period of several days for inflammation.

The eyes were rinsed with warm isotonic saline solution after twenty-four hours.

The data, scored according to the method of Draize, Woodard and Calvery (Journal of Pharm. and Exp. Therapeutics, Volume 82, December, 1944) are shown in Table IV.

SUMMARY -

Brominated Aroclor 1221 (OR 16832)

A) Oral LD_{50} (Rats, Mixed Sex)

The Oral LD_{50} for male and female rats was placed at 6250 milligrams per kilogram with lower and upper limits of 5625 milligrams to 6940 milligrams per kilogram.

The compound was classed as practically non-toxic by oral ingestion in male and female rats.

B) Skin Absorption MLD (Rabbits, Mixed Sex)

The Minimum Lethal Dose by Skin Absorption in male and female rabbits was found to be greater than 794 milligrams per kilogram and less than 1260 milligrams per kilogram.

The compound was classed as moderately toxic by skin absorption in male and female rabbits.

C) Skin Irritation (Rabbits, Mixed Sex)

The compound was classed as a moderate irritant when applied undiluted to intact skin of male and female rabbits.

The average maximum score was 3.6 out of a possible 8 in twenty-four hours.

D) Eye Irritation (Rabbits, Mixed Sex)

The compound was classed as a slight eye irritant in male and female rabbits. The average maximum score was 8.0 out of a possible 110 in one hour.

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BY: MELVIN D. BIRCH

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TABLE I

THE ORAL LD_{50} OF 'Brominated Aroclor 1221 (OR 16832)' FOR RATS

Sample Fed Undiluted

Animal No. - Sex	Weight Gm.	Dose Mg./Kg.	Fate
1- Female	230	5,010	Survived
2- Male	245	5,010	Survived
3- Female	245	5,010	Died
4- Male	230	5,010	Survived
5- Female	250	5,010	Survived
6- Male	240	6,310	Survived
7- Female	230	6,310	Died
8- Male	255	6,310	Died
9- Female	240	6,310	Survived
10- Male	250	6,310	Survived
11- Female	220	7,940	Survived
12- Male	240	7,940	Died
13- Female	235	7,940	Died
14- Male	230	7,940	Died
15- Female	225	7,940	Died
16- Male	225	10,000	Died
17- Female	230	10,000	Died
18- Male	250	10,000	Died
19- Female	230	10,000	Died
20- Male	255	10,000	Died

DISCUSSION -

The Oral LD_{50} for male and female rats was placed at 6,250 milligrams per kilogram with lower and upper limits of 5,625 to 6,940 milligrams per kilogram.

The compound was classed as practically non-toxic by oral ingestion in male and female rats.

Survival time was one day to ten days with most deaths occurring within three days.

Toxic symptoms included greatly reduced appetite and activity, diarrhea, increasing weakness, and collapse.

At autopsy there was liver hyperemia and acute gastrointestinal inflammation with distended vessels.

Surviving animals were sacrificed ten days after dosing. Slight areas of lung congestion were noted on the upper dosage levels; on the lower dosage levels the viscera appeared normal by macroscopic examination.

T A B L E II

THE MINIMUM LETHAL DOSE OF 'Brominated Aroclor 1221 (OR 16832)' BY SKIN ABSORPTION IN RABBITS

Sample Applied Undiluted

Animal No. - Sex	Weight Kg.	Dose Mg./Kg.	Weight Change 5 Days Later Kg.	Fate
1 - Male	2.2	501	- 0.1	Survived
2 - Female	2.0	794	- 0.2	Survived
3 - Male	2.4	1260	- 0.4	Died - 11 Days
4 - Female	2.6	2000	- 0.5	Died - 7 Days
5 - Male	2.3	3160	-----	Died - 4 Days
6 - Female	2.2	5010	-----	Died - 3 Days
7 - Male	2.4	7940	-----	Died - 3 Days

DISCUSSION -

The Minimum Lethal Dose by Skin Absorption in male and female rabbits was found to be greater than 794 milligrams per kilogram and less than 1260 milligrams per kilogram.

The compound was classed as moderately toxic by skin absorption in male and female rabbits.

Survival time was three to eleven days.

Toxic symptoms included greatly reduced appetite, slight diarrhea during second and third day, increasing weakness, and collapse.

At autopsy there was enlarged gall bladder, distended coronaries, hemorrhagic lungs, mottled and jaundiced liver, discolored spleen and kidneys, acute gastrointestinal inflammation with distended vessels.

Surviving animals were sacrificed fourteen days after dosing. The viscera of animal #1 appeared normal by macroscopic examination; animal #2 showed areas of slight discoloration of the liver and slight gastrointestinal inflammation.

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T A B L E III

SKIN IRRITATION IN RABBITS AFTER APPLICATION OF 'Brominated Aroclor 1221 (OR 16832)'

Sample Applied Undiluted

Animal No. - Sex	Numerical Evaluation At The End Of					
	1 Hour	24 Hours	48 Hours	72 Hours	120 Hours	168 Hours
1 - Female	1	3	3	1	1	0
2 - Male	1	4	3	2	1	0
3 - Male	1	4	3	2	1	0
Average	3.0	3.6	3.0	1.6	1.0	0.0

DISCUSSION -

The compound was classed as a moderate irritant when applied to intact skin of male and female rabbits.

The average maximum score was 3.6 out of a possible 8 in twenty-four hours.

Observations following application:

Immediate:	Moderate discomfort
1-Hour:	Barely perceptible erythema, no edema
24-Hours:	Well defined erythema, slight edema
48-Hours:	Well defined erythema; very slight edema
72-Hours:	Slight to well-defined erythema, no edema
120-Hours:	Slight erythema, no edema
168-Hours:	Skin normal; zero reading

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T A B L E IV

EYE IRRITATION IN RABBITS AFTER APPLICATION OF 'Brominated Aroclor 1221 (OR 16832)'

Sample (0.1 Milliliter) Applied Undiluted

	Numerical Evaluation At The End Of					
Animal No. - Sex	1 Hour	24 Hours	48 Hours	72 Hours	120 Hours	168 Hours
1 - Female	8	2	0	0	0	0
2 - Male	8	2	0	0	0	0
3 - Female	8	2	0	0	0	0
Average	8.0	2.0	0.0	0.0	0.0	0.0

DISCUSSION -

The compound was classed as a slight eye irritant in male and female rabbits.

The average maximum score was 8.0 out of a possible 110 in one hour.

Observations Following Application:

Immediate:	Slight discomfort
10-Minutes:	Moderate erythema, slight edema and discharge, Slight dilatation of pupil
1-Hour:	Moderate erythema, slight edema and discharge; pupil normal
24-Hours:	Mild erythema; no edema or discharge
48-Hours:	Eye normal; zero reading
72- 168 Hours:	Eye normal; zero reading

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APPLICATION FOR TOXICITY STUDY

Name of Compound: BROMINATED AROCLOR 1221 Date: 5-27-69

Monsanto Name: OR 16832 Med. Dept. Project No:

Type of Compound (insecticide, plasticizer, etc.): INDUSTRIAL HYDRAULIC

PHYSICAL PROPERTIES

Form: LIQUID Melting Point: Vapor Pressure:

Dustiness: Boiling Point or Range: b 2 mm 140-180°

CHEMICAL PROPERTIES

Purity (expected impurities): MIXED CHLORO-BROMO BIPHENYL

Stability: HIGH pH: NEUTRAL

Solubilities:

Water: NO Alcohol: SLIGHT

Organic Solvents: YES

Vegetable Oils: MISSIBLE

Mineral Oils: MISSIBLE

PROSPECTIVE USE: (method of handling, concentration used, etc.)

AS IS, MIXED WITH MINERAL OIL OR PHOSPHATE ESTERS

METHOD AND HAZARDS OF MANUFACTURE:

EXPOSURE TO BROMINE VAPOR

EXPECTED EXPOSURE: SKIN, VAPOR

HISTORY OF EFFECTS NOTED IN LABORATORY OR PRODUCTION: —

LITERATURE REFERENCES: —

Urgency of Project:

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Remarks:

Signed R. W. Wulf T312

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