

2010 Florida Citrus Pest Management Guide: Fresh Fruit Pesticide Residue Limits¹

M.A. Ritenour²

Current production practices often include the use of various pre- and postharvest chemicals, many of which are pesticides. To be used, these materials must be labeled for use on citrus and used only according to label instructions. Chemical residues on the fruit after harvest continue to be a concern to regulators and the public alike because of their potential negative health effects. Therefore, the U.S. and other countries set maximum residue limits (MRLs) on fresh produce for various chemicals. United States MRLs are rarely exceeded when the label instructions are followed. However, when MRLs set by importing countries are lower than U.S. MRLs, then use of these pesticides usually must be discontinued or modified to keep from exceeding the country's tolerances. In addition, individual buyers may set their own, more restrictive standards. Similar to buyer-imposed food safety standards, buyer-imposed MRL standards, especially from large buyers, can significantly impact how pesticides are used in the field and packing facility.

Table 1 list the MRLs (in parts-per-million) for various chemicals use on fresh Florida citrus for the U.S., CODEX, and some important export countries.

knowledgeable sources within specific markets of interest.

The limit of detection for chemical residues on citrus fruit is often around 0.01 ppm, depending on the testing laboratory and chemical of interest. Most often, when no tolerance is stated, any detectable residue will violate tolerances. Violations may lead to rejected loads of product, restrictions on future shipments, and even increased requirements for the entire industry to a given market. Because MRLs change frequently, see the University of Florida's Postharvest Resources Web site (<http://postharvest.ifas.ufl.edu>) or the Foreign Agricultural Service (FAS) International Maximum Residue Limits Database (<http://mrldatabase.com/>) for the most recent information. A database of pesticide MRLs for the European Union is also now available at http://ec.europa.eu/sanco_pesticides/public/index.cfm. Table 1 and the Web sites are intended as an initial reference source and no guarantee is made for their accuracy. Always verify these values with other

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 2. M.A. Ritenour, associate professor, Horticultural Sciences Department, Indian River REC, Ft. Pierce, Florida; Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

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Table 1. Maximum Residue Limits (MRLs) in parts-per-million (ppm), by country

Chemical Name	Trade Names (Examples only, not inclusive)	U.S.	Canada	CODEX	EU	Japan (Grapefruit)	Taiwan (Grapefruit)	Korea (Grapefruit)
2,4-D (2,4-Dichlorophenoxyacetic acid)	Citrus Fix, Hivol	3	2	1	1	2	2	1
Abamectin	Agri-Mek, Clinch, Zephyr, ABBA, Epi-mek, Reaper	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Acephate	Acephate, Orthene	nonbearing						
Acequinocyl	Kanemite	0.2	0.35		0.2	2		
Acetamiprid	Assail	0.5	0.5*		1	5		
Aldicarb	Temik	0.3		0.2	0.02	0.3		0.2
Azadirachtin	Aza-Direct, Azatin, Ecozin, Neemix	exempt						
Azinphos-methyl salts	Asinphosmethyl, Guthion	2	2	1	0.05	1	2	1
Azoxystrobin	Abound	10	0.8*	15	1	1	1	15
Bifenazate	Acramite	nonbearing						
Bifenthrin	Brigade, Capture, Telstar, Fanfare	0.05		0.05	0.1	2	1	0.05
Bromacil	Bromo, Hyvar	0.1				0.07	0.5	0.1
Buprofezin	Applaud	2.5		1	1	2	0.5	1
Carbaryl	Sevin	10	10	15	0.05	7	2	15
Carfentrazone-ethyl	Aim	0.1			0.01	0.1		
Chlorpyrifos	Lorsban, Nufos	1	1	1	0.3; 0.2 lemon; 2.0 mandarins	1	1	0.3
Clethodim	Prism	nonbearing						
Cryolite	Kryocide	7						
Cyfluthrin		0.2		0.3	0.02	2		2
Dicofol	Dicofol, Kelthane	6	5	5	2	5	3	1
Diflubenzuron	Micromite	0.5		0.5	1	3	1	1
Dimethoate	Dimethoate, Cygon	2	1.5	5	0.02	2	2	2
Diuron	Diuron, Direx, Karmex	0.05 (except lemon)	1		0.1	0.8	0.2	1
Endosulfan	Endosulfan, Phaser, Thionex	nonbearing						

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EPTC	Eptam	0.1			0.05	0.1		
Ethoprophos	Mocap	nonbearing						
Fenbuconazole	Enable	1			1; 0.05 lemon, mandarin, lime	1		
Fenbutatin Oxide	Vendex	20	2	5	5	5	2	5
Fenoxycarb	Fenoxycarb, Award, Precision	nonbearing						
Fenpropathrin	Danitol	2			2	5	0.5	
Fenpyroximate	Portal	0.6		0.2 orange	0.5; 0.3 lemon, lime, mandarin	1	0.5	
Ferbam	Ferbam	4		10 mandarin; 2 orange		2	2	
Fluazifop-P-butyl	Fusilade	nonbearing						
Fludioxonil	Graduate	10	10	7	7; 10 grapefruit	10		7
Formetanate Hydrochloride		1.5 (G, O); 0.03 (T), 0.6 (L)	4		0.05	4		
Fosetyl-aluminum	Aliette	5	9		75	150	10	
Glyphosate	Roundup, Durango, Touchdown, & others	0.5			0.1; 0.5 orange & mandarin	0.5	0.1	0.5
Harpin Protein	Messenger	exempt						
Hexythiazox	Savey	nonbearing						
Hydrogen cyanide		50				50		
Imazalil	Various	10	5	5	5	5	2	5
Imidacloprid	Admire, Alias, Provado, Couraze, Nuprid, Pasada, Widow	0.7	1	1	1	1		1
Malathion	Malathion, Aitrapa, Fyfanon	8		7	0.02	4	2	7
Metaxyl, Mefenoxam	Ridomil Gold, Subdue, UltraFlourish	1	5	5	0.5	2	0.5	5
Metalddehyde	OR-Cal Slug & Snail Bait	0.26			0.05			
Methanearsonic acid (MSMA)		0.35					0.5	

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Methidathion	Supracide	4; 6 mandarin	2	2; 5 mandarin	5	5	1	2
Methoprene	Extinguish Ant Bait	exempt			0.05			
Naled	Dibrom	3	3			0.2		
Neem oil extract	Trilogy	exempt				exempt		
Norflurazon	Solicam	0.2				0.2		0.2
Oryzalin	Oryzalin, Surflan	0.05			0.01	0.08		
Oxamyl	Vydate	3		5	0.01; 0.02 mandarin	5	0.5	5
Oxyfluorfen	Goal	nonbearing						
Paraquat Dichloride	Paraquat, Gramoxone, Boa	0.05		0.02	0.02	0.05	0.2	0.02
Pendimethalin	Prowl, Pendimax	0.1			0.05	0.05		
Phosmet	Imidan	5		3	0.2	5	1	5
Phosphites	Fosphite, Phostrol, ProPhyt	exempt						
Piperonyl Butoxide	Evergreen EC	8 orange	8 orange	5		5		5
Propargite	Comite, Omite	5 grapefruit & lemon; 10 orange	5	3	3	3	5	5
Propiconazole	Banner, Bumper, Tilt, Orbit, PropiMax	nonbearing						
Pyraclostrobin	Headline	2	2*	1	1	2		1
Pyrethrins	Pyrellin (+ Rotenone), Evergreen (+ Piperonyl Butoxide)	1 orange	1 orange	0.05	1	1		
Pyridaben	Nexter	0.5			0.5	2	2	
Pyrimethanil	Penbotec	10	10*	7	10	15		7
Pyriproxyfen	Distance, Esteem, Knack	0.3		0.5	0.6	0.5	0.3	0.5
Rimsulfuron		0.01			0.05			
Rotenone	Pyrellin (Pyrethrins + Rotenone)	exempt			0.01			
Sethoxydim	Poast Plus	0.5			0.1	1		1

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Simazine	Simazine, Princep, Sim-Trol	0.25 grapefruit, orange, lemon			0.1	0.2		0.25
Sodium aluminumfluoride	Prokil Cryolite	7						
SOPP (2 Phenylphenol, O-phenylphenol)	Various	10	10	10	12 (listed as food additive)	10		10
Spinetoram	Delegate	0.3	0.3*		0.2			
Spinosad	Entrust, Naturalyte, Justice, Spintor	0.3	0.3*	0.3	0.3	0.3	0.3	0.3
Spirodiclofen	Envidor	0.5	0.5*		0.5; 0.1 Lime, tangerine	2		
Spirotetramat	Movento	0.6	0.6	0.5	1			0.5
Sulfur		exempt						
Tebuconazole		0.8		2	2	2		2
Thiabendazole (TBZ)	Various	10	10	7	5	10	10	10
Thiamethoxam	Actara, Plantinum	0.4	0.02		0.2	1		1 tangerine
Thiazopyr	Mandate	0.05 grapefruit & orange				0.05		
Trifloxystrobin	Gem	0.6		0.5	0.3	0.3		0.5
Trifloxysulfuron		0.03				0.03		
Trifluralin	Trifluralin, Treflan, Trilin	0.05			0.1	0.05	0.05	0.05
zeta-cypermethrin	Mustang	0.35		2	2	2		2
			*grapefruit, lemon, lime, tangerine & citrus hybrid		Coupons with no MRL listed default to a 0.01 ppm limit.	Coupons with no MRL listed default to a 0.01 ppm limit.		