

Do not allow pesticides to contact your skin. Read and follow all safety precautions on labels.

After handling pesticide, wash hands and face before eating or smoking. Instruct your family, co-workers and farm laborers on pesticide safety procedures. Post safety rules and emergency information where workers will see them.

Apple growers sometimes need to use pesticide in areas where residences, cropland, pasture, or bodies of water are nearby. Pesticide drift from orchards to off-target areas presents a hazard. Avoid application when conditions favor drift.

FIELD USE AND CARE OF RESPIRATORS



Wear the label-recommended respirator with a

filter for powders and an activated charcoal filter for organic vapors. Write the date of first use on the cartridge. Change the filters and car-tridges after the number of hours specified, or more often if breathing becomes difficult or if pesticide odor is detected. Respirators do not

provide adequate protection from inhalation of pesticide dust, mist or vapors when mixing pesticide in closed or poorly ventilated areas.

The respirator should be fitted properly on the face, not too high on the nose, with narrow portion over the bridge of the nose, and chin cup contacting under side of the chin. Headbands should be adjusted just tight enough to insure a good seal. Refer to the directions for respirator fit testing which should be included with the respirator packaging.

Remove filters and cartridges and wash face piece with soap and warm water after use. Dry face piece with a clean cloth and/or place face piece in a well-ventilated area to dry. Store respirator, filters, and cartridges in a clean, dry place — preferably in a tightly closed plastic bag.

Other Safety Equipment

- Chemical resistant gloves.
- Personal protective clothing, such as rubber apron, coveralls and cap.
- Chemical resistant work shoes or boots.
- Chemical resistant goggles.

ACUTE TOXICITY OF PESTICIDE

A pesticide's hazard to warm-blooded animals, including humans, is usually determined in relation to the way it enters the body. Methods of entry include the respiratory system, digestive system and skin. The greatest hazard is from pesticide entry via the



respiratory system (inhalation).

Pesticide toxicity by this route is not much different from that of intravenous injection because membranes of the lungs that separate air from blood are extremely thin, and absorption is therefore very rapid (this is also

true for the eyes). Oral absorption (through the digestive tract) is the next most hazardous avenue for poisoning. Dermal (skin) absorption is less immediate than respiratory or oral. However, there is considerable variation in the rate of penetration through the skin by different materials and formulations.

When spraying, many airborne spray particles are trapped in the secretions of the upper respiratory tract and swallowed, thereby providing exposure by inhalation and ingestion. Assuming that the person applying the pesticide takes adequate precaution (respirator, goggles, etc.) to prevent this type of exposure, dermal toxicity is probably a more realistic index of occupational hazard than oral toxicity.

DANGER — POISON, WARNING, CAUTION:

One of these “signal words” appears on the label of every pesticide. Acute (or immediate, single dose) toxicity is reported as an LD50 value (see Table 9). The LD50 for a chemical is the dose that has been found in controlled experiments to kill 50% of a large number of test animals. The LD50 dose is usually expressed as the number of milligrams (mg) of pure active ingredient per kilogram (kg) body weight of the test animals. The lower the LD50, the more toxic the chemical.

Because the LD50 is based on animal tests, uses pure active ingredient rather than formulated product, and does not account for individual sensitivity, it does not necessarily represent the toxic dose for an individual human. The LD50 of a chemical gives no information on the possible long-term health effects from repeated exposure at low levels.

READ THE LABEL FOR PRESCRIBED SAFETY EQUIPMENT AND PRECAUTIONS!

Table 9 – Acute Toxicity of Apple Pesticides.

Chemical	LD50 for test animals (mg technical chemical per kg body weight)		Chemical	LD50 for test animals (mg technical chemical per kg body weight)	
	Oral (Rat)	Dermal (Rabbit)		Oral (Rat)	Dermal (Rabbit)
acetamiprid (Assail)	417	> 2,000	maneb (Manex)	7,990	> 5,000
abamectin (Agri-Mek)	300	> 1,800	metalaxyl (Ridomil)	669	> 3,100
AVG (ReTain)	> 1,840	> 2,000	methidathion (Supracide)	44	200 ¹
azadirachtin (Neemix)	> 5,000	> 2,000	methomyl (Lannate)	17-24	5,880
azinphosmethyl (Guthion)	4	150-200	methoxyfenozide (Intrepid)	> 5,000	> 5,000
Bacillus thuringiensis toxin	nontoxic		metiram (Polyram)	> 6,810	> 2,000
basic copper sulfate (Basicop, etc.)	472	---	myclobutanil (Nova)	1,600	> 5,000
benomyl (Benlate)	> 10,000	>10,000	NAA (Fruitone-N, K-Salt Fruit Fix)	1,000	---
benzyladenine (Accel)	1,300-2,125	---	NAD (Amid-thin)	1,690	> 2,000
Bifenazate (Acaramite)	> 5,000	> 2,000	napropamide (Devrinol)	> 500	---
captan	9,000	---	norflurazon (Solicam)	> 8,000	>20,000
carbaryl (Sevin)	246	---	oil (refined petroleum distillate)	> 15,000	> 5,000
chlorophacinone (Rozol)	3	---	oryzalin (Surflan)	> 10,000	---
chlorpyrifos (Lorsban)	96-270	2,000	oxamyl (Vydate)	5	2,960
cinnamaldehyde (Valero)	---	---	oxyfluorfen (Goal)	> 5,000	>10,000
clofentezine (Apollo)	> 3,200	---	paraquat (Gramoxone Extra)	150	---
copper hydroxide (Kocide)	1,000	---	pendimethalin (Prowl)	3,956	> 2,200
copper oxychloride (COCS)	1,131	> 2,000	permethrin (Ambush, Pounce)	430-4,000	> 2,000
cyprodinil (Vanguard)	> 5,000	> 2,000	phosmet (Imidan)	147-316	> 4,640
dazomet (Basamid)	519	> 2,000	promalin (Promalin)	5,050	5,050
diazinon	1,250	> 2,020	pronamide (Kerb)	8,350	> 3,160
dichlobenil (Casoron)	> 4,460	> 2,000	pyrethrum	1,500	> 1,800
dicofol (Kelthane)	570	2,000-5,000	pyrethrin & rotenone (Pyrellin EC)	1,500	---
dimethoate (Digon)	235	400	pyridaben (Pyramite)	820-1,930	> 2,000
diphacinone (Ramik)	7	---	pyriproxyfen (Esteem)	> 5,000	> 2,000
diuron (Direx, Karmex)	> 5,000	> 5,000	rotenone	132-1,500	---
dodine (Syllit)	1,000	1,500	sethoxydim (Poast)	3,200	> 5,000
endosulfan (Thiodan, Phaser)	160	359	simazine (Princep)	>5,000	> 3,100
esfenvalerate (Asana XL)	458	> 2,000	sodium methyldithiocarbamate	812	> 2000
ethephon (Ethrel)	3,030	1,560	(Vapam)		
fenamiphos (Nemacur)	11	71	spinosad (SpinTor)	>5,000	> 5,000
fenarimol (Rubigan)	2,500	---	streptomycin (AgriMycin)	9,000	---
fenbutatin-oxide (Vendex)	2,631	> 2,000	sulfosate (Touchdown)	750	> 200 ¹
fenpropathrin (Danitol)	71	> 2,000	sulfur	> 5,000	> 5,000 ²
ferbam (Ferbam Granuflo)	> 5,000	> 4,000	tebufenozide (Confirm)	> 5,000	> 5,000
fluazifop-butyl (Fusilade)	3,328	---	terbacil (Sinbar)	5,000	---
formetanate HCl (Carzol)	15-26	>10,000	thiabendazole (Mertect 340-F)	3,100	---
fosetyl-Al (Aliette)	5,000	> 2,000	thiophanate-methyl (Topsin M)	7,500	---
glufosinate-ammonium (Rely)	2,000	> 4,000	thiram	1,000	> 5,000 ¹
glyphosate (Roundup)	> 5,000	> 5,000	triadimefon (Bayleton)	1,000	> 5,000
hexythiazox (Savey)	> 5,000	> 5,000	triflumizole (Procure)	1,057	> 5,000
imidacloprid (Provado)	450	> 5,000	trifloxystrobin (Flint)	> 4,000	> 2,000
indoxacarb (avaunt)	687	> 5,000	zinc phosphide	46	---
insecticidal soap (M-Pede)	16,900	> 5,000	ziram	1,400	> 6,000
kresoxim-methyl (Sovran)	> 5,000	> 2,000	2,4-D (Amine 4, Saber)	500-949	---
mancozeb (Dithane, etc.)	11,200	>15,000			

--- = unknown; > = greater than; 1 - Irritating to skin, mucous membranes; 2 - May cause skin reaction.

Note: Chemicals for which at least one formulation carries the DANGER signal word because of acute toxicity or other hazard are in bold letters. Different formulations of the same active ingredient can have different signal words.

Toxicity Category & Signal Word on Label	LD50 Oral (mg active ing. per kg body weight)	LD50 Dermal (mg active ing. per kg body wt.)
I DANGER POISON	0 to 50	0 to 200
II WARNING	>50 to 500	>200 to 2,000
III CAUTION*	>500 to 5,000	>2,000 to 20,000
IV none*	>5,000	> 20,000

* Category IV material may have Caution signal word due to skin irritation or other hazard.

In addition to oral or dermal acute toxicity, a pesticide may also carry the **DANGER — POISON**, **DANGER**, or **WARNING** signal words because of other potential hazards, such as inhalation toxicity or the ability to cause severe eye or skin damage

LABEL COMPLIANCE

Under the present EPA regulations, pesticides may be applied:

- at a different rate per 100 gallons dilute than stated on label as long as the application stays within the dose per acre limit;
- at a lower rate per acre than on label; and
- less frequently than on label.

IMPORTANT — it is illegal to:

- increase amount applied per acre (overdosage);
- use shorter intervals between sprays than minimum interval stated on label; and
- shorten intervals to harvest (illegal residues on crop).

State regulations may be more restrictive than those of the EPA.

PROTECTING WATER QUALITY

Apple growers have a responsibility to prevent pesticide from contaminating surface bodies of water and groundwater supplies. Over 90% of the rural population in the U.S. depends on groundwater as their supply of drinking water. Groundwater is very difficult to clean if it does become polluted. Listed below are a few practices that can help prevent water contamination. Contact Extension for more information.

- Consider the potential for rinse water, spills, application or erosion to create pesticide laden run-off which can reach a surface body of water. If you do not have a self-contained mixing pad, use an area where the run-off risk is low. If you are working near a stream or pond, do not allow run-off to occur.

- Use an anti-backflow device when filling the spray tank.
- Periodically change the location of field mixing areas. Be aware of the location and condition of wells, stay at least 50 feet away from wells. Special caution is needed around wells with cracked casings.
- Be aware of the soil types, geology, and depth of water table in your local area. The potential for pesticide leaching into groundwater is generally greater on ledge, sandy soils, or other soils low in organic matter. The risk increases when the water table is close to the surface. Try to choose pesticides with a low leachability hazard if you are working under these conditions.
- Keep spray equipment accurately calibrated.
- Use proper procedures for pesticide storage and disposal. Keep pesticide storage and mixing areas away from streams, ponds, and springs.

RESTRICTED ENTRY INTERVAL

The REI values listed in Table 10 are the best information available as of November 2002.

Manufacturers may write the label with a longer REI than required by the EPA, or the EPA may change its minimum REI requirement. To know the use restrictions for a pesticide you must READ THE LABEL!

PESTICIDE RESIDUE TOLERANCES

Federal laws warn that food shipments bearing residues of pesticide chemicals in excess of established tolerances will be contraband and subject to seizures as “adulterated.” This applies to both raw and processed foods.

The amount of pesticide residue in or on a food material at harvest must fall into established tolerances, expressed in “parts per million” (ppm). The actual amount of pesticide chemical found in a food at harvest depends in part on the amount applied to the crop and the length of time since the last application. Therefore, growers are responsible for strictly following label information as to:

- maximum spray dosage, and
- the preharvest interval: which is time between the final pesticide application and harvest.

The FDA advises pesticide users to follow directions on recently registered labels, so they do not exceed the residue tolerance for any material. Use the following table as a general guide, but verify the preharvest interval by checking the label before using the product. Table 10 refers to use on apples only.