

→ D.W. R. Richard.

FEB 29 1968

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

Pesticides Regulation Division

101 South Laboratory Building, A.R.C.
Beltsville, Maryland 20705

TO DRE Kelly

February 21, 1968

Monsanto Chemical Company
Organics Division
800 N. Lindbergh Blvd.
St. Louis, Missouri 63141

Gentlemen:

We would appreciate receiving samples of your various Arochlors (chlorinated polyphenyls) to be used in our laboratory in the enforcement of the Federal Insecticide, Fungicide and Rodenticide Act (as amended). In addition we would also like to have any literature you may have concerning these materials as well as Analytical methods if they are available.

If there is a charge for any or all of these, please submit the bill with the material and we will initiate payment immediately on receipt of the shipment.

Thank you for your attention to this matter.

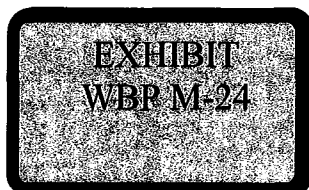
Sincerely yours,

W. N. Blickenstaff

W. N. Blickenstaff
Chemist in charge

I haven't done anything.
Lator.

MON-MT-008577



bcc: W. R. Richard - WRICH
C. Paton - CPATO

February 29, 1968

Mr. W. N. Blickenstaff
U. S. Dept. of Agriculture
Pesticides Regulation Division
101 South Laboratory Bldg, A.R.C.
Beltsville, Maryland 20705

Dear Mr. Blickenstaff:

I enclose our technical bulletin O/PL-306. This describes the physical and chemical characteristics of our 12 Aroclors. Do you want samples of all of them and what size sample are you desirous of obtaining? I presume what you want is the technical Aroclor material as sold.

Could you explain to me your interest in Aroclors. Especially in relationship to the enforcement of the Federal Insecticide, Fungicide and Rodenticide Act. Are Aroclors used in applications that come under this act?

Sincerely,

R. Emmet Kelly, M. D.
Medical Director

REK/ln
enc.

EXHIBIT
WBP M-24.1

MON-MT-008578

File	
Destroy	
CDB	
JTG	
WTH	✓
MNJ	✓
REK	✓
RAM	✓
EPW	✓

March 12, 1968

Mr. W. N. Blickenstaff
United States Dept. of Agriculture
Pesticides Regulation Division
101 South Laboratory Building, A.R.C.
Beltsville, Maryland 20705

Dear Mr. Blickenstaff:

I have forwarded your letter to Mr. Ken Wells, of our Organic Division, and I am sure you will be hearing from him shortly.

It is true that at quite some time in the past one of the Arochlors was used as a volatilization retarder for some insecticides. Lindane was the only one and I am really not sure how widespread this use was. For all I know, it may not be used anymore; although, certainly, it could be used without our knowledge. We do not, however, have any direct knowledge of its use.

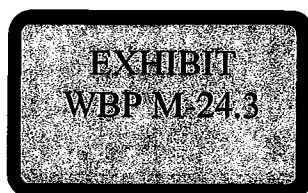
Sincerely,

R. Emmet Kelly, M. D.
Medical Director

REK/ln

bcc: Mr. K. A. Wells - Will you send samples of our Arochlors to Mr. Blickenstaff.

REK



MON-MT-008580

Monsanto

APR 29 1968

Cumming Paton - General Offices

DATE April 26, 1968

cc W. R. Richard

SUBJECT AROCLORS/
USDA INVESTIGATION

TO : Dr. R. Emmet Kelly
Medical

I refer to your letter of March 6 to Mr. Blickenstaff of USDA in Beltsville, Maryland. It is interesting to note that his interest in Aroclors stems on recommendations on page 36 of our technical bulletin O/PL-306. I am sure he is referring to our recommendations on vapor suppression. In fact, our recommendations are based on those of the USDA scientists at Beltsville, Md.

Our bulletin CS-6, issued in March, 1961, gives full details of the researches and recommendations given by the USDA workers which appeared to have been carried out for a period of years starting as early as 1954. I wonder if a new breed has arisen at Beltsville which is unfamiliar with the work of their predecessors. Do you think it would be worthwhile sending bulletin CS-6 to Mr. Blickenstaff.

Cumming Paton

dbw

EXHIBIT
WBP M-24.4

MON-MT-008581

St. Louis

April 29, 1968

Mr. W. R. Richard - WRICH

AROCLORS/USDA INVESTIGATION

Mr. Cumming Paton
CPATO

Thank you for your note of April 26 on subject matter. Will you send me Bulletin CS-6, as I think it would be worthwhile to send it along to Mr. Blickenstaff. If your files show the names of anyone at Beltsville with whom we have communicated, I would include that in my letter.

R. Emmet Kelly, M. D.

REK/ln

EXHIBIT
WBP M-24.5

MON-MT-008582

File		
Destroy		
CDB		
JTG		
WHH	✓	
MNJ	✓	✓
REK	✓	✓
RAM		
EPW	✓	✓

May 2, 1968

Mr. W. N. Blickenstaff
United States Dept. of Agriculture
Pesticides Regulation Division
101 South Laboratory Bldg., A.R.C.
Beltsville, Maryland 20705

Dear Mr. Blickenstaff:

It appears that the use of Monsanto Aroclor resin as an ingredient in insecticide formulations was based on U.S.D.A. work. I had not realized this when I wrote you earlier.

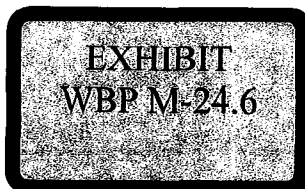
I am sending you a copy of our data sheet that refers more specifically to it.

I hope by now you have received the samples and if you have not, please let me know.

Sincerely,

R. Emmet Kelly, M. D.
Medical Director

REK/ln



MON-MT-008583

Monsanto Chemical Company • Organic Chemicals Division
800 North Lindbergh Blvd. • St. Louis 66, Missouri

CHEMICAL SPECIALTIES DATA REPORT

The information in this report was compiled to assist you in your evaluation and development of special uses for Monsanto products. Every effort has been made to include pertinent material bearing on the subject. This information is intended

to guide your development work, but Monsanto cannot take part in the specific formulation or evaluation of any finished product...since knowledge of such should be reserved to yourself and is often your most valuable trade secret.

No. CS-6
DATE March, 1961

MONSANTO AROCLOR* RESINS FOR INSECTICIDE FORMULATIONS

A Discovery

A simple method of increasing the service life of expensive lindane sprays was developed several years ago by U. S. Department of Agriculture scientists at their Beltsville, Maryland, testing station. The technique was to incorporate Monsanto's "Aroclor" 5460, a resinous chlorinated terphenyl in the lindane solution. This pale yellow solid reduces volatility of the lindane -- slows it down to an effective, but not wasteful, evaporation rate. The result is an insecticide deposit on treated surfaces that lasts up to ten times longer than that left by straight lindane solutions.

Normally, simple solutions of lindane leave a crystalline residue that dissipates within a few weeks. On hard surfaces such as glass, metal or painted areas, the residues last only about a week. Because lindane is a well established and effective pesticide, U.S.D.A. researchers sought a way to improve the lasting qualities of lindane residues. Of numerous compounds tested, "Aroclor" 5460 gave the best results at lowest cost.

Test Work

A major objective of these studies was to develop a suitable formulation for application to crops and other plants. Although results under carefully controlled conditions were quite promising, subsequent tests by other agricultural experimenters gave only moderate success. Consequently, interest has been slow to develop in agricultural circles. Apparently, the vagaries of sunlight, weather, and plant growth represent too many variables for effective study of the formulation residues by direct application to exposed plants.

* Aroclor: Reg. U. S. Pat. Off.

EXHIBIT
WBP M-24.7

MON-MT-008584

The information in this bulletin is, to our best knowledge, true and accurate, but all recommendations or suggestions are made without guarantee, since the conditions of use are beyond our control. The Monsanto Chemical Company disclaims any liability incurred in

connection with the use of these data or suggestions. Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use.

AD 76

A New Idea

But another possibility for putting the U.S.D.A. discovery to work has lain dormant until recently; this is the possibility of using to good advantage the ability of "Aroclor" resins to make the lindane adhere to smooth hard surfaces like metal, glass, painted areas, etc. This would consist of painting or spraying "Aroclor"/lindane formulations on such areas as the inside of garbage can lids, on window screens, doorsills, the painted walls of outbuildings, dairy plants, storage areas, etc., in order to obtain lasting control of flies, ants, roaches, silverfish and other troublesome pests. Suitable formulations can be readily packaged in shoe-polish type "dauber" bottles, aerosol spray cans, and bulk packages for mechanical spray application. Development of this idea is based on the following:

Advantages of Using "Aroclor" Resins in Insecticide Formulations

- * A suitable "Aroclor" (Monsanto makes seven) can remarkably extend the effective life of lindane and other chlorinated insecticides as much as ten times (up to 2 and 3 months).
- * "Aroclor" resins are very low in cost (around 20¢/lb.).
- * Small quantities are sufficient (5 to 25 parts per hundred, by weight).
- * Formulation is extremely simple -- the resin is dissolved in a suitable solvent compatible with the insecticide.
- * Stable in inventory and in insecticide formulation. "Aroclor" resins are fire-resistant, non-oxidizable, non-corrosive, withstand weather extremely well.
- * Non-staining "Aroclor"/insecticide films formed when the solutions dry are practically invisible. "Aroclor" 5460 has a pale yellow color as supplied. Other suitable "Aroclor" products are nearly colorless.
- * "Aroclor" resins are odorless -- won't impart "chemical" odors.
- * "Aroclor" resins are safe to handle as long as they are not volatilized and inhaled. They are practically non-volatile at ordinary temperatures, do not irritate or sensitize normal skin.
- * The nature of the residue can be varied. Monsanto supplies a variety of "Aroclor" resins. These are chlorinated to various degrees and vary in physical properties as follows:

Chlorinated Terphenyls

Aroclor 5460 - Yellow, transparent, friable solid (dries hard)
Aroclor 5442 - Yellow, transparent, sticky semi-solid (dries tacky)
Aroclor 4465 - Yellow, transparent, brittle resin (dries sticky)

Chlorinated Biphenyls

Aroclor 1262 - Light yellow, sticky, viscous semi-solid (dries stick)
Aroclor 1260 - Pale yellow, soft, sticky semi-solid (dries sticky)
Aroclor 1254 - Pale yellow, viscous oil (dries "wet")

Experimental Work and Formulations

The following information was derived from preliminary reports on work done by U.S.D.A. research groups. These data are not to be construed as recommendations by either the U.S.D.A. or Monsanto, but rather are intended to serve as a guide or starting point for the development of private formulations.

Fifty to 200 milligrams of lindane per square foot of surface has given good insect control on nonporous surfaces. The ratio of lindane to "Aroclor" 5460 has been varied from 1:1 to 1:4. For most purposes a 1:1 or a 1:2 mixture is satisfactory.

Formulations as used in the U.S.D.A. experiments are:

1) For application as a solution.

Lindane	5 parts by weight
"Aroclor" 5460	5 parts by weight
Carbon Tetrachloride	750 parts by weight

(Carbon tetrachloride is toxic and should be handled with extreme caution. Less toxic solvents are easily obtained.)

2) For application as an emulsion.

Lindane	20 parts by weight
"Aroclor" 5460	20 parts by weight
Xylene	100 parts by weight
"Triton" X-100 (available from Rohm & Haas)	3 parts by weight

To obtain a stable 1% lindane emulsion, mix 1 part by weight of the above concentrate to 13 parts by weight of water.

3) For use as a pressurized (aerosol type) spray.

- | | | |
|----|-----------------------|--------------------|
| a) | Lindane | 5 parts by weight |
| | "Aroclor" 5460 | 5 parts by weight |
| | Methylene chloride | 40 parts by weight |
| | "Freon" 12 (DuPont) | 50 parts by weight |
| b) | Lindane | 5 parts by weight |
| | "Aroclor" 5460 | 5 parts by weight |
| | Cyclohexanone | 10 parts by weight |
| | Ortho-dichlorobenzene | 35 parts by weight |
| | "Freon" 12 (DuPont) | 45 parts by weight |

Experimental Results - American Roaches

Using Formula 3a or 3b, the toxicant was applied onto a painted wall, depositing about 200 mg./sq. ft. of lindane and a like amount of "Aroclor" 5460.

When the toxicant coat was one month old, it gave 90-100% kill of American roaches when the roaches contained in a petri dish were placed against the surface of the treated wall for two hours.

The U.S.D.A. research team found that the lindane-"Aroclor" 5460 mixture (used at the rate of 50 mg. of actual lindane per sq. ft.) would kill 80% of all cockroaches exposed for 2 hours to a 60-day-old treated surface. It remained lethal to 66% of the roaches after 90 days. Regular lindane sprays used at the same rate killed only 4% of the roaches after 60 days.

Results with Houseflies

Deposits of 25 mg. of lindane plus 25 mg. of "Aroclor" 5460 applied from carbon tetrachloride onto glass and aluminum (hard surfaces) gave 100% kill of normal houseflies exposed for 2 hours to these treated surfaces after they had aged 18 weeks, the duration of the test.

Without the "Aroclor" the hard surfaces treated with lindane alone were effective only about a week.

A lindane plus "Aroclor" mixture sprayed as an aerosol onto leaves of a willow tree continued to kill houseflies after 2 months of outdoor weathering. Careful inspection of the treated leaves showed that the toxicant was held firmly to the surface and notwithstanding rain and weather, the coating remained in good condition. Also, within limits of a preliminary inspection there seemed to be no injury to the willow leaves.

(Note: The primary purpose of this report is to provide information for the development of suitable insecticide formulations for application to "nonsensitive" surfaces such as metals, glass, paints, and other materials that will not be damaged by the application. Development of formulations for living plants requires sufficient test work to insure that the formulations will not be injurious to the plants or their products.)

Another Formulation Reported

A more recent development in these experiments is the following simple formulation:

"Aroclor" 5460	25%
Lindane	25%
Methylethyl Ketone (MEK)	50%

Work on this was reported in the August 14, 1954 issue of Chemical Week magazine.

This simple formulation appears to be most suitable for "painted on" formulations packaged in bottles but should be used with caution in mechanical spray equipment since the MEK solvent will soften rubber and certain plastics. The formulation could also be modified easily for aerosol packaging.

Since MEK evaporates rapidly, it should not seriously affect painted areas unless too heavy applications are made. The package label should include a caution to this effect. Also, MEK is flammable. Possible substitutes that are less flammable are methylchloroform or a mixture of methylchloroform and methylene chloride.

Formulating Other Insecticides

The beneficial effects of "Aroclor" 5460 apply generally to other chlorinated insecticides including chlordane, aldrin and dieldrin, but do not apply to phosphate type insecticides such as TEPP, parathion, methylparathion, malathion and chlorothion.

* * * *

For samples of the "Aroclor" products mentioned in this report, contact the nearest branch office (see attached list) or write to:

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
Plasticizers Department
800 North Lindbergh Boulevard
St. Louis 66, Missouri

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
District Sales Offices

ATLANTA: 1401 Peachtree St. N.E., Atlanta 5, Georgia
BOSTON: Everett Station, Boston 49, Massachusetts
CHICAGO: McGraw-Hill Building, 520 N. Michigan Ave., Chicago 11, Ill.
CINCINNATI: 2330 Victory Parkway, Cincinnati 6, Ohio
CLEVELAND: 427 Hanna Building, Cleveland 15, Ohio
DETROIT: 18230 Grand River Avenue, Detroit 23, Michigan
HOUSTON: 2472 Bolsover St., P. O. Box 6863, Houston, Texas
LOS ANGELES: 6670 E. Flotilla St., Los Angeles 22, California
MINNEAPOLIS: Foshay Tower, Room 515, Minneapolis 2, Minnesota
NEW YORK: 445 Park Avenue, New York 22, New York
PITTSBURGH: 20 Cedar Boulevard, Pittsburgh 28, Pennsylvania
SAN FRANCISCO: 111 Sutter Street, San Francisco 4, California
SEATTLE: 911 Western Avenue, Seattle 4, Washington
SYRACUSE: 731 James Street, Syracuse 3, New York
WILMINGTON: 2005 Concord Pike, Fairfax, Wilmington 3, Delaware

* * * * *

LONDON: Monsanto House, 10-18 Victoria St., London S.W. 1, England
MELBOURNE: 256 Flinders Street, Adelaide, Australia
MONTREAL: P. O. Box 900, Montreal 3, Canada
TORONTO 183 Front St. East, Toronto 2, Ont., Canada
VANCOUVER: 1550 Rand Avenue, Vancouver 14, B. C., Canada

MON-MT-008589

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE
Pesticides Regulation Division
101 South Laboratory Building, A.R.C.
Beltsville, Maryland 20705

MAY 15 1968

May 10, 1968

R. Emmet Kelly, M. D.
Medical Director, Monsanto Co.
800 N. Lindbergh Boulevard
St. Louis, Missouri 63166

Dear Dr. Kelly:

Thank you for your letter of May 2, 1968 which contained a data sheet concerning the use of Monsanto Arochlor resins in pesticide formulations.

We did indeed receive samples of Arochlors 1254 and 1260 and wish to extend our thanks for these samples. In order for us to have as complete references for our analytical laboratory, would it be possible for us to get similar samples of the other 9 Monsanto Arochlors.

Again, if there is any charge for these samples, please forward the bill with the samples.

Sincerely yours,

W. N. Blickenstaff

W. N. Blickenstaff
Chemist in Charge

EXHIBIT
WBP M-24.8

MON-MT-008590

St. Louis

May 16, 1968

File		
Destroy		
CDB		
JTG		
WHH	✓	
MMJ	✓	
REK	✓	✓
RAM		
EPW	✓	

Mr. K. A. Wells

The attached letter is self-explanatory. Can you send 3 ounces of the other 9 Aroclors to Mr. Blickenstaff.

R. Emmet Kelly, M. D.

REK/ln
att.

EXHIBIT
WBP M-24.9

MON-MT-008591

E. Kelly

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Pesticides Regulation Division
101 South Laboratory Building, A.R.C.
Beltsville, Maryland 20705

June 3, 1968

Dr. William R. Richard, Manager
Research and Development
Organic Chemicals Division
Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63166

Dear Dr. Richard:

On Friday, May 24, 1968, Mr. Ronald Thomas of our laboratory spoke with Dr. Early of your Washington office. At that time Dr. Early indicated that he had contacted you concerning a request from our laboratory for samples of the various arochlors.

We would be interested in receiving samples of all of the arochlors except 1254 and 1260. If there is a charge for these samples please enclose the bill with the samples and we will see that payment is made.

Thank you for your consideration in this matter.

Sincerely yours,

W. N. Blickenstaff

W. N. Blickenstaff
Chemist in charge

EXHIBIT
WBP M-24.10

1221
1232 1
1242
8-1248
1248
1248
1248
1248

MON-MT-008592

June 18, 1968

Mr. W. N. Blickenstaff
Chemist in charge
U. S. Dept. of Agriculture
Pesticides Regulation Div.
101 South Lab. Bldg., A.R.C.
Boltsville, Md. 20705

Dear Mr. Blickenstaff:

We are enclosing, per your request, samples of
the following Aroclors:

Aroclor	1221
"	1232
"	1242
"	1248
"	1262
"	4465
"	5442
"	5460

I hope they arrive in good condition.

Sincerely,

W. R. Richard
Manager R & D

WRR:ms

Encs.

EXHIBIT
WBPM-24.11

MON-MT-008593