OPERATION OF THE PRIOR INFORMED
CONSENT PROCEDURE FOR BANNED
OR SEVERELY RESTRICTED CHEMICALS
IN INTERNATIONAL TRADE

DECISION GUIDANCE DOCUMENTS

Aldrin

JOINT FAO/UNEP PROGRAMME
FOR THE OPERATION OF
PRIOR INFORMED CONSENT

United Nations Environment Programme
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The inclusion of these chemicals in the Prior Informed Consent Procedure is based on reports of control action submitted to the United Nations Environment Programme (UNEP) by participating countries, and which are presently listed in the UNEP-International Register of Potentially Toxic Chemicals (IRPTC) database on Prior Informed Consent. While recognizing that these reports from countries are subject to confirmation, the FAO/UNEP Joint Working Group of Experts on Prior Informed Consent have recommended that these chemical be included in the Procedure. The status of these chemicals will be reconsidered on the basis of such new notifications as may be made by participating countries from time to time.

The use of trade names in this document is primarily intended to facilitate the correct identification of the chemical. It is not intended to imply approval or disapproval of any particular company. As it is not possible to include all trade names presently in use, only a number of commonly used and published trade names have been included here.

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ABBREVIATIONS WHICH MAY BE USED IN THIS DOCUMENT

(n.b.: chemical elements and pesticides are not included in this list)

ADI	acceptable daily intake
ai	active ingredient
b.p.	boiling point
bw	body weight
^{o} C	degree Celsius (centigrade)
CCPR	CODEX Committee on Pesticide Residues
DNA	Designated National Authority
EC	emulsion concentrate
EEC	European Economic Community
EPA	U.S. Environmental Protection Agency
ERL	extraneous residue limit
FAO	Food and Agriculture Organization of the United Nations
g	ram microgram good agricultural practice guideline level
µg	microgram
GAP	good agricultural practice
GL	guideline level
ha	hectare
HEOD	
IARC	International Agency for Research on Cancer
i.m.	intramuscular
i.p.	intraperitoneal
IPCS	International Programme on Chemical Safety
IRPTC	International Register of Potentially Toxic Chemicals
JMPR	Joint FAO/WHO Meeting on Pesticide Residues (Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and a WHO Expert Group on Pesticide Residues)
k	kilo- (x 103) kilogram
kg	kilogram
l	litre
LC_{50}	lethal concentration, 50%
LD_{50}	lethal dose, median
m	metre
mg	milligram
ml	millilitre
m.p.	melting point

MRL	Maximum Residue Limit. (For difference between draft MRLs and Codex MRLs, see the introduction Annex I.)
MTD	maximum tolerated dose
ng	nanogram
NOEL	no-observed-effect level
NOAEL	no-observed-adverse-effect level
NS	Not Stated
OP	organophosphorus pesticide
PHI	pre-harvest interval
ppm	parts per million (Used only in reference to concentration of a pesticide in an experimental diet. In all other contexts the terms mg/kg or are used).
sp gr	specific gravity
STEL	Short Term Exposure Limit
TADI	Temporary Acceptable Daily Intake
TLV	Threshold Limit Value
TMDI	Theoretical maximum daily intake
TMRL	Temporary Maximum Residue Limit
TWA	Time Weighted Average
UNEP	United Nations Environment Programme
WHO	World Health Organization
WP	wettable powder
wt	weight
<	less than
<<	much less than
≤	less than or equal to
>	greater than
≥	greater than or equal to

ALDRIN

PRIOR INFORMED CONSENT
DECISION GUIDANCE DOCUMENT

1. IDENTIFICATION

1.1 Common Name: Aldrin

1.2 Chemical Type: Organochlorine

1.3 Use: Pesticide (insecticide)

1.4 Chemical Name: 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-exo-1,4-endo-5,8-dimethanonaphthalene; (HHDN)

1.5 CAS No.: 309-00-2

1.6 Trade Names/Synonyms: Compound 118, Octalene, Aldrec, Aldrex, Drinox, Aldrite, Aldrosol, Altox, Bangald, Aldrine, HHDN, Rasayaldrin.

Discontinued name: Seedrin Liquid

1.7 Mode of Action: Central nervous system stimulant producing convulsions

1.8 Formulation Types: Emulsifiable concentrate (30% a.i.), wettable powder (40-70% a.i.), granules, dusts (2.5 to 5%) and dust concentrates, seed dressings, oil solutions

1.9 Basic Producer: Shell International Chemical Co.(NL)

2. SUMMARY OF CONTROL ACTIONS

2.1 General: Aldrin is one of the world's most stringently controlled pesticides. At least twenty-three countries have prohibited use of the compound. Another thirteen countries have severely restricted its use. Specific actions reported by governments are summarized in Annex 1.

2.2 Reasons for the Control Action: Aldrin and dieldrin, to which the compound is readily converted in the environment, have been subjected to control actions principally due to their high toxicity, to their persistence in the environment, especially in temperate areas, and to the bioaccumulation of residues in the food chain and in human tissues. Aldrin is variably toxic to microorganisms and highly toxic to fish, crustaceans, and many bird and animal species.

2.3 Uses Banned: In most cases, all uses are banned. Several countries have banned all uses except those noted in following section and Annex 1. Specific uses banned in various countries include use as an external parasiticide and antiweevil agent on seeds and products intended for

human and animal consumption (Argentina in the tobacco industry (Argentina and Colombia), a fertilizers (Portugal).

2.4 Uses Reported to be Continued in Effect: Termite control is the most common allowable use among countries still authorizing some uses. The compound is also permitted in certain countries for a few agricultural public health purposes: tse-tse fly control (Kenya) dipping of non-food roots and tops and moth-proofing manufacturing processes in closed systems (USA). Se Annex 1 for details.

2.5 Alternatives: Countries controlling aldrin and dieldrin have found many alternatives for designated purposes

2.6 Contacts for Further Information: FAO/UNEP Joint Da Base, IRPTC Geneva; Designated National Authorities countries taking control actions.

3. SUMMARY OF FURTHER INFORMATION ON ALDRIN

3.1 Chemical and Physical Properties: Pure aldrin is a colourless crystalline solid. Technical grade aldrin (95% HHDN is tan to dark-brown in colour. Aldrin is stable at temperatures of less than 200°C. It is practically insoluble in water (27 μg/1 at 27°C); very soluble in most organic solvents (greater than 600 g/l in acetone, benzene and xylene).

3.2 Toxicological Characteristics:

3.2.1 Acute Toxicity: Rat Oral LD_{50}: 38-67 mg/kg depending upon vehicles used. Rat Dermal LD_{50}: 98 mg/kg. Rabbit Dermal LD_{50}: 600-1250 mg/kg depending on formulation vehicle. WHO Classification: a.i. Class Ib - high hazardous.

Formulations: For solids, above 90% a.i., Class Ib; between 10 and 90%, Class II: below 10%, Class III. liquids, above 25%, Class Ib; between 3 and 25%, Class II; below 3%, Class III.

3.2.2 Short-Term Toxicity: In both humans and animals, the primary acute toxic effects are on the central nervous system, including hyperexcitability and tremors followed by convulsions and possibly death. The liver is also a target organ. Dieldrin (to which aldrin is rapidly converted after absorption) has been found to cause immunosuppression in mice. No teratogenic effects have been observed in either humans or in animals below levels causing maternal toxicity. Fetuses are affected through transplacental exposure. The overall no-observed-adverse-effect level in the rat is 0.5 mg dieldrin/kg diet, equivalent to 0.025 mg/kg bw: in the dog, the lowest no-observed-adverse-effect level is 0.04 mg/kg bw. The lowest reported dose fatal to man has been estimated to be 10 mg/kg.

3.2.3 Chronic Toxicity: Weight of the evidence demonstrates no mutagenic potential. IARC states that there is inadequate evidence of carcinogenicity in man and limited evidence of carcinogenicity in experimental animals, and accordingly classifies aldrin in category 3, a possible human carcinogen. In the USA, federal authorities have classified aldrin as a probable human carcinogen, based on evidence of liver cancer in experimental mice. JMPR/Codex ADI: 0-0.0001 mg/kg bw (combined total for aldrin and dieldrin).

3.2.4 Epidemiological Studies: A long-term study of 800 workers in an aldrin/dieldrin manufacturing plant starting in the 1950's established a no-effect level at a dieldrin blood concentration of 200 μg/l, corresponding to a total daily intake of 2300 μg/person per day: this figure was lowered to

105 μg/l, equivalent to 1220 μg/person per day for a group of 10 workers showing no excessive liver enzyme induction (the first reversible effect of dieldrin found in experimental animals). Follow-up studies indicated no specific carcinogenic activity, with similar results reported in a mortality study of 1155 workers in a manufacturing plant between 1946 and 1976.

3.3 Environmental Characteristics:

3.3.1 Fate: In biologically active soils, aldrin converts rapidly to dieldrin by epoxidation, with 50-75% of the end-season residues being dieldrin. The half-life of dieldrin in temperate soils is about five years. In tropical areas, dieldrin is lost more quickly, up to 90% disappearing within one month. Resistance to soil leaching generally precludes groundwater contamination, although there is some risk of surface runoff. Biomagnification is high, estimated at 3,140 in fish and 44,600 in snails. Although persisting for years, there is no evidence that aldrin and dieldrin accumulate indefinitely in soils, in water, or the atmosphere.

3.3.2 Effects: Highly toxic to fish and crustaceans (LC_{50}s ranging from 2.2 to 53 micro g/l). Toxicity to birds has been found to vary by species between 6.6 and 520 mg/kg bw; response among mammals varies by species.

3.4 Exposure:

3.4.1 Food: The dietary contribution is probably the most significant route of human exposure; because of aldrin's rapid conversion to dieldrin, most of the dietary intake is in the form of dieldrin. Monitoring analyses undertaken by FAO/WHO for the period 1971-81 in Australia, Canada, Guatemala, Japan, New Zealand, the USA and the UK found mean daily intakes varying between 0.007 to 0.056 μg/kg bw, below recommended ADI levels.

3.4.2 Occupational/Use: Aldrin can be absorbed into the body both through skin contact and inhalation at the manufacturing, formulating and application stages. One or more gross overexposures can lead to acute convulsive intoxication; a greater number of smaller doses may cause accumulative intoxification. A time-weighted average TLV for exposure to aldrin and dieldrin has been set at 0.25 mg/m^3. One fatal overexposure of an applicator has been reported.

3.4.3 Environment: Exposure from air is of minor importance to the general population. Concentrations between 0.1 to 0.4 ng/m^3 have been found in the air of agricultural communities. Higher exposure rates to air-borne aldrin can be expected in homes treated with the compound for termite control. Mean aldrin levels found in inside air in slab constructed homes declined from 77 to 36 ng/m^3 from the day of application to a year later, and in crawl-space constructed homes, the range was 1,970 to ng/m^3 over the same period. Low levels of dieldrin in surface water have been reported in several countries.

3.4.4 Accidental Poisoning:

No recent data are available.

Emergency first aid treatment: For eyes, irrigate immediately; for skin, wash with soap immediately; for respiration, remove affected person to fresh air and perform artificial respiration if necessary; if ingested, give large quantities of water and induce vomiting if person is conscious. Obtain medical attention immediately. Barbituates (preferably phenoboubitone or pentoboubitone) or diazepam administered IM or IV for convulsions.

3.5 Measures to Reduce Exposure: Respiratory and dermal protection can reduce exposure to workers and users. During handling and application, protective rubber or PVC gloves, rubber boots and overalls should be worn; dust mask should be worn when handling dust concentrates. Because of its persistence and bioaccumulation, exposure to the general population and environment can be reduced primarily by reducing use.

3.6 Packaging and Labelling: Follow FAO Guidelines on Good Labelling Practice.

3.7 Waste Disposal Methods: Guidelines are under development. This section will be updated when guidelines are available.

3.8 Maximum Residue Limits, (mg/kg. aldrin and dieldrin combined): JMPR/Codex: potatoes, 0.1; meat fat, 0.2E; carrots, lettuce, 0.1E; asparagus, egg plant, broccoli, Brussels sprouts, cabbage, cauliflower, cucumbers, horse radish, onions, parsnips, peppers, pimentos, radishes, radish tops, 0.1; eggs (shell-free), 0.1E; milk, 0.006E; fruit, 0.05, rice (in husks), 0.02; other raw cereals, 0.02E. (E = extraneous residue limits).

USA: Tolerances for residues of aldrin and dieldrin in or on various foodstuffs are set at 0, 0.02, 0.05 or 0.1 ppm.

WHO has recommended that the level of aldrin and dieldrin in drinking water should not exceed 0.03 μg/l.

4. MAJOR REFERENCES

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ANNEX 1
SUMMARY OF CONTROL ACTIONS AND REMAINING USES FOR ALDRIN, AS REPORTED BY COUNTRIES

BANNED:

Belize	(NS)	Banned as agricultural chemical.
Colombia	(1988)	Banned.
Ecuador	(1985)	Banned.
Liechtenstein	(NS)	Banned.
Mexico	(1982)	Banned as agricultural chemical.
Panama	(1987)	Banned as agricultural chemical.
Singapore	(1984)	Banned.
Sweden	(1970)	Banned.
Switzerland	(1986)	Banned.
USSR	(NS)	Banned.
Yugoslavia	(1982)	Banned as agricultural chemical.

WITHDRAWN:

None reported.

SEVERELY RESTRICTED:

Dominica (NS) Severely restricted pesticide.
Mauritius (1970) Restricted use under the Pesticide Control Act of 1970.

Only remaining uses allowed:

EEC-countries[*] (1988) All use prohibited except for treating growing media of container-grown ornamental, treatment of potatoes grown on former pastureland in the UK, and treatment of narcissi against specified pests.

Kenya (1987) Tse-tse fly control only.

Republic of Korea (1986) Sale and use prohibited except for production of industrial goods.

USA (1974) All uses cancelled except for subsurface ground insertion for termite control, dipping of non-food roots and tops, moth-proofing by manufacturing process in a closed system.

Venezuela (1983) Only permitted when intended for control of vectors for medical reasons by Ministry of Health, control of agricultural pests by Ministry of Agriculture, control of attasexdens and other ants with granulated formulations of aldrin and chlordane in applications directly on the soil, control of termites in formulations of aldrin and chlordane.

Specific uses reported as not allowed:

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[*] **EEC-countries - Belgium, Denmark, France, Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and United Kingdom.**

Chile (1983) Not allowed on natural or artificial meals directly or in concentrated form as animal feed. Prohibited on seeds, grain, etc.

Argentina (1963-72) Prohibited for use as external parasiticide (1968), for use in tobacco industry and commerce (1971), for use as a scabacide in sheep in certain parts of the province of Buenos Aires (1963) and for use as antiweevil agent on seeds and their products intended for human or animal consumption (1972).

Use permitted only with special authorization:

Japan (1981) Manufacture and import prohibited without authorisation by the Government. Uses other than those specified by Cabinet order are prohibited. Prohibition of import of specified products containing this substance.

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