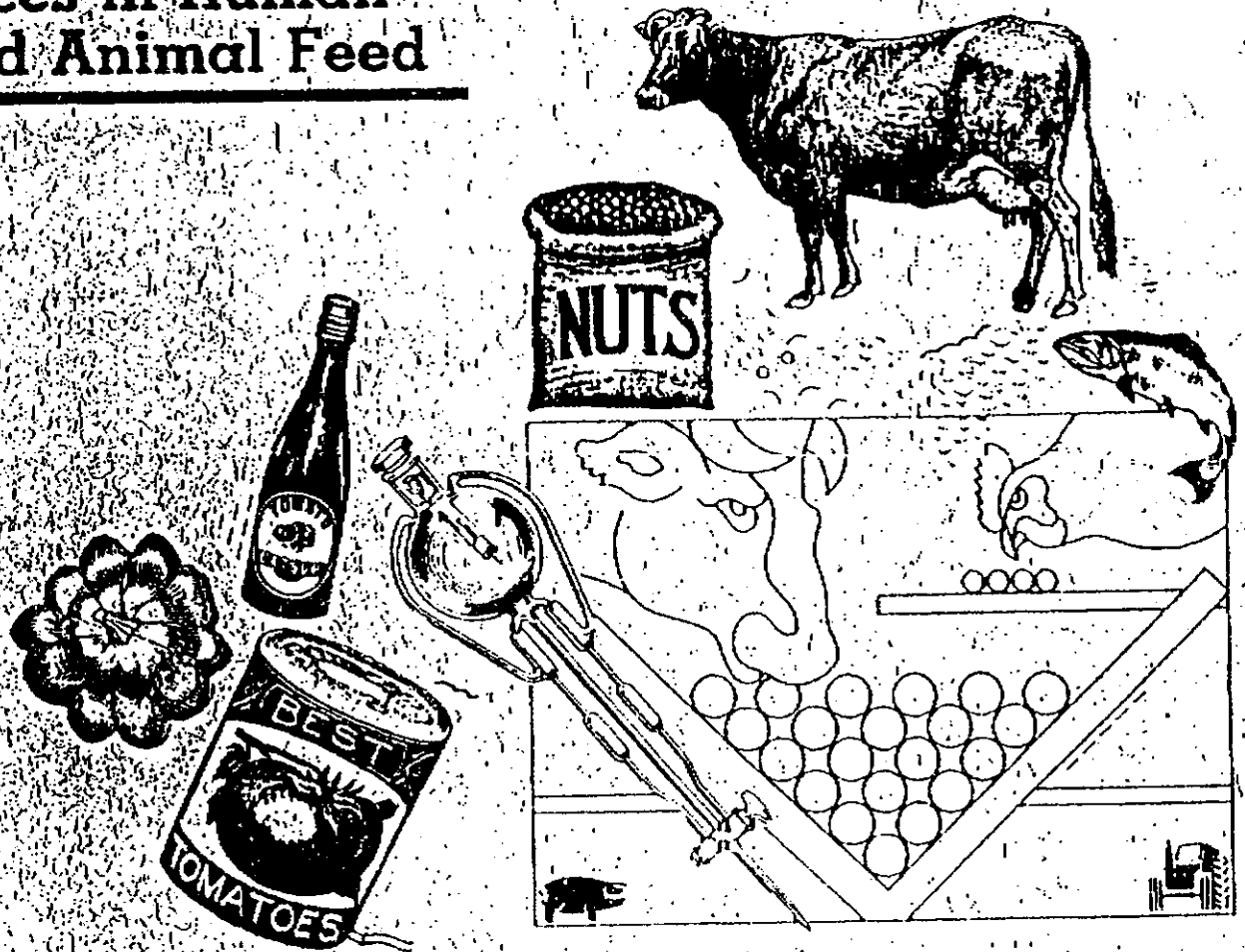


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# Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Feed



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ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES  
IN HUMAN FOOD AND ANIMAL FEED

Action levels for poisonous or deleterious substances are established by the Food and Drug Administration (FDA) to control levels of contaminants in human food and animal feed.

The action levels are established and revised according to criteria specified in Title 21, Code of Federal Regulations, Parts 109 and 509 and are revoked when a regulation establishing a tolerance for the same substance and use becomes effective.

Action levels and tolerances represent limits at or above which FDA will take legal action to remove adulterated products from the market. Where no established action level or tolerance exists, FDA may take legal action against the product at the minimal detectable level of the contaminant.

Action levels and tolerances are established based on the unavoidability of the poisonous or deleterious substance and do not represent permissible levels of contamination where it is avoidable. The blending of a food or feed containing a substance in excess of an action level or tolerance with another food or feed is not permitted, and the final product resulting from blending is unlawful, regardless of the level of the contaminant.

This booklet lists action levels established by the FDA for poisonous or deleterious substances in human food and animal feed. This list is current as of March 1987. Notices will be published in the Federal Register as new action levels are established or as existing action levels are revised or revoked. It is the responsibility of the user of the list to keep up to date on changes in the action levels.

Single copies of this booklet are available from:

Food and Drug Administration  
Center for Food Safety and Applied Nutrition  
Industry Programs Branch (HFF-326)  
200 C Street, S.W.  
Washington, DC 20204  
Phone (202) 485-0251

Additional copies of this publication may be reproduced in any quantity.

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Copies of the Compliance Policy Guides (CPG) referenced in the action level list may be obtained from:

National Technical Information Services (NTIS)  
Sales Desk  
5285 Port Royal Road  
Springfield, VA 22161  
Phone (703) 487-4650

For further assistance or information contact:

Food and Drug Administration  
Center for Food Safety and Applied Nutrition  
Guidelines and Compliance Research Branch (HFF-312)  
200 C Street, S.W.  
Washington, DC 20204  
Phone (202) 485-0175

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SUBSTANCE

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FDA ACTION LEVELS

AFLATOXIN

<u>Commodity</u>	<u>Action Level (ppb)</u>	<u>Reference</u>
Brazil nuts	20	CPG 7112.07
Cottonseed meal (for non-dairy animals)	300	CPG 7126.33
Finished feeds and feed ingredients	20	CPG 7126.33
Foods	20	CPG 7120.26
Milk	0.5 (aflatoxin M <sub>1</sub> )	CPG 7106.10
Peanuts & peanut products	20	CPG 7112.02
Pistachio nuts	20	CPG 7112.08

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FDA ACTION LEVELS

ALDRIN & DIELDRIN

<u>Commodity</u> <sup>a</sup>	<u>Action Level (ppm)</u>	<u>Reference</u>
fa	0.03	CPG 7141.01-8.1
l feed, processed	0.03	" "
akes	0.05	" "
agus	0.03	" "
is	0.02	" "
(garden and sugar)	0.1	" "
ops (garden and sugar)	0.05	" "
ti	0.03	" "
ls-sprouts	0.03	" "
egetables	0.1	" "
e	0.03	" "
s	0.1	" "
lower	0.03	" "
grains (except buckwheat, millet, lte, and wild rice)	0.02	" "
	0.03	" "
	0.03	" "
ls	0.05	" "
hay	0.03	" "
ers	0.1	" "
it	0.05	" "
	0.03	" "
(escarole)	0.05	" "
id oils (animal feed)	0.3	" "
	0.05	" "
	0.3 (edible portion)	" "
fodder, and straw of cereal grains pt those of buckwheat, millet, teosinte, ild rice)	0.03	" "

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FDA ACTION LEVELS

ALDRIN & DIELDRIN (Con't)

<u>Commodity</u> <sup>a</sup>	<u>Action Level (ppm)</u>	<u>Reference</u>
Grapefruit	0.02	CPG 7141.01-B.1
Hay	0.03	" "
Horseradish	0.1	" "
Kale	0.05	" "
Kohlrabi	0.05	" "
Legume vegetables (except guar, jackbeans, lablab beans, and lentils)	0.05	" "
Lemons	0.02	" "
Lespedeza	0.03	" "
Lettuce	0.03	" "
Limes	0.02	" "
Mangoes	0.03	" "
Melons	0.1	" "
Milk	0.3 (fat basis)	" "
Mustard greens	0.05	" "
Oranges	0.02	" "
Parsnips	0.1	" "
Pea hay	0.03	" "
Peaches	0.02	" "
Peanuts	0.05	" "
Peanut hay	0.03	" "
Peppers	0.05	" "
Pimentos	0.05	" "
Pineapple	0.03	" "
Pome fruits (except crabapples and loquats)	0.03	" "
Potatoes	0.1	" "
Radishes	0.1	" "
Radish tops	0.03	" "
Rutabagas	0.1	" "

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FDA ACTION LEVELS

ALDRIN & DIELDRIN (Con't)

<u>Commodity</u> <sup>a</sup>	<u>Action Level (ppm)</u>	<u>Reference</u>
Salsify roots	0.1	CPG 7141.01-B.1
Salsify tops	0.05	" "
Small fruits and berries	0.05	" "
Soybean hay	0.03	" "
Spinach	0.05	" "
Squash	0.1	" "
Stone fruits (except Chickasaw, Damson, and Japanese plums, and peaches)	0.03	" "
Sugarbeet pulp (animal feed)	0.1	" "
Sweet potatoes	0.1	" "
Swiss chard	0.05	" "
Tangerines	0.02	" "
Tomatoes	0.05	" "
Turnips	0.1	" "
Turnip tops	0.05	" "

<sup>a</sup> Action levels for crop groups cover all commodities specified in 40 CFR 108.34(f), except where an exception is noted.

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FDA ACTION LEVELS

BENZENE HEXACHLORIDE (BHC)

The figures below are for residues of total BHC. However, in adding amounts of individual isomers do not count alpha, gamma or delta BHC at a level below 0.02 ppm in milk and rabbits, and 0.01 ppm for all other commodities listed. Do not count beta BHC at a level below 0.05 ppm for milk and rabbits, and 0.02 ppm for all other commodities listed.

<u>Commodity<sup>a</sup></u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Animal feed, processed	0.05	CPG 7141.01-B.2
Apples	0.05	" "
Asparagus	0.05	" "
Avocados	0.05	" "
Beans	0.05	" "
Brassica (cole) leafy vegetables (except broccoli raab, rape greens)	0.05	" "
Celery	0.05	" "
Carrots	0.3	" "
Cereal grains (except lucid wheat, millet, popcorn, teosinte, wild rice)	0.05	" "
Citrus fruits	0.05	" "
Cocoa beans	0.5	" "
Cucurbit vegetables (except Balsam pears, Chinese wax gourds, gherkins, gourds)	0.05	" "
Eggplant	0.05	" "
Eggs	0.05	" "
Endive	0.05	" "
Figs	0.05	" "
Frog legs (edible portion)	0.3	" "
Guavas	0.05	" "
Hay (animal feed)	0.05	" "
Lettuce	0.05	" "
Mangoes	0.05	" "
Milk and dairy products	0.3 (fat basis)	" "
Okra	0.05	" "
Onions	0.05	" "

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FDA ACTION LEVELS

BENZENE (HEXACHLORIDE (BHC) Con't

<u>Commodity</u> <sup>a</sup>	<u>Action Level (ppm)</u>	<u>Reference</u>
Paprika	1.0	CPG 7141.01-B.2
Pears	0.05	" "
Peas	0.05	" "
Pecans	0.05	" "
Peppers	0.05	" "
Pineapples	0.05	" "
Quinces	0.05	" "
Rabbits	0.3 (fat basis) <sup>b</sup>	" "
Root and tuber vegetables (except carrots)	0.05	" "
Small fruits and berries	0.05	" "
Spinach	0.05	" "
Swiss chard	0.05	" "
Stone fruits (except Chickasaw, Danson, and Japanese plums)	0.05	" "
Tomatoes	0.05	" "
Turnip greens	0.05	" "

<sup>a</sup>Action levels for crop groups cover all commodities specified in 40 CFR 180.34 (f), except where an exception is noted.

<sup>b</sup>For rabbits that contain insufficient fat to conduct an analysis on a fat basis, analyze the rabbits on a whole product basis (edible portion) and use 0.1 ppm, the limit of determination, as the action level.

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FDA ACTION LEVELS

" CADMIUM

<u>Commodity</u>	<u>Action Level</u>	<u>Reference</u>
Pottery (ceramics) Flatware (avg. of 6 units)	0.5 mcg/ml of leaching solution	CPG 7117.06
Small hollowware (any one of 6 units)	0.5 mcg/ml of leaching solution	" "
Large hollowware (any one of 6 units)	0.25 mcg/ml of leaching solution	" "

24284





FDA ACTION LEVELS

CHLORDANE

The following action levels are for residues of chlordane, including heptachlor and its epoxide, cis and trans chlordane, cis and trans nonachlor, oxychlordane (octachlor epoxide), alpha, beta and gamma chlordene and chlordene. Levels of individual components must be quantitated at 0.02 ppm or above and confirmed in order to be added into the "chlordane" total value. Also see "analytical notes" at the bottom.

<u>Commodity</u> <sup>a</sup>	<u>Action Level (ppm)</u>	<u>Reference</u>
Animal fat, rendered	0.3	CPG 7141.01-B.3
Animal feed, processed	0.1	" "
Asparagus	0.1	" "
Bananas	0.1	" "
Beans	0.1	" "
Beets (with or without tops)	0.1	" "
Beet greens	0.1	" "
Brassica (cole) leafy vegetables (except broccoli raab, Chinese mustard cabbage, and rape greens)	0.1	" "
Carrots	0.1	" "
Celery	0.1	" "
Citrus fruits	0.1	" "
Corn	0.1	" "
Cucumbers	0.1	" "
Eggplant	0.1	" "
Fish	0.3 (edible portion)	" "
Lettuce	0.1	" "
Melons	0.1	" "
Okra	0.1	" "
Onions	0.1	" "
Papayas	0.1	" "
Parsnips	0.1	" "

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FDA ACTION LEVELS

CHLORDANE (Con't)

<u>Commodity<sup>a</sup></u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Peanuts	0.1	CPG 7141.01-B.3
Peas	0.1	" "
Peppers	0.1	" "
Pineapple	0.1	" "
Pome fruits (except crabapples and loquats)	0.1	" "
Potatoes	0.1	" "
Radishes (with or without tops)	0.1	" "
Radish tops	0.1	" "
Rutabagas (with or without tops)	0.1	" "
Rutabaga tops	0.1	" "
Small fruits and berries (except cranberries, currants, elderberries, gooseberries, and olallie berries)	0.1	" "
Spinach	0.1	" "
Squash	0.1	" "
Stone fruits (except Chickasaw, Damson, and Japanese plums)	0.1	" "
Sweet potatoes	0.1	" "
Swiss chard	0.1	" "
Tomatoes	0.1	" "
Turnips (with or without tops)	0.1	" "
Turnip greens	0.1	" "

<sup>a</sup> Action levels for crop groups cover all commodities specified in 40 CFR 180.34(f), except where an exception is noted.

Analytical Notes:

- (1) When the GLC pattern of the residue matches that of technical chlordane, quantitate against a reference standard of technical chlordane. When the residue consists of identifiable individual components, quantitate against their respective reference standards and sum the components.

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FDA ACTION LEVELS

CHLORDANE (Con't)

(2) If heptachlor and/or its epoxide are proportionally higher than the amount of chlordane present, follow the guidance in PAM Volume I, section 300.64c and apply the action levels established specifically for heptachlor and heptachlor epoxide.

CHLORDEZONE<sup>a</sup>

(Decachlorooctahydro-1,3,4-methano-2H-cyclobuta (cd) pentalen-2-one)

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Crabmeat	0.4	CPG 7141.01-B.4
Fish and shellfish	0.5 (edible portion)	" "

<sup>a</sup>Previously listed as Kepone, the tradename for chlordecene.

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FDA ACTION LEVELS

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CHOTALARIA SEEDS  
(C. spectabilis, C. saquittalis, C. striata)

---

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Grains and feeds	Average of 1 whole seed/pound	CPG 7126.15

---

DICOFOL<sup>a</sup>  
[1, 1 Bis (p-chlorophenyl)-2,2,2, -trichloroethanol]

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<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Animal feed, processed	0.5	CPG 7141.01-B.6

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<sup>a</sup>Previously listed as Kelthane, the tradename for dicofol.

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FDA ACTION LEVELS

DDT, DDE, AND DDE

The following action levels are for residues of the above pesticides individually or in combination. However, in adding amounts of DDT, TDE and DDE do not count any of the three found below 0.02 ppm for non-fatty food and 0.2 ppm for fish, eggs, and grains.

<u>Commodity<sup>a</sup></u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Animal feed, processed	0.5	CPG 7141.01-B.5
Artichokes	0.5	" "
Asparagus	0.5	" "
Avocados	0.2	" "
Beets (roots and tops)	0.2	" "
Brassica (cole) leafy vegetables (except broccoli raab, Chinese mustard cabbage, and rape greens)	0.5	" "
Carrots	3	" "
Cereal grains (except buckwheat, fresh sweetcorn, millet, popcorn, teosinte, and wild rice)	0.5	" "
Celery	0.5	" "
Citrus fruits	0.1	" "
Cocoa beans	1	" "
Corn, fresh sweet	0.2	" "
Cottonseed	0.1	" "
Cucumbers	0.1	" "
Eggplant	0.1	" "
Eggs	0.5	" "
Endive (escarole)	0.5	" "
Fish	5 (edible portion)	" "
Grapes	0.05	" "
Guavas	0.2	" "
Hay	0.5	" "
Hops	0.1	" "

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FUA ACTION LEVELS

DDT, DDE, AND DDE (Con't)

<u>Commodity<sup>a</sup></u>	<u>Action level (ppm)</u>	<u>Reference</u>
Legume vegetables (except guar, jackbeans, lablab beans, and lentils)	0.2	CPG 7141.01-B.5
Lettuce	0.5	" "
Mangoes	0.2	" "
Melons	0.1	" "
Milk	1.25 (fat basis)	" "
Mushrooms	0.5	" "
Okra	0.2	" "
Onions (dry bulb)	0.2	" "
Papayas	0.2	" "
Parsnips (roots and tops)	0.2	" "
Peanuts	0.2	" "
Peppermint hay	0.5	" "
Peppermint oil	1	" "
Peppers	0.1	" "
Pineapples	0.2	" "
Pome fruits (except crabapples and loquats)	0.1	" "
Potatoes	1	" "
Radishes (roots and tops)	0.2	" "
Rutabagas (roots and tops)	0.2	" "
Small fruits and berries (except elderberries, grapes and olallie berries)	0.1	" "
Soybean oil (crude)	1	" "
Spearmint hay	0.5	" "
Spearmint oil	1	" "
Spinach	0.5	" "
Squash	0.1	" "

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FHA ACTION LEVELS

DDT, DDE, AND TDE (Con't)

<u>Commodity<sup>a</sup></u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Stone fruits (except Chickasaw, Danson, and Japanese plums)	0.2	CPG 7141.01-B.5
Sweet potatoes	1	" "
Swiss chard	0.5	" "
Tomatoes	0.05	" "
Tomato pomace	0.5	" "
Turnips (roots and tops)	0.2	" "

<sup>a</sup>Action levels for crop groups cover all commodities specified in 40 CFR 180.34(f), except where an exception is noted.

DIMETHYLNITROSAMINE (NITROSODIMETHYLAMINE)

<u>Commodity</u>	<u>Action Level (ppb)</u>	<u>Reference</u>
Barley malt	10	CPG 7104.07
Malt beverages	5	CPG 7101.07

24298



FDA ACTION LEVELS

EMERTIN

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
animal feed, processed	0.03	CPG 7141.01-B.7
asparagus	0.05	" "
beans	0.05	" "
citrus fruits <sup>a</sup>	0.05	" "
corn, fresh sweet	0.05	" "
eggs	0.03	" "
figs	0.05	" "
fish and shellfish	0.3 (edible portion)	" "
fish by-products, including fish oil (animal feed)	0.3	" "
guavas	0.05	" "
leafy vegetables <sup>a,b</sup>	0.05	" "
langoes	0.05	" "
melons	0.05	" "
milk and dairy products	0.3 (fat basis)	" "
oilseed meal (animal feed)	0.03	" "
okra	0.05	" "
peas	0.05	" "
pimentos	0.05	" "
pineapples	0.05	" "
pome fruits <sup>a</sup>	0.05	" "
pumpkins	0.05	" "
root vegetables <sup>a,b</sup>	0.05	" "
small fruits <sup>a</sup>	0.05	" "
stone fruits <sup>a</sup>	0.05	" "
vegetable oils and fats, including soapstock (animal feed)	0.3	" "

<sup>a</sup>Refer to 40 CFR 180.34(f) for commodities covered by this food group.

<sup>b</sup>Other than those commodities specified in 40 CFR 180.131.

24300





FDA ACTION LEVELS

ETHYLENE DITHIOCARBAMATE (EDB)

<u>Commodity</u>	<u>Action Level (ppb)</u>	<u>Reference</u>
Grain products, intermediate (milled), must be cooked prior to consumption	150	CPG 7141.01-B.6
Grain products, ready-to-eat (cooked), require no cooking prior to consumption	30	" "
Honey, ready-to-eat (will not undergo further processing prior to consumption)	30	" "

24302



FDA ACTION LEVELS

HEPTACHLOR AND HEPTACHLOR EPOXIDE

The figures below are for residues of the above pesticides individually or in combination. However, do not count heptachlor or heptachlor epoxide found at a level below 0.1 ppm for fish and 0.01 for nonfatty food.

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Animal feed, processed <sup>d</sup>	0.03	CPG 7141.01-B.9
Artichokes	0.05	" "
Asparagus	0.05	" "
Beans, except snap beans	0.05	" "
Citrus fruits <sup>a</sup>	0.05	" "
Cucumbers	0.05	" "
Eggs	0.03	" "
Eggplant	0.05	" "
Figs	0.05	" "
Fish and shellfish	0.3 (edible portion)	" "
Hay <sup>b</sup>	0.03	" "
Leafy vegetables	0.05	" "
Melons	0.05	" "
Okra	0.05	" "
Pears	0.05	" "
Pimentos	0.05	" "
Pumpkins	0.05	" "
Quinces	0.05	" "
Rice	0.03	" "
Small fruits <sup>a,b</sup>	0.05	" "
Stone fruits <sup>a,b</sup>	0.05	" "
Squash (summer or winter)	0.05	" "

<sup>a</sup>Refer to 40 CFR 180.34(F) for commodities covered by this food group.

<sup>b</sup>Other than those commodities specified in 40 CFR 180.104 and 180.319.

24304



FDA ACTION LEVELS

MERCURY

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Fish, shellfish, crustaceans, other aquatic animals. Fresh, frozen or processed.	1 (methyl mercury) in edible portion	CPG 7108.07
Wheat (pink kernels only)	1	CPG 7104.05

METHYL ALCOHOL

<u>Commodity</u>	<u>Action Level</u>	<u>Reference</u>
Imported brandy	0.35%	CPG 7119.09

MIRRIX

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Fish and shellfish	0.1 (edible portion)	CPG 7141.01-B.11



FDA ACTION LEVELS

LEAD		
<u>Commodity</u>	<u>Action Level</u>	<u>Reference</u>
Pottery (ceramics) Flatware (avg. of 6 units)	7.0 mcg/ml of leaching solution	CPG 7117.07
Small hollowware (any one of 6 units)	5.0 mcg/ml of leaching solution	" "
Large hollowware (any one of 6 units)	2.5 mcg/ml of leaching solution	" "
Silver-plated hollowware (avg. of 6 units)	7.0 mcg/ml of leaching solution if product in- tended for use by adults	CPG 7117.05
Silver-plated hollowware (one or more of 6 units)	0.5 mcg/ml of leaching solution if product in- tended for use by infants and children	" "

24308





FDA ACTION LEVELS

LINDANE

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Animal feed, processed	0.1	CPG 7141.01-B.10
Artichokes	0.5	" "
Barley	0.1	" "
Beans	0.5	" "
Citrus fruit <sup>a</sup>	0.5	" "
Cocoa beans, whole raw bean	0.5	" "
Corn, fresh sweet	0.5	" "
Corn	0.1	" "
Eggs	0.5	" "
Endive	0.5	" "
Figs	0.5	" "
Hay	0.1	" "
Milk and dairy products	0.3 (fat basis)	" "
Oats	0.1	" "
Peas	0.5	" "
Rice	0.1	" "
Root vegetables <sup>a,h</sup>	0.5	" "
Rye	0.1	" "
Small fruits <sup>a,b</sup>	0.5	" "
Sorghum (milo)	0.1	" "
Turnip greens	0.5	" "
Wheat	0.1	" "

<sup>a</sup> Refer to 40 CFR 180.34 (F) for commodities covered by this food group.

<sup>b</sup> Other than those commodities specified in 40 CFR 180.133.

24310



FDA ACTION LEVELS

N-NITROSAMINES

<u>Commodity</u>	<u>Action Level (ppb)</u>	<u>Reference</u>
Rubber baby bottle nipples	10	CPG 7117.11

PARALYTIC SHELLFISH TOXIN

<u>Commodity</u>	<u>Action Level</u>	<u>Reference</u>
Clams, mussels, oysters (fresh, frozen, canned)	80 mcg/100 g meat	CPG 7108.20

POLYCHLORINATED BIPHENYLS  
(PCB's)

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Red meat	3 (fat basis)	CPG 7111.03

24312



FDA ACTION LEVELS

TOXAPHENE

<u>Commodity</u>	<u>Action Level (ppm)</u>	<u>Reference</u>
Animal feed, processed	0.5	CPG 7141.01-B.12
Artichokes	1.0	" "
Asparagus	1.0	" "
Cherries	1.0	" "
Figs	1.0	" "
Fish and shellfish	5.0 (edible portion)	" "
Melons	1.0	" "
Mustard greens	1.0	" "
Plums	1.0	" "
Pumpkins	1.0	" "
Root vegetables <sup>a, b</sup>	1.0	" "
Small fruits <sup>a, b</sup>	1.0	" "
Squash (summer or winter)	1.0	" "
Turnip greens	1.0	" "

<sup>a</sup> Refer to 40 CFR 180.34 (f) for commodities covered by this food group.

<sup>b</sup> Other than those commodities specified in 40 CFR 180.138.

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