



WORLD HEALTH ORGANIZATION  
INTERNATIONAL AGENCY FOR RESEARCH ON CANCER

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans

# Volume 5

## Some Organochlorine Pesticides

### Summary of Data Reported and Evaluation

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Aldrin  
Aramite<sup>R</sup>  
BHC (Technical Grades) and Lindane  
Chlorobenzilate  
Dieldrin  
Endrin  
Methoxychlor  
Mirex  
Quintozene  
Terpene polychlorinates (Strobane<sup>R</sup>)

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Last updated: 17 March 1998

# ALDRIN

VOL.: 5 (1974) (p. 25)

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Aldrin has been tested only by the oral route in rats and mice. The study in mice was considered to be inadequate for evaluation. Studies in rats were negative in two cases and inadequate in two others.

Aldrin is metabolized to dieldrin, so that exposure to aldrin also involves exposure to dieldrin (see monograph on dieldrin).

### 5.2 Human carcinogenicity data

The epidemiological study which was carried out on occupationally exposed workers does not allow any conclusions to be drawn concerning the existence of an excess risk of developing cancer.

Aldrin is metabolized into dieldrin, so that exposure to aldrin also involves exposure to dieldrin (see monograph on dieldrin).

**Subsequent evaluation:** [Suppl. 7 \(1987\)](#)

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# ARAMITER<sup>R</sup>

VOL.: 5 (1974) (p. 39)

CAS No.: 140-57-8

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Aramite<sup>R</sup> is carcinogenic in the rat and dog following its oral administration. It produced liver tumours in the rat and carcinomas of the gall bladder and biliary ducts in the dog.

Aramite<sup>R</sup> was tested in 4 strains of mice by the oral route and produced a significant increase of hepatomas in males of one strain.

No tumours were reported in limited studies involving skin application and subcutaneous injection (single-dose) in mice.

### 5.2 Human carcinogenicity data

No epidemiological studies were available to the Working Group.

**Subsequent evaluation:** Suppl. 7 (1987) (p. 57: **Group 2B**)

For definition of Groups, see [Preamble Evaluation](#).

### Synonyms

- 2-(4-*tert*-Butylphenoxy)-1-methylethyl 2-chloroethyl sulfite
- Aratron
- 2-(*p-tert*-Butylphenoxy)isopropyl 2-chloroethyl sulfite
- 2-(*p-tert*-Butylphenoxy)isopropyl 2'-chloroethyl sulfite
- 2-(*p-tert*-Butylphenoxy)-1-methylethyl 2-chloroethyl ester of sulfurous acid
- 2-(*p-tert*-Butylphenoxy)-1-methylethyl 2-chloroethyl sulfite
- 2-(*p-tert*-Butylphenoxy)-1-methylethyl 2'-chloroethyl sulfite
- 2-(*p-tert*-Butylphenoxy)-1-methylethyl sulfite of 2-chloroethanol
- CES
- $\beta$ -Chloroethyl- $\beta$ -(*p-tert*-butylphenoxy)- $\alpha$ -methylethyl sulfite
- $\beta$ -Chloroethyl- $\beta'$ -(*p-tert*-butylphenoxy)- $\alpha'$ -methylethyl sulfite
- 2-Chloroethyl sulfite of 1-(*p-tert*-butylphenoxy)-2-propanol
- Compound 88R
- 2-Chloroethyl 1-methyl-2-(*p-tert*-butylphenoxy)ethyl sulfate
- Ester of 2-chloroethanol with 2-(*p-tert*-butylphenoxy)-1-methyl sulfite
- Niagaramite
- Ortho-Mite

# BHC (TECHNICAL GRADES) AND LINDANE

VOL.: 5 (1974) (p. 47)

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Technical BHC, its pure  $\alpha$ -,  $\beta$ - and  $\gamma$ -isomers and the mixture of  $\delta$  +  $\epsilon$  isomers are carcinogenic in mice, producing liver-cell tumours following oral administration. This effect was recorded in both sexes after exposure to the  $\beta$ - and  $\gamma$ -isomers; the technical compound, the  $\alpha$ -isomer and the  $\delta$  +  $\epsilon$  mixture were tested in male mice only.

Available feeding studies in rats were considered inadequate either because survival rates were low, the information reported was insufficient or because the doses given were too low.

No tumours were reported in limited skin application and subcutaneous implantation studies in mice.

### 5.2 Human carcinogenicity data

No epidemiological studies were available to the Working Group. Patients dying with cancer did not show higher concentrations of BHC in fat tissues and liver than did control patients.

No firm conclusions as to a causal relationship with aplastic anaemia and/or leukaemia can be drawn from available case reports.

**Subsequent evaluations:** [Vol. 20 \(1979\)](#); [Suppl. 7 \(1987\)](#)

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# CHLOROBENZILATE

**VOL.:** 5 (1974) (p. 75)

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Chlorobenzilate was tested in a preliminary study by the oral route in two strains of mice and produced an increased incidence of hepatomas in males of both strains. Reports of feeding studies in rats were considered inadequate for evaluation.

### 5.2 Human carcinogenicity data

No epidemiological studies were available to the Working Group.

**Subsequent evaluations:** [Vol. 30 \(1983\)](#); Suppl. 7 (1987) (p. 60: **Group 3**)

For definition of Groups, see [Preamble Evaluation](#).

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# DIELDRIN

VOL.: 5 (1974) (p. 125)

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Dieldrin was tested by the oral route only in mice and rats. The hepatocarcinogenicity of dieldrin in the mouse has been demonstrated and confirmed in several experiments, and some of the liver-cell tumours were found to metastasize. A dose-response effect has been demonstrated in both sexes with an increased tumour incidence in females at the lowest dose tested, 0.15 ppm in the diet (corresponding to about 0.01 mg/kg bw/day). In mice, there is no evidence of carcinogenicity in organs other than the liver.

The available data in rats have not provided evidence of carcinogenicity at levels of up to 50 ppm in the diet (corresponding to an intake of about 2.5 mg/kg bw/day).

The experiments in dogs and monkeys were too limited in duration and/or group sizes to allow any conclusions to be made.

### 5.2 Human carcinogenicity data

The epidemiological study carried out on occupationally exposed workers does not allow any conclusions to be made concerning the existence of an excess risk of developing cancer.

Although fat concentrations of dieldrin residues were higher in terminal cancer patients than in control patients, this finding is inconclusive as to a causal relationship.

**Subsequent evaluation:** [Suppl. 7 \(1987\)](#)

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# ENDRIN

VOL.: 5 (1974) (p. 157)

CAS No.: 72-20-8

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

In oral experiments in mice, insufficient details were available to allow an evaluation to be made.

Two feeding studies in rats were reported. One was negative, although the time when the tumours occurred in both treated and control groups was not given; the other provided no details of pathological studies and therefore cannot be evaluated.

### 5.2 Human carcinogenicity data

The epidemiological study carried out on occupationally exposed workers does not allow any conclusions to be made concerning the existence of an excess risk of developing cancer.

**Subsequent evaluation:** Suppl. 7 (1987) (p. 63: **Group 3**)

For definition of Groups, see [Preamble Evaluation](#).

### Synonyms

- Compound 269
- Experimental Insecticide 269
- Hexachloroepoxyoctahydro-*endo,endo*-dimethanonaphthalene
- 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-*endo,endo*-1,4:5,8-dimethanonaphthalene
- 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-*endo*-1,4-*endo*-5,8-dimethanonaphthalene
- 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-*endo,endo*-5,8-dimethanonaphthalene
- 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4,5,8-*endo-endo*-dimethanonaphthalene
- Mendrin

# METHOXYCHLOR (Group 3)

VOL.: 5 (1974) (p. 193)

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Methoxychlor was tested by the oral route only in the rat. Three experiments, including one employing dietary levels of up to 1600 ppm (equivalent to about 80 mg/kg bw/day), provided no evidence of carcinogenicity. Because of inadequate reporting, conclusions cannot be drawn from the results of a fourth experiment in which some liver tumours were observed in rats fed up to 2000 ppm in the diet (equivalent to about 100 mg/kg bw/day). Data from these four experiments do not allow an evaluation of the carcinogenicity of methoxychlor to be made at the present time.

No tumours were reported in limited skin application and subcutaneous injection (single-dose) studies.

### 5.2 Human carcinogenicity data

No epidemiological studies were available to the Working Group.

**Subsequent evaluation:** [Vol. 20 \(1979\)](#); [Suppl. 7 \(1987\)](#) (p. 66: **Group 3**)

For definition of Groups, see [Preamble Evaluation](#).

# MIREX

**VOL.:** 5 (1974) (p. 203)

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Mirex was tested in a preliminary study by the oral route in two strains of mice (the only route and species for which published results were available). It produced an increased incidence of hepatomas in both sexes of both strains used.

### 5.2 Human carcinogenicity data

No epidemiological studies were available to the Working Group.

**Subsequent evaluations:** [Vol. 20 \(1979\)](#); Suppl. 7 (1987) (p. 66: **Group 2B**)

For definition of Groups, see [Preamble Evaluation](#).

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# QUINTOZENE (PENTACHLORONITROBENZENE)

**VOL.:** 5 (1974) (p. 211)

**CAS No.:** 82-68-8

**Chem. Abstr. Name:** Pentachloronitrobenzene

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Quintozene (pentachloronitrobenzene) was tested in a preliminary study by the oral route in two strains of mice and produced an increased incidence of hepatomas in males of one strain. A feeding study in rats was considered inadequate. Application of quintozene followed by croton oil to mouse skin gave positive results which could not be interpreted due to a lack of adequate controls.

### 5.2 Human carcinogenicity data

No epidemiological studies were available to the Working Group.

**Subsequent evaluation:** Suppl. 7 (1987) (p. 71: **Group 3**)

For definition of Groups, see [Preamble Evaluation](#).

### Synonyms

- Botrilex
- Brassicol
- Folosan
- Olpisan
- PCNB
- Terrachlor
- Terraclor
- Tilcarex
- Tritisan

# TERPENE POLYCHLORINATES (STROBANE<sup>R</sup>)

VOL.: 5 (1974) (p. 219)

CAS No.: 8001-50-1

## 5. Summary of Data Reported and Evaluation

### 5.1 Animal carcinogenicity data

Terpene polychlorinates (Strobane<sup>R</sup>) were tested in a preliminary study by the oral route in two strains of mice and produced an increased incidence of hepatomas in males of one strain. The suggestion that the product also increased the incidence of malignant lymphomas in this species awaits confirmation.

No adequate data were available for other species or other routes of administration.

### 5.2 Human carcinogenicity data

No epidemiological studies were available to the Working Group.

**Subsequent evaluation:** Suppl. 7 (1987) (p. 71: **Group 3**)

For definition of Groups, see [Preamble Evaluation](#).

### Synonym

- Chlorinated mixed terpenes

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