

HERBICIDES

(How poisonous are they?)

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Introduction

The answer is always a relative one — “Compared to what?”

Most herbicides are relatively non-toxic to man. A few, however, are quite poisonous. All must be handled with utmost care. Note that “caution with” — and “fear of” are not equivalent statements. Almost every imaginable substance can be poisonous and American agriculture uses millions of pounds of herbicides annually. America also produces the purest, highest quality food on earth.

To obtain information on toxicity, the herbicides are tested on various animals: mice, rats, etc. Few have been tested on humans. Therefore, the toxicity ratings given hereafter are the known effects on animals and it is probable that the herbicide will produce similar effects on man. Certain individuals may be allergic to a bland chemical or its carrier whereas other individuals may be resistant to some of the more toxic substances.

It should be mentioned that the LD-50 values (lethal to 50% of the animals tested) are for

a single dosage. Repeated treatments over long periods may give different results.

Any herbicide ingested in sufficient quantities can cause ill effects. Some are readily absorbed through the skin, others affect the eyes, and some produce disagreeable results when inhaled.

When using any herbicide always:

1. Read the entire label carefully. Be sure to study and follow the precautions on the label.
2. Avoid spilling the material on your skin or clothing. It is best to wear rubber footwear, long sleeves, rubber gloves and other designated protective clothing. In case of spillage, wash the contacted areas immediately with soap and water.
3. Do not smoke while using chemicals.
4. After using chemicals, change clothes and *wash thoroughly*. This is especially important if the chemical has been spilled on clothing or skin.

The following table gives the common name and one or more trade names of about 100 herbicides that have extensive to minor usage in this state.

Numerical toxicity rating is based on a modification of the classification of pesticides in the

Cooperative Extension Service
College of Agriculture

Agricultural Experiment Station
University of Idaho

Toxicity Response of Small Animals of Indicated Herbicide Dosages

| Common Name or Designation | Some Common Trade Names | LD-50 Mg./Kg. | Ingested Toxicity Rating* | Dermal Response Rating** | Mfg. Company*** |
|----------------------------|----------------------------|---------------|---------------------------|--------------------------|-------------------------------|
| Acrolein | Aqualin | 46 | 2 | 2 | Shell |
| Alachlor | Lasso | 1,700 | 4 | 4 | Monsanto |
| Ametryn | Ametryn | 1,110 | 4 | 5 | Geigy |
| AMS | Ammate | 1,600 | 4 | 5 | DuPont |
| Amiben | Amiben, Vegiben | 3,500 | 4 | 5 | Amchem |
| Amitrole | Amino Triazole Weedazol | 15,000 | 6 | 5 | American Cyanamid |
| Amitrole-T | Amitrol-T, Cytrol | 5,000 | 4-5 | 4 | Amchem |
| Aromatic solvents | Various brands | — | 3 | — | |
| Aspirin | (For Comparison) | 750 | 4 | — | |
| Atrazine | Atrazine | 3,080 | 4 | 5 | Geigy |
| Bandane | Bandane | 540 | 4 | 4 | Velsicol |
| Barban | Carbyne | 1,350 | 4 | 5 | Gulf |
| Benefin | Balan | 10,000 | 4 | 3 | Lilly |
| Bensulide | Betasan, Prefar | 770 | 4 | 4 | Stauffer |
| Borate | Borax, Borascue | 2,500 | 4 | 4 | U.S. Borax |
| Bromacil | Hyvar X | 5,200 | 5 | 5 | DuPont |
| Bromoxynil | Buctril, Brominil | 260 | 3 | 3 | Amchem-Chipman |
| Butylate | Sutan | 2,000 | 4 | 3 | Stauffer |
| Cacodylic acid | Ansar 560, 120 | 1,000 | 4 | 5 | Ansul |
| Calcium arsenate | Various brands | 35 | 2 | 4 | Chipman, etc. |
| Calcium cyanamide | Aero-Cyanamide | 1,400 | 4 | — | Am. Cyanamid |
| CDA | Randex | 700 | 4 | 2 | Monsanto |
| CDEC | Vegadex | 850 | 4 | 3 | Monsanto |
| Chloroxuron | Tenoran | 2,700 | 4 | 5 | C.I.B.A. |
| Chloropicrin | Teargas | 0.5 | 1 | 2 | Dow and Others |
| Chloropropham (CIPC) | Chloro-IPC | 5,000 | 5 | 5 | PPG |
| CMA | Super-Dal-E-Rad | 440 | 3 | 5 | Ansul |
| Copper sulfate | Various brands | 300 | 3 | — | |
| Cycloate | RoNeet | 2,000 | 4 | 3 | Stauffer |
| Dalapon | Dowpon | 9,300 | 4 | 4 | Dow |
| DCPA | Dacthal | 3,000 | 4 | 5 | Diamond-Shamrock |
| Diallate | Avadex | 395 | 3 | 3 | Monsanto |
| Dicamba | Banvel D | 1,040 | 4 | 4 | Velsicol |
| Dichlobenil | Casoron | 2,460 | 4 | 5 | T. Hayward |
| Dichlone | Phygon | 1,380 | 4 | 3 | Naugatuck-div. U.S. Rubber |
| Diphenamid | Dymid, Enide | 2,200 | 4 | 4 | Elanco |
| Diquat | Diquat | 400 | 3 | 3 | Chevron Ortho Div. |
| Diuron | Karmex | 3,400 | 4 | 4 | DuPont |
| DMTT | Mylone | 500 | 4 | 4 | U. Carbide |
| Dinoseb | Sinox, Dow General | 30 | 2 | 1 | Dow-Niagra |
| Dinoseb (amine) | Premerge, Sinox PE | 40 | 2 | 1 | Dow-Niagra |
| DSMA | Sodar, Ansar, Methar | 600 | 4 | 3 | Ansul-Niagra |

* The toxicity ratings in the table have the following relative meanings when taken internally:

| Toxicity rating | Class activity | LD 50 (Mg./Kg.) | Probable lethal dose for 150-lb. man |
|-----------------|------------------|------------------|--------------------------------------|
| 1 | Extremely toxic | less than 5 | A taste (less than 7 drops) |
| 2 | Very toxic | 5 to 49 | 7 drops to 1 teaspoonful |
| 3 | Moderately toxic | 50 to 499 | 1 teaspoon to 1 ounce |
| 4 | Slightly toxic | 500 to 4,999 | 1 ounce to 1 pint (1 pound) |
| 5 | Almost Nontoxic | 5,000 to 14,999 | 1 pint to 1 quart |
| 6 | Nontoxic | 15,000 and above | more than 1 quart |

** Dermal response ratings have the following relative meanings:

1. Absorbed and poisonous
2. Causes burns and blisters
3. Moderately Irritating
4. Mildly Irritating
5. Nonirritating

*** May not be sole or primarily manufacturer(s).

Toxicity Response of Small Animals to Indicated Herbicide Dosages

| Common Name or Designation | Some Common Trade Names | LD-50 Mg./Kg. | Ingested Toxicity Rating* | Dermal Response Rating** | Mfg. Company** |
|----------------------------|-------------------------|---------------|---------------------------|--------------------------|-------------------------------|
| Endothal | Endothal, Aquathol | 35 | 2 | 3 | Pennsalt |
| EPTC | Eptam | 1,630 | 4 | 4 | Stauffer |
| Erbon | Baron, Novon | 1,000 | 4 | 3 | Dow |
| Fenac | Fenac | 3,000 | 4 | 5 | Amchem |
| Fenuron | Dybar | 6,400 | 5 | 4 | DuPont |
| Fenuron + TCA | Urab | 4,000 | 4 | — | |
| Fluometuron | Cotoran | 8,900 | 5 | 5 | CIBA |
| Gasoline | Various brands | — | 3 | 4 | |
| Kerosene | Various brands | — | 2-3 | 4 | |
| Linuron | Lorox | 1,500 | 5 | — | DuPont |
| MAMA | Ansar, Methar | 720 | 4 | — | Ansul, etc. |
| MCPB | Various brands | — | — | — | Chipman |
| MCPA | Various brands | 700 | 4 | 4 | |
| MCPP | Mecoprop, Mecopex | 650 | 4 | — | Chipman |
| Methyl bromide | Various brands | 17 ppm (air) | 2 | 2 | Dow, etc. |
| Metobromuron | Patoran | 2,700 | 4 | 5 | CIBA |
| MH (amine) | MH-30 | 2,340 | 4 | 5 | Naugatuck-div. U.S. Rubber |
| Monuron | Telvar | 3,500 | 4 | 4 | DuPont |
| Monuron + TCA | Urox-Various | 2,300 | 4 | — | |
| MSMA | Weed-E-Rad, Ansar | 700 | 4 | — | Ansul |
| Nitraline | Planavin | 2,000 | 4 | 4 | |
| Nitrofen | Tok | 2,630 | 4 | 4 | Rohm-Haas |
| Norea | Herban | 2,500 | 4 | 5 | Hercules |
| NPA | Alanap (Na. salt) | 1,770 | 4 | 5 | Naugatuck-div. U.S. Rubber |
| Paraquat | Paraquat | 150 | 3 | 2 | Chevron |
| PBA | Benzac, Zobar | 700 | 4 | — | Amchem |
| PCP (Na. salt) | Weedbeads | 210 | 3 | 1 | Monsanto, etc. |
| Pebulate | Tillam | 1,120 | 4 | 4 | Stauffer |
| Petroleum solvents | Various brands | — | 4 | 1 | |
| Phenmedipham | Betanol | 4,000 | 4 | 5 | Nor-Am |
| Picloram | Tordon | 8,200 | 5 | 4 | Dow |
| PMA | PMAS, TAT-C-Lect | 40 | 2 | 2 | Cleary Corp. |
| Prometone | Prometone | 2,980 | 4 | 5 | Geigy |
| Prometryne | Caparol | 3,750 | 4 | 5 | Geigy |
| Propanil | Stam F-34, Rogue | 1,384 | 4 | 5 | Rohm-Haas |
| Propazine | Propazine | 5,000 | 4 | 5 | Geigy |
| Propham (IPC) | ChemHoe | 3,000 | 4 | 5 | PPG |
| Propochlor | Ramrod | 1,200 | 4 | 1 | Monsanto |
| Pyrazon (PCA) | Pyramin | 3,600 | 4 | 3 | BASF |
| Sesone | Sesone | 1,000 | 4 | 4 | Un. Carbide |
| Siduron | Tupersan | 2,500 | 5 | 5 | DuPont |
| Silvex | Kuron, Weedone-TP | 500 | 4 | 4 | Dow, etc. |
| Simazine | Simazine | 5,000 | 4 | 5 | Geigy |
| SMDC | Vapam | 285 | 3 | 3 | Stauffer |
| Sodium arsenite | Atlas A | 10 | 2 | 1,2 | Allied |
| Sodium Chlorate | Atlacide | 850 | 4 | 4 | Chipman-etc. |
| Table salt (NaCl) | (For comparison) | 3,320 | 4 | | |
| Tandex | Tandex | 3,000 | 4 | 5 | Niagra |
| TCA | Various brands | 3,370 | 4 | 2 | Dow, etc. |

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|----------------------------|-------------------------|---------------|---------------------------|--------------------------|-------------------|
| Terbacil | Sinbar | 7,500 | 5 | 5 | DuPont |
| Terbutryn | Ingran | 2,100 | — | — | Geigy |
| Triallate | Avadex BW | 1,340 | 4 | 3 | Monsanto |
| Trifluralin | Treflan | 3,700 | 4 | 4 | Elanco |
| 2, 3, 6-TBA | Trysben, Benzac | 1,644 | 4 | 5 | DuPont, etc. |
| 2, 4-D | Various brands | 500 | 4 | 4 | |
| 2, 4-DB | Butyrac, Butoxone | 500 | 4 | — | Chipman Amchem |
| 2, 4-DEP | Falone | 850 | 4 | 4 | Naugatuck |
| 2, 4, 5-T | Various brands | 300 | 3 | 4 | |
| Vernolate | Vernam | 1,780 | 4 | 4 | Stauffer |

Federal Insecticide, Fungicide, and Rodenticide Act; from "Clinical Toxicology of Commercial Products" by Gleason, M.N., Gosselin, R. E., and Hodge, H. D. Williams and Wilkins Co., Baltimore, Md., 1963; from 1966 Pesticide Manual, North Carolina State University; and from data supplied by numerous basic product manufacturers.

Discussion

Before any herbicide can be marketed, its toxicity to animals must be registered with the Department of Health, Education and Welfare, and its usefulness as an herbicide must be established with the U. S. Department of Agriculture. These dual regulations place very strict requirements on the development, federal registration, and labeling of all herbicides. These rigid regulations are undoubtedly responsible, in part, for the extremely low number of known cases of herbicide poisoning.

However, accidents do happen and severe errors have been made. The major difficulties have been:

1. failure to read the label.
2. availability to small children.
3. carelessness in handling, leaving containers open, not destroying old containers.

Federal regulations also extend to limiting the quantity of any herbicide that can remain as a residue in any treated crop.

Poison Control Centers

Boise—Poison Information Center, St. Luke's Hospital, 130 East Bannock. 342-7781, Ext. 761. Don J. Ness, Chief Pharmacist.

Spokane, Poison Information Center Deaconess Hosp., W. 800 5th Ave., Riverside 747-4811 (Area Code 509), Harry H. Olsen, M. D., Director; Anna Mae Erickson, R. N. Assistant Director.

Food inspection for pesticide residues is constantly in progress and some shipments with residues in excess of tolerance have been seized and destroyed. To assure the highest quality of food, inspection and detection services are provided by both Federal personnel and by our Idaho State Department of Agriculture.

The ultimate question is, what influence have herbicides and other pesticides had on public health? Recently Drs. R. C. Teal, M. D., and C. H. Hine, M. D., Ph.D., representing the California Medical Association testified as follows:

1. "There has been no increase in morbidity (proportion of diseased persons) due to the ingestion of agricultural chemicals."
2. "Surveys show—the total public health has improved by the use of pesticides."
3. "Pesticides constitute only a moderate health hazard."
4. "Accidental ingestion by children and adults is due to careless handling. Therefore, more educational efforts are desirable."

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JAMES E. KRAUS, Director