



**A**  
**GUIDE** *to*  
**PESTICIDES**  
*Used in*  
**PLANT**  
**PROTECTION**

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## FOREWORD

Due to the spectacular success achieved by the pesticides in pest control, they are extensively used in plant protection work. As a result, large number of them are available in the market and several new products are being introduced annually by the various commercial firms. It is often experienced that the cultivators find it extremely difficult to select a proper type of pesticide for plant protection work. In fact, a bulletin giving an up-to-date technical information about the various pesticides used in plant protection was a long felt need of the Department for giving guidance to the extension workers and cultivators in selecting a proper type of pesticide to meet their requirements.

This bulletin has been prepared by Dr. S. K. Dorge, Agricultural Entomologist, Agriculture Department, Maharashtra State, Poona, with the help of his staff members Sarvashri D. S. Ajri and T. K. Murti. It is hoped that it will serve as a guide for efficient utilization of pesticides in plant protection work.

POONA-1.

Dated :

GHATGE,

*Director of Agriculture,  
Maharashtra State.*

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## ABBREVIATIONS

ppm.	..	Parts per million.
mg./kg.	..	Milligrams per kilogram of body weight.
g./kg.	..	Grams per kilogram of body weight.
LD <sub>50</sub>	..	Dose of pesticide enough to kill 50 per cent of the test species.
MLD	..	Minimum lethal dose.
b.p.	..	Boiling point.
m.p.	..	Melting point.
pt.	..	Pint.
sp. gr.	..	Specific gravity.

## APPENDIX

*Tolerance Limits*

Since most of the pesticides used in pest control work have long residual property, they leave toxic residues on treated products which produce deleterious effects on human beings and animals consuming them. Some of them especially the chlorinated hydrocarbons, are stored in body fat and even are excreted through milk. The contamination of food stuff with pesticidal residues, therefore poses an important problem in human welfare. In advanced countries like U.S.A. legal provisions are made to fix tolerance limits for different pesticides on various products so as to avoid toxicity hazards. These values are given below which will be useful in knowing the extent to which the pesticidal residues are admissible in food stuffs.

Serial No.	Name of the insecticide.	Tolerance limits (Parts of pesticidal residues per million parts of food stuff).
1	Aldrin .. .. .	0-0-75
2	Aramite .. .. .	0
3	Calcium arsenate .. .. .	0-5 (As <sub>2</sub> O <sub>3</sub> ).
4	Chlordane .. .. .	0-3
5	Endrin .. .. .	0
6	DDT .. .. .	7
7	Guthion .. .. .	0-5-2
8	Heptachlor .. .. .	0
9	Keithane .. .. .	0-15
10	Lindane .. .. .	10
11	Malathion .. .. .	8
12	Methyl bromide .. .. .	5-200 (Br.)
13	Nicotine sulphate .. .. .	2
14	Toxaphene .. .. .	7
15	Thiodan .. .. .	2
16	Phosdrin .. .. .	0-25-1.
17	Demeton .. .. .	0-3-1-25.
18	Diazinon .. .. .	0-75-1
19	Dieldrin .. .. .	0-0-75
20	Chlorobenzilate .. .. .	5
21	Crolyite .. .. .	7
22	Fluorine .. .. .	7
23	Pyrethrins .. .. .	Exempt.
24	Rotenone .. .. .	Exempt.
25	Lead arsenate .. .. .	7
26	Sevin .. .. .	5-25
27	Methoxychlor .. .. .	2-100
28	Tedion .. .. .	2
29	TEPP .. .. .	0
30	Parathion .. .. .	1
31	Trithion .. .. .	0-8-2

*List of Indian Standards\* Issued on Pesticides.*

Serial No.	Name of the pesticide.	Formulation.	I.S.I. Standard.
1	2	3	4
1	Aldrin .. ..	Technical .. ..	1306—1958
2	Aldrin .. ..	Dust .. ..	1308—1958.
3	Aldrin .. ..	Emulsifiable concentrate .. ..	1307—1958.
4	BHC .. ..	Refined .. ..	881—1956.
5	BHC .. ..	Technical (Revised) .. ..	560—1961.
6	BHC .. ..	Dust (second revision) .. ..	561—1962.
7	BHC .. ..	Emulsifiable Concentrate (revised) .. ..	632—1958.
8	BHC .. ..	Smoke generator .. ..	1505—1959.
9	BHC .. ..	Water dispersible powder (second revision).	562—1962.
10	Carbon disulphide .. ..	Technical .. ..	717—1955.
11	Carbon tetrachloride .. ..	Technical .. ..	718—1955.
12	Chlordane .. ..	Technical .. ..	2863—1964.
13	Chlordane .. ..	Dust .. ..	2864—1964.
14	DDT .. ..	Technical (revised) .. ..	563—1961.
15	DDT .. ..	Dust (revised) .. ..	564—1961.
16	DDT .. ..	Emulsifiable concentrate .. ..	733—1956.
17	DDT .. ..	Water dispersible powder (revised) .. ..	565—1961.
18	Diazinon .. ..	Technical .. ..	1833—1961.
19	Diazinon .. ..	Emulsifiable concentrate .. ..	2861—1964.
20	Diazinon .. ..	Water dispersible powder .. ..	2862—1964
21	Dieldrin .. ..	Technical (revised) .. ..	1052—1962.
22	Dieldrin .. ..	Emulsifiable concentrate (revised) .. ..	1054—1962.

Serial No.	Name of the pesticide.	Formulation.	I.S.I. Standard.
1	2	3	4
23	Dieldrin .. ..	Water dispersible powder (revised) ..	1053—1942
24	Endrin .. ..	Technical .. ..	1309—1958.
25	Endrin .. ..	Emulsifiable concentrate ..	1310—1958.
26	Ethylene dibromide ..	....	1311—1958.
27	Ethylene dichloride ..	Technical .. ..	869—1956.
28	Ethylene dichloride; carbon tetrachloride (3: 1) (revised).	....	634—1965.
29	Household insecticidal spray ..	....	1824—1961.
30	Limesulphur .. ..	Solution .. ..	1950—1957.
31	Malathion .. ..	Technical .. ..	1832—1961.
32	Malathion .. ..	Dust .. ..	2568—1963.
33	Malathion .. ..	Emulsifiable concentrate ..	2567—1963.
34	Malathion .. ..	Water dispersible powder ..	2569—1963.
35	Methyl bromide .. ..	....	1312—1958.
36	Methyl parathion .. ..	Technical .. ..	2570—1963.
37	Methyl parathion .. ..	Emulsifiable concentrate ..	2865—1964.
38	Nicotine sulphate .. ..	Solution .. ..	1055—1957.
39	Official test insecticides (OTI)	....	2555—1963.
40	Parathion .. ..	Technical .. ..	2128—1962.
41	Parathion .. ..	Emulsifiable concentrate ..	2129—1962.
42	Pyrethrum extract ..	....	1051—1957.
43	Zinc phosphide .. ..	Technical .. ..	1251—1958.

*List of some important Firms Dealing in Pesticides*

1. Messrs. Bayer (India) Ltd., 82, Veer Nariman Road, Bombay-1. (B.R.).
2. Messrs. Bharat Pulverising Mills, 38-A, Sayani Road, Bombay-28.
3. Messrs. Bombay Chemicals Ltd., 129, Mahatma Gandhi Road, Bombay-1.
4. Messrs. Ciba of India Ltd., Pesticide Department, Esplande House, 29, Waudby Road, P. B. No. 479, Bombay-1.
5. Messrs. Cyanamid India Ltd., Annie Besant Road, P. O. Box 65-67, Bombay-18.
6. Messrs. Flintrock Products Ltd., Belvedere Road, Mazgaon, Bombay-1.
7. Messrs. Gerdau India Corporation, 1-C, Sindhu House, Nanabhai Lane, P. O. Box No. 1979, Bombay-1.
8. Messrs. Hoechst Pharmaceuticals Ltd., Dugal House, Backbay Reclamation, P. O. Box No. 273, Bombay-1.
9. Messrs. Imperial Chemical Industries Ltd., Ballard Estate, Fort, Bombay-1.
10. Messrs. Mysore Insecticides Pvt. Ltd., P. Box. No. 1835, No. 6, Linghi Chetti Street, Madras-1.
11. Messrs. National Organic Chemical Industries Ltd., Neville House, Currimbhoy Road, Ballard Estate, Bombay-1.
12. Messrs. Rallis India Ltd., Ralli House, 21, Ravelin Street, Bombay-1.
13. Messrs. Sandoz India Ltd., 3, Wittet Road, Ballard Estate, P. B. No. 1540, Bombay-1.
14. Messrs. Union Carbide India Ltd., Kasturi Building, Jamshedji Tata Road, P. B. No. 610, Bombay-1.

Serial No.	Name of pesticide and its formulation.	Trade names.	Names of the firm(s)
1	2	3	4
1	Aldrin 5% dust	.. Aldrex 5% dust Hexamar aldrin 5% dust	.. Messrs. National Organic Chemical Industries Ltd. (NOCIL). Messrs. Bharat Pulverising Mills.
2	Aldrin 10% dust	.. Aldrex 10% dust Hexamar aldrin 10% dust	.. Messrs. NOCIL. Messrs. Bharat Pulverising Mills.
3	Aldrin 40% dust	.. Aldrex 40% dust Hexamar aldrin 40% dust	.. Messrs. NOCIL. Messrs. Bharat Pulverising Mills.



Serial No.	Name of pesticide and its formulation.	Trade names.	Names of the firm(s)
1	2	3	4
4	Aldrin 30% E. C.	Aldrex 30% E.C. Hexamar 30% E.C.	Messrs. NOCIL. Messrs. Bharat Pulverising Mills.
5	Aldrin 5% W.P.	Aldrex 50% W.P. Hexamar 50% W.P.	Messrs. NOCIL. Messrs. Bharat Pulverising Mills.
6	Aramite 25% E.C.	....	Messrs. Rallis India Ltd Messrs. NOCIL.
7	Azinphos 50% E. C.	Gusathion	Messrs. Bayer India Ltd.
8	BHC 5% dust	Hexamar BHC 5% dust. Micosane D-05 Hexidole 805 Gammexane D.025 Intox BHC 5% dust Hortex 5% dust	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co. Messrs. Rallis India, Ltd. Messrs. I.C.I. (India) Pvt. Ltd., Messrs. Sandoz (India) Pvt. Ltd., Messrs. Bombay Chemicals.
9	BHC 10% dust	Hexamar BHC 10% dust. Micosane D-10 Hexidole 810 Gammexane D-120 Intox BHC 10% dust Hortex 10% dust	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co., Messrs. Rallis India Ltd., Messrs. I.C.I., India Pvt. Ltd., Messrs. Sandoz India Ltd., Messrs. Bombay Chemicals.
10	BHC 50% WP	Hexamar BHC 50% Micosane W-50 Hexidole 950 "Gammexane" W.D.P. Intox BHC 50% WP Hortex 25% WP	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co., Messrs. Rallis India Ltd., Messrs. I.C.I. (India) Ltd., Messrs. Sandoz India Pvt. Ltd., Messrs. Bombay Chemicals.
11	BHC 20% E.C.	"Gammexane" 20% E.C. Lintaf 20	Messrs. I.C.I. (India) Ltd. Messrs. Rallis India Ltd.,
12	Carbaryl 10% dust	Sevin 10% dust Hexavin dust 10%	Messrs. Union Carbide Ltd., Messrs. Bharat Pulverising Mills.
13	Carbaryl WP	Sevin 85% WP Hexavin WP	Messrs. Union Carbide Ltd., Messrs. Bharat Pulverising Mills.
14	Carbophenothion E.C.	Trithion 20% E.C.	Messrs. Mysore Insecticides Co.

Serial No.	Name of pesticide and its formulation.	Trade names.	Names of the firm(s).
1	2	3	4
15	Carbophenothion dust ..	Trithion 2% dust ..	Messrs. Mysore Insecticides Co.
16	Chlordane 5% dust ..	Hexamar chlordane 5% dust. Mico 5% chlordan ..	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co.
17	Chlordane 10% dust ..	Hexamar chlordane 10% dust. Mico 10% chlordan .. Intox 'S'—10% dust ..	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides, Messrs. Sandoz Indian Ltd.,
18	Chlordane 75% E.C. ..	Hexamar chlordane 75% E.C. Mico 75% chlordan E.C. Intox 'S' liquid 70% E.C	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co. Messrs. Sandoz India Ltd.,
19	Chlordane 20% E.C. ..	Termex (for control of termites).	Messrs. Rallis India Ltd.,
20	Chlorobenzilate ..	..... Akar 25% E.C. ..	Messrs. NOCIL. Messrs. Rallis India Ltd.
21	DDT 5% dust ..	Hexamar DDT 5% .. Lotexdit D-05 .. Guesarol 405 .. Intox DDT 5% ..	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co. Messrs. Rallis India Ltd., Messrs. Sandoz India Ltd.
22	DDT 10% dust ..	Hexamar DDT 10% .. Lotexdit D-10 .. Geigy 33 .. Intox DDT 10% ..	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co. Messrs. Rallis India Ltd. Messrs. Sandoz India Ltd.
23	DDT 50% WP ..	Hexamar DDT 50% .. Lotexdit W-50 .. Guesarol 550 .. Intox DDT-50% ..	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co. Messrs. Rallis India Ltd. Messrs. Sandoz India Ltd.
24	DDT E.C. ..	Hexamar DDT 25% E.C. Lotexdit 25% E.C. .. Geigy-125 .. Dydimac 25% ..	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co. Messrs. Rallis India Ltd., Messrs. I.C.I. India Ltd.,
25	Diazinon 20% E.C. ..	Basudin 20% E.C. ..	Messrs. Rallis India Ltd.
26	Diazinon 10% WP ..	Basudin 10W ..	Messrs. Rallis India Ltd.

Serial No.	Name of pesticide and its formulation.	Trade names.	Names of the firm(s)
1	2	3	4
27	Dicofol 50% WP	.. Kelthane	.. Messrs. NOCIL.
28	Dieldrin 18% E.C.	.. Dieldrex 18% E.C.	.. Messrs. NOCIL.
29	Dieldrin 20% E.C.	.. Ensodil	.. Messrs. NOCIL.
30	Dimethoate 40%	.. Rogor ..	.. Messrs. Rallis India Ltd.
31	Disulfoton 5% granules.	.. Solvirex .. Disyston	.. Messrs. Sandoz India Ltd., .. Messrs. Bayer India Ltd.,
32	ED/CT mixture	.. ....	Messrs. Bayer India Ltd.,
33	Endosulfan 35% E. C.	.. Thiodan ..	.. Messrs. Hoechst Phar. Ltd.,
34	Endrin 20% E.C.	.. Tafdriin 20 .. Endrex 20% E.C. Mico 20% endrin Hexamar 20% endrin	.. Messrs. Rallis India Ltd., .. Messrs. NOCIL. .. Messrs. Mysore Insecticides Co. .. Messrs. Bharat Pulverising Mills.
35	Endrin 1% dust	.. Hexamar endrin 1% Endrex 1% dust.	.. Messrs. Bharat Pulverising Mill. .. Messrs. NOCIL.
36	Heptachlor 3%	.. Mico 3% heptachlor Heptaf 3%	.. Messrs. Mysore Insecticides Co. .. Messrs. Rallis India Ltd.
37	Heptachlor 5%	.. Mico 5% heptachlor Heptaf 5%	.. Messrs. Mysore Insecticides, Co. .. Messrs. Rallis India Ltd.
38	Heptachlor 6%	.. Mico 6% heptachlor Heptaf 6%	.. Messrs. Mysore Insecticides Co. .. Messrs. Rallis India Ltd.
39	Heptachlor 20% E.C.	.. Mico 20% heptachlor	.. Messrs. Mysore Insecticides Co.
40	Heptachlor 25% E.C.	.. Mico 25% heptachlor	.. Messrs. Mysore Insecticides, Co.
41	Isobenzan 1% dust	.. Telodrin 1% dust	.. Messrs. NOCIL.
42	Isobenzan 15% E.C.	.. Telodrin 15% E.C.	.. Messrs. NOCIL.
43	Lindane 0.65% dust	.. Geigy vegetable dust Hexamar lindane Micodane D-065	.. Messrs. Rallis India Ltd. .. Messrs. Bharat Pulverising Mills. .. Messrs. Mysore Insecticides, Co.
44	Lindane 6.5% WP WP	.. Hexamar lindane 6.5% W.D.P. Micodane W-065	Messrs. Bharat Pulverising, Mills. .. Messrs. Mysore Insecticides Co.

Serial No.	Name of pesticide and its formulation.	Trade names.	Names of the firm(s)
1	2	3	4
45	Lindane 20% E.C.	Hexamar lindane 20 % E.C. Micodane 20% E.C.	Messrs. Bharat Pulverising Mills. Messrs. Mysore Insecticides Co.
46	Lindane 1.3% dust	Hexamar lindane 1.3% Micodane D-01 1% dust	Messrs. Bharat Pulverising, Mills Messrs. Mysore Insecticides Co.
47	Malathion 50% E.C.	Malamar 50% E.C. Malathion 50% E.C. Mico 50% malathion	Messrs. Bharat Pulverising Mills. Messrs. Cyanamid India Ltd. Messrs. Mysore Insecticides Co.
48	Malathion dust	Malamar 5% dust Malathion 4% dust	Messrs. Bharat Pulverising Mills. Messrs. Cyanamid India Ltd.
49	Malathion 25% WP	Malamar 25% WP	Messrs. Bharat Pulverising Mills.
50	Menazon 70% WP	Sayfos	Messrs. I.C.I. Pvt. Ltd.
51	Methyl demeton 25% E.C.	Metasystox	Messrs. Bayer India Ltd.
52	Methyl parathion	....	Messrs. Bayer India Ltd.
53	Mevinphos	Phosdrin	Messrs. NOCIL.
54	Dibromochloropane	Nemagon	Messrs. NOCIL.
55	Nicotine sulphate	Black leaf 40	....
56	Parathion 50% E.C.	Folidol E 605 Paramar 50% E.C. Ekatox	Messrs. Bayer India Ltd. Messrs. Bharat Pulverising Mills. Messrs. Sandoz India Ltd.
57	Parathion 2% dust	Folidol 2% dust Paramar 2% dust Ekatox 2% dust	Messrs. Bayer India Ltd. Messrs. Bharat Pulverising Mills. Messrs Sandoz India Ltd.,
58	Parathion 1% dust	Ekatox 1% dust Paramar 1% dust	Messrs. Sandoz India Ltd., Messrs. Bharat Pulverising Mills.
59	Phorate 10% G.	Thimet	Messrs. Cyanamid India Ltd.
60	Phosphamidon WP & E.C.	Dimecron 100% 50%, 20%, E.C. 50% WP.	Messrs. Ciba India Ltd.

Serial No.	Name of pesticide and its formulation.	Trade names.	Names of the firm(s).
1	2	3	4
61	Pyrethrum ..	....	Messrs. Bombay Chemicals.
62	Sulphur WP ..	Thiovit 80% Sultaf .. Solbar ..	.. Messrs. Sandoz India Ltd. .. Messrs. Rallis India Ltd. .. Messrs. Bayer India Ltd.
63	Thiometon 25% E.C. ..	Ekatin 25%	.. Messrs. Sandoz India Ltd.
64	Morphothion 3% dust ..	Ekatin M. dust	.. Messrs. Sandoz India Ltd.,
65	Thuricide dust or WP ..	....	Messrs. Mysore Insecticide Co.
66	Toxaphene 10% dust dust ..	....	Messrs. Bharat Pulverising Mills.
67	Toxaphene 5% dust ..	....	Messrs. Bharat Pulverising Mills.
68	Trichlorphon 80% ..	Dipterex ..	.. Messrs. Bayer India Ltd.,
69	Zinc phosphide powder ..	....	Messrs Bharat Pulverising Mill.

\* WP = Wettable powder.

† E.C. = Emulsifiable concentrate.