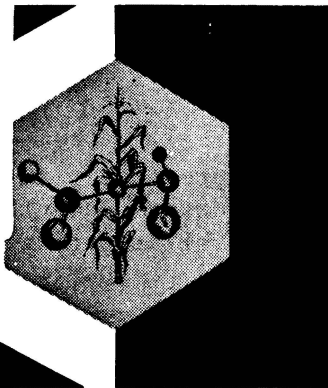


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CHEMICAL-DRUG-PESTICIDE

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HELPFUL SERVANTS AND EVERYDAY HAZARDS

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If Socrates could return to life today, he might be amazed to learn that his "juice of the hemlock" was not "a poison" but a cluster of poisons. The many "hemlocks" of an ancient day have yielded a profusion of toxic substances with an apparent endless capacity; serving and harming mankind in proportion to their suitability and proper use. To a degree it may be maintained that the number of toxic agents surrounding a people constitutes an index of its cultural development. Intelligent men in their desire to make the best use of the abundance of materials about them inescapably will uncover and produce limitless combinations of substances some of which will prove to possess dangerous properties. We attach no guilt to the chemist, who because of a commendable curiosity to learn of what a lump of coal consists, first produced benzene. This plentiful substance, like a countless number of others, is at the same time one of man's helpful servants and one of his treacherous enemies.

While the number of potentially hazardous substances knowingly or accidentally isolated by scientists may mark milestones of racial advancement, the "poisonings" of human beings in proportion to their number serve as an index of our deficiency in plans for human living. Whether by accident, carelessness, unconcern, ignorance, or superstition, the number of poisonings among our people represents a tangible need for a greater awareness of the hazards as well as the great benefits from use of chemicals, drugs, and pesticides in our daily living. Today, in a world still far removed from human perfection our efforts are directed toward the beneficial actions of man's natural and synthetic agents.

Acute and chronic chemical poisonings in the home and on the farm often arise through misuse of commercial products, and evidence is increasing that there are hundreds of nonfatal cases for every fatality.

Any substance, may be considered a poison which, acting directly through its inherent chemical properties, and by its ordinary action, is capable of destroying life, or of seriously endangering health, when it is applied to the body externally or in moderate doses internally. This is somewhat arbitrary and excludes substances which are injurious only in very large amounts and injurious physical, mechanical, and bacterial agents.

Poisoning may be classified as accidental, suicidal, industrial, and criminal. The statistics for these vary from year to year.

Suspicion of poisoning is aroused if a personal or animal previously in good health, shows rather sudden sickness which becomes rapidly worse, and the suspicion becomes more firm if the symptoms appear a short time after eating a substance which may have an unusual odor or taste.

The following symptomatic classes of poisons are generally recognized:

1. Irritants - either mild and simple irritants or corrosives according to their actions.
2. Nerve Poisons - most of these are fatal in very small amounts. They act on the neuromuscular apparatus and are subdivided into three groups: convulsants which cause spasms, cardiac poisons which stop the heart, and somnifacients which produce sleep and coma.
3. Blood Poisons - those which alter the hemoglobin or blood corpuscles. These include the toxic gases, the nitrites etc.

The degree to which pesticide compounds and other commercial products are poisonous or toxic varies widely. The simplest way of expressing toxicity of a compound is by means of an LD₅₀ (lethal dosage) value. An LD₅₀ value is an estimate of amounts of a chemical which, when applied under stated conditions to a large number of named laboratory animals, kills 50% of them. This toxicity value is generally expressed in milligrams of the chemical per kilogram of body weight of the laboratory animal (mg./kg.). The values are obtained for laboratory animals (mice, rats, rabbits, and guinea pigs) and can be applied to man only with reservations. Toxicity may also be expressed in the following commonly used terms:

<u>Commonly used term</u>	<u>Oral LD₅₀ in rats (mg. per kg.)</u>	<u>Probable lethal dose in man</u>
Extremely toxic	1 or less	1 grain
Highly toxic	1 - 50	1 teaspoon
Moderately toxic	50 - 500	1 oz.
Slightly toxic	500 - 5,000	1 pint
Practically non-toxic	5,000 - 15,000	1 quart
Relatively harmless	Over 15,000	More than 1 quart

Of the more than 250,000 commercial products available for use about the home and farmstead which contain potentially harmful substances; analysis of 15,000 indicate 79% were moderately toxic or worse.

LD (50-124) mg./kg.
50

Organic Phosphates			
Name	Oral LD	Dermal	
		50	LD 50
coumaphos (CO-RAL)	56	56	860
(Meta-Systox R)	56	76	250
(Diazinon)	76	80	4000
dichlorvos (DDVP, Vapona)	80	96	75
ethion	96	98	--
methyl trithion	98		190

Chlorinated Organics			
Name	LD	Dermal	
		50	LD 50
heptachlor	60	60	195
pentachlorophenol	70	70	--
lindane	88	88	900
dichloroethyl ether	105	105	--

Miscellaneous Products			
Aloe			
Antipyrine			
Aspirin			
BAL			
Benzene			
Benzalkonium Chloride			
Boric Acid			
Caffeine			
Camphor			
Camphorated Oil			
Carbolic Acid			
Carbon Tetrachloride			
Chloral Hydrate			
Chlorpromazine			
Creosote			
Digitalis			
Fowler's Solution			
Laudanum			
Menthol			
Nux Vomica			
Oil of Wintergreen			
Oxalic Acid			
Pehnacetin			
Phenobarbital			
Plumbers' Acid			
Quinine			
Red Lead			
Reserpine			
Resorcinol			
Roccal			
Secobarbital Sodium			
Silver Nitrate			
Sodium Perborate			
Tranquilizers			
Zephiran Chloride			

Other Organic			
Name	Oral LD	Dermal	
		50	LD 50
(Lethane 384)	0.5	0.5	500
nicotine	50	50	--
1-10 mg./kg. (L-Human)			
nicotine sulfate			
(Black Leaf 40)	38	38	285
endothall	38	38	750
dimetilan (snip)	50	50	200
warfarin	58	58	--
binapacryl (morocide)	58	58	720
(Dexon)	60	60	--
pyrolan	62	62	--
dinitrophenols-2-			
cyclohexyl-R	80	80	--
acrylonitrile	90	90	--
dinobuton (dessin)	95	95	884
baygon	95	95	1000+
triphenyl tin hydroxide (du-ter)	108	108	5000

Inorganic			
Name	Oral LD	Dermal	
		50	LD 50
dibasic sodium arsenate	50	50	--
cadmium chloride (caddy)	88	88	--

LD₅₀ (0-49) mg./kg.

Organic Phosphates				
Name	Oral LD		Dermal LD	
	50		50	
tepp	1.2		2.4	
phorate	2.5		3	
disulfoton	2.6		20	
(Tetram)	3		--	
paraoxon	3.5		--	
(zinphos)	3.5		11	
sulfotepp	5		8	
dimefox	5		--	
parathion	6		30	
mevinphos (Phosdrin)	6		14	
demeton (Systox)	6		14	
schradan (OMPA)	8		15	
methyl parathion	9		67	
azinphosmethyl (Guthion)	11		220	
(Shell compound 4072)	14.5		31	
E-838 (Potasan)	15		--	
dimethyl parathion	15.2		--	
phosphamidon (Dimecron)	17		267	
(azodrin)	21		354	
(Bidrin)	22		225	
carbophenothion (Trithion)	28		1270	
dioxathion (Delnav)	40		235	
EPN	42		30	

Chlorinated Organics				
Name	Oral LD		Dermal LD	
	50		50	
endrin	5		18	
chloropicrin	5		--	
(isodrin) (Primin)	12		35	
aldrin	38		98	
dieldrin	38		90	
endosulfan (Thiodan)	40		359	
toxaphene	40		1075	

Other Organic				
Name	Oral LD		Dermal LD	
	50		50	
carbanolate (Temik)	0.65		2.5	
sodium fluoracetate 2 mg./kg. (L-Human)	1		--	
strychnine	1		--	
cycloheximide (acti-dione)	1.8		--	
Zectran	15		1,500	
paris green	22		2,400	
nornicotine	23		--	
dinitro-o-cresol (DNOC)	30		--	
organic mercury compounds	30		--	
methyl bromide gas	very toxic		--	

Inorganic				
Name	Oral LD		Dermal LD	
	50		50	
hydrogen cyanide	0.04 gm. (L-Human)		--	
sodium arsenite	10		--	
arsenic trioxide	13		--	
potassium arsenite	0.5 gm. (L-Human)		--	
thallium sulfate	14		--	
calcium arsenate	25		--	
zinc phosphide	35		--	
	40.5		--	

LD50 (125-749) mg./kg.

Organic Phosphates		
Name	Oral LD	Dermal LD
	50	50
(Ciodrin)	125	385
(Imidan)	147	3160
dimethoate (Cygon)	215	500
fenthion	215	500
maled (Dibrom)	430	1,100
trichlorfon (Dipterex)	450	2,000
(Ruelene)	490	4,000

Other Organic		
Name	Oral LD	Dermal LD
	50	50
rotenone	132	--
cycloheximide (Actidone)	133	--
ethylene	146	300
ethylene dibromide (EDB)	146	--
paraquat	157	--
(Red Squill)	200	--
pyrethrins	200	1800+
nabam	395	--
diallate (avadex)	395	--
diquat dibromide	400	500
(Mylone)	500	--
(Lethane 60)	500	--
naphthyl acetamid (amid-thin)	500	--
carbaryl (sevin)	500	4,000
DSMA or disodium methylarsonate	600	--
allethrin	680	--
diphenamid (Dymind, Enide)	700	--
dinocap	980	--

Inorganic		
Name	Oral LD	Dermal LD
	50	50
cryolite	200	--
bordeaux mixture	300	1000+

Chlorinated Organics		
Name	Oral LD	Dermal LD
	50	50
kepone	125	2000+
D-D (Vidden D)	140	2,100
DBCP	173	1,420
(Nemagon) (Fumazone)	173	1,420
(Lanstan)	197	362
chlordane	200	840
(Strobane)	200	5,000
DDT	250	2,510
dichloropropene (Telone)	250	--
DMC	250	--
DMPA (Zytron)	270	--
(V-C 13)	270	--
2,4,5-T-acid	300	--
(Vorlex)	305	--
(Mirex)	306	2,000
2,4-D-acid	375	--
2,4,5-T-mixed butyl ester	481	--
2,4,5-T-isopropyl ester	495	--
(Bandene)	575	12,000
(Dilan)	600	6,900
2,4-D-mixed butyl ester	620	--
mecoprop (MCPPE)	650	--
silvex	650	--
2,4-D-sodium salt	666	--
(MCPA)-acid	700	--
2,4-D-isopropyl ester	700	--
chloroacetamides (CDAA)	700	--

Miscellaneous Products	
Acetone	Terpin Hydrate
Alum	Turpentine
Antu	Undecylenic Acid
Borax	Vanilla
Butyl Alcohol	Varsol
Chloramine-T	Wood Alcohol
Chloroform	
Disel Fuel	
Epsom Salts	
Ethylene Glycol	
Formalin	
Gasoline	
n-butyl chloride	
Novocaine	
Paregoric	
PAS	
Phenothiazine	
Pine Oil	
Rubber Solvent	
Sodium Silicate	
Sodium Sulfite	
Sodium Thioglycollate	
Sodium Thiosulfate	
Sulfanilamide	
Tannic Acid	

Organic Phosphates		
Name	Oral LD 50	Dermal LD 50
tetradifon (Tedion)	1,400	--
(Chlorthion)	1,500	1,400
malathion	1,500	4,444
dichlone (Phygon)	1,500	--
ronnel (Korlan, Trolene)	1,740	5,000
(abate)	4,000	1,300

Chlorinated Organics		
Name	Oral LD 50	Dermal LD 50
ethylene dichloride	770	3,890
dicofol	800	1,230
CDEC (Vegelex)	850	--
2,4 Dep (falone)	850	--
2,4 Des, sesone	1,000	--
DBH	1,000	--
chlorobenzilate	1,040	5,000
DFDT	1,120	--
chlorophenory: MCPA amine sale	1,200	--
phygon (Dichlone)	1,300	--
fenson	1,350	--
(Genite EM-923)	1,400	--
(Sulphenone)	1,400	--
linuron (lorox)	1,500	--
pentachloronitro- benzene (PCNB)	1,710	--
(Fenac)	1,780	3160
paradichlorobenzene	2,000	--
ovex	2,050	--
Pyrazon-Pyramin	2,500	--
(Dyrene)	2,710	--
dacthal	3,000	--
atrazine	3,080	--
(pentac)	3,160	3160
TDE (DDD)	3,400	4,000
amiben (Amiben, Vegiben)	3,500	3,136
chloranil (Spergon)	4,000	--
(Perthane)	4,000	--
(botran)	4,040+	--
(difolatan)	4,600	--
methoxychlor	5,000	6,000
(acaralate)	5,000+	4,000+
propazine	5,000+	--
simazine	5,000	--
CIPC	5,000-7,500	--
(Neotran)	5,800	--
BBH	6,000	--
dalapon	6,600-9,000	--
folpet (Phaltan)	10,000	--
tetradifon (Tedion)	14,700	10,000

Miscellaneous Products		
Algin		
Aluminum Hydroxide		
Calamine		
Castor Oil		
Ethyl Alcohol		
Lysol		
Piperazine		
Soaps		
Titanium Oxide		
Witch Hazel		

Chlorinated Organics (continued)		
Name	Oral LD 50	Dermal LD 50
captan	15,000	--
kerosene	28,000	--

Other Organic		
Name	Oral LD 50	Dermal LD 50
ryania	750	4,000
bensulide (Betasan)	770	3,950
thiram	780	--
ethoxyquin (stop scald)	800	--
sodium methyl dithio- carbamate (Vapam)	820	--
carbaryl (Sevin)	850	4,000
cyfluthrin	900	--
methaldehyde	1,000	--
dodine	1,000	--
naphthalene acetic acid NAA	1,000	--
isobornyl thiocyno- acetate (Thanite)	1,000	6,000
PEBC (Tillam)	1,120	2,936
Glyodin base	1,300	--
ziram (Zerlate)	1,400	--
pyrethrins	1,500	--
CDED, EPTC (Eptam)	1,630	10,000
morestan	1,800	2,000
planavin	2,000	2,000
NPA (Alanap-3)	2,000	--
maleic hydrazide amine	2,340	4,000
terbam	2,700	--
dichlobenil (Casoron)	3,160	--
trifluralin (Treflan)	3,700	--
(Prometryne)	3,750	--
(Aramite)	3,900	--
xylene	4,000	--
phenothiazine	5,000	--
(Prometone)	5,000	--
zineb	5,200	--
bromocil (hyvar-x)	5,200	--
streptomycin	6,000	--
(Polyram)	6,400	--
maneb	7,500	--
fenuron (Dybar)	7,500	--
siduron (tupersan)	7,500+	5,500+
benefin (bolan)	10,000+	--
amitrole	14,000	--
bacillus thuringiensis (thuricide)	15,000+	--

Inorganic		
Name	Oral LD 50	Dermal LD 50
KOCN (Potassium Cyanate)	850	--
Lead arsenate	1,025	2,400+
Sulfamate	3,900	--
(Ammate)	3,900	--
fixed copper	3,000-6,000	--
lime sulfur	May cause skin irritation	
sulphur	generally considered nontoxic	
copper sulfate	15,000	--