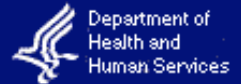


**U.S. Food and Drug Administration****CENTER FOR FOOD SAFETY AND APPLIED NUTRITION**[FDA Home Page](#) | [CFSAN Home](#) | [Search/Subject Index](#) | [Q & A](#) | [Help](#)**CFSAN/Office of Plant & Dairy Foods**
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2004-2005 Exploratory Survey Data on Perchlorate in Food

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Background

Perchlorate is a naturally occurring and manmade chemical. Naturally occurring perchlorate, for example, is found in arid states (e.g., Texas), as well as in nitrate fertilizer deposits in Chile and potash found in United States and Canada. Most of the perchlorate manufactured in the United States is used as the primary ingredient of solid rocket propellant. Perchlorate is also used in pyrotechnics, such as fireworks, gun powder, explosives, and highway flares. In addition, perchlorate is used in a wide variety of industrial processes, including tanning and leather finishing, rubber manufacture, paint and enamel production, and additives in lubricating oils.

In recent years there has been increasing interest in perchlorate levels in soil, ground water, drinking water, and irrigation water around the country and what health effects these levels may have. Human exposure to sufficient doses of perchlorate can interfere with iodide uptake into the thyroid gland, disrupting its functions and potentially leading to a reduction in the production of thyroid hormones.

In order to work toward development of an assessment of the potential risk of perchlorate, FDA is conducting exploratory surveys to better understand the occurrence and levels of perchlorate in a variety of foods from various locations. The levels of perchlorate found in the foods analyzed will also be used to better understand perchlorate exposure from food and to support action, if warranted, to protect the public health.

For determining perchlorate levels in food, a rapid, sensitive, and specific ion chromatography-tandem mass spectrometry (IC-MS/MS) method, developed by FDA, with limits of quantitation of 0.5 part per billion (ppb) for bottled water; 1.0 ppb for produce; and 3.0 ppb for milk, grain products, and seafood was used. This method, entitled "[Determination of Perchlorate Anion in Foods by Ion Chromatography-Tandem Mass Spectrometry](#)," has been published in the September 15, 2004 issue of Analytical Chemistry (Analytical Chemistry, 2004, 76, 5518-5522) and is posted on CFSAN's internet website.

2004/2005 Exploratory Surveys

The data

The data presented below in Tables 1-12 are results from exploratory surveys of individual food products conducted by FDA during Fiscal Years (FY) 2004 and 2005 (a fiscal year covers the period from October 1 in a year to September 30 in the following year, e.g., FY 2004 is from October 1, 2003 to September 30, 2004).

During FY04, FDA conducted an initial exploratory survey in which FDA collected samples of domestic origin of seven food products (bottled water, milk, lettuce, tomatoes, carrots, spinach, and cantaloupe). The overall goal of the sampling plan (convenience samples, not necessarily representative of the U.S. food supply) was to gather initial information on occurrence of perchlorate in foods from various locations with a high likelihood of perchlorate contamination. The produce samples (lettuce, tomatoes, carrots, spinach, and cantaloupe) were collected particularly from regions (i.e., Southern California and Arizona) where water sources are known to be contaminated with perchlorate based on a study report of detecting perchlorate in winter lettuce grown in Southern California or Arizona (Environmental Working Group. [Suspect Salads: Toxic rocket fuel found in samples of winter lettuce. 2003.](#)

[EXIT disclaimer](#)) and thus, the perchlorate levels are likely to be biased high. Bottled water and milk samples were collected from throughout the country. Produce samples (lettuce, tomatoes, carrots, spinach, and cantaloupe) were selected for the survey based on their high water content, relatively high consumption, and early indications of perchlorate uptake by plants, when irrigated with perchlorate-containing water or when plants are grown in soil that naturally contains perchlorate or that has been previously exposed to perchlorate-containing water or fertilizer. Additional information on sample collection and perchlorate analysis by FDA field offices during FY04 is provided in a document entitled "[FDA Collection and Analysis of Food for Perchlorate - High Priority - DFP # 04-11](#)" posted on CFSAN's internet website.

For FY05, FDA expanded the exploratory survey. Besides collecting additional samples of tomatoes, carrots, spinach, and cantaloupe, FDA collected samples of other high water content foods, including fruits and fruit juices such as apples, oranges, and grapes; vegetables such as cucumbers, green beans, and greens; and seafood such as aquaculture fish and shrimp. In addition, grain products such as wheat flour, cornmeal, and rice were sampled as a follow up to a Texas Tech University study report finding perchlorate in wheat heads (Jackson *et al.*, Perchlorate Accumulation in Forage and Edible Vegetation. 2005, 53:369-373. J. Agric. Food Chem.). The FY05 samples collected by FDA consisted of domestic products grown in a broader range of locations within the United States (i.e., Florida, Georgia, Idaho, Indiana, Illinois, Iowa, Kansas, Louisiana, Maine, Mississippi,

Missouri, Montana, Nebraska, New Jersey, New Mexico, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Texas, Washington) to determine if perchlorate occurs in foods from wider regions of the United States, and not only from regions where water sources are known to be contaminated with perchlorate. In FY05, FDA also collected and analyzed a limited number of imported products commonly entering the U.S. market (e.g., produce from Mexico, grapes from Chile, aquaculture salmon from Canada, shrimp from Southeast Asia) that were available for sampling during FY05. However, food samples (domestic and imported) collected in FY05 are also convenience samples and are not necessarily representative of the U.S. food supply. Additional information on sample collection and perchlorate analysis by FDA field offices during FY05 is provided in a document entitled "[FDA Collection and Analysis of Food for Perchlorate - High Priority - DFP # 05-09](#)" posted on CFSAN's internet website.

Domestic produce samples were collected at the grower or packing shed, while fruit juice and import samples were collected at retail establishments. For sample analysis, only the edible portion of fruit, vegetable, and seafood samples were used to determine perchlorate levels. In addition, outermost leaves of each lettuce head were removed, similar to the actions typically taken by a consumer prior to consumption, while the entire bunch of spinach was used to determine perchlorate levels.

Limitations of the data

The FY04/05 exploratory survey data consist of 27 types of foods and beverages⁽¹⁾, representing only about 32 and 42 percent of the total diet for the U.S. population, ages 2 years and older and for children, 2-5 years, respectively. In addition, the data cover a limited number of samples of these foods and a limited number of brands. Also, the data do not fully address the variation from one unit of a food product to another unit of the same product, or from one production lot or production area of a food product to another lot. Further, the choice of food products for testing in this exploratory survey should not be taken as an indicator of food product choices by consumers or of food product recommendations by FDA.

To help address these limitations, FDA is continuing to test additional food types for perchlorate. In FY05 and FY06, FDA tested for perchlorate levels in samples of baby and adults foods, respectively, collected under FDA's Total Diet Study (TDS) survey. FDA is preparing a perchlorate exposure assessment based on FDA's FY05/06 TDS data which is expected to be released in the fall of 2007. TDS is FDA's ongoing market basket survey in which more than 280 core foods (TDS foods) in the U.S. food supply are collected and analyzed to determine levels of various contaminants and nutrients in those foods.

What Consumers Should Understand

Consumers should not view the perchlorate levels as an indicator of perchlorate exposure, or as the "risk" of eating certain foods. First, perchlorate levels alone do not equate to perchlorate exposure; calculating exposure requires consideration of both perchlorate levels, and the amounts of food that consumers eat. Second, estimates of perchlorate exposure take into account not single food items, but the wide variety of foods found in a range of diets. Third, the scope of the data is too limited to properly consider potential sources of variation in

measured perchlorate levels, such as variability between different units or lots of food. Fourth, the impacts of perchlorate exposure will vary depending upon an individual's iodine sufficiency. Thus, the data were not generated to be representative of the perchlorate levels in the U.S. food supply but are only exploratory in nature.

Until more is known about the health effects of perchlorate and its occurrence in foods, FDA recommends a healthy eating plan, consistent with the Dietary Guidelines for Americans, that emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products; includes lean meats, poultry, fish, beans, eggs, and nuts; and is low in saturated fats, *trans* fats, cholesterol, salt (sodium) and added sugars. Additionally, adequate intake of iodine has previously been recognized as important for healthy thyroid function.

Exposure Estimates

FDA's CFSAN estimated human exposure to perchlorate through consumption of 27 foods and beverages for which CFSAN has collected data on perchlorate levels (See "[Preliminary Estimation of Perchlorate Dietary Exposure Based on FDA 2004/2005 Exploratory Data](#)"). Data sources for the 27 foods and beverages are from FDA's FY04/05 exploratory surveys that are presented in this document.

Table 1: Perchlorate Values in Lettuce Samples

Type of Lettuce	Location of Grower	Perchlorate (ppb)	Mean Perchlorate (ppb)
Green Leaf Lettuce	Gadsen, Arizona	11.8	10.6
Green Leaf Lettuce	Yuma, Arizona	10.1	
Green Leaf Lettuce	Yuma, Arizona	10.7	
Green Leaf Lettuce	Yuma, Arizona	10.9	
Green Leaf Lettuce	Yuma, Arizona	13.9	
Green Leaf Lettuce	Yuma, Arizona	14.7	
Green Leaf Lettuce	Yuma, Arizona	23.1	
Green Leaf Lettuce	Yuma, Arizona	27.4	
Green Leaf Lettuce	El Centro, California	9.90	
Green Leaf Lettuce, organic	El Centro, California	10.4	
Green Leaf Lettuce	Holtville, California	17.7	
Green Leaf Lettuce	Salinas, California	1.00	

Green Leaf Lettuce	Salinas, California	1.30	ND=LOD 8.10 ND=LOD/2 8.06 ND=0 8.04
Green Leaf Lettuce	Salinas, California	3.10	
Green Leaf Lettuce	Salinas, California	3.83	
Green Leaf Lettuce	Salinas, California	5.40	
Green Leaf Lettuce	Salinas, California	5.98	
Green Leaf Lettuce	Salinas, California	5.98	
Green Leaf Lettuce	Salinas, California	6.50	
Green Leaf Lettuce	Salinas, California	7.72	
Green Leaf Lettuce	Salinas, California	11.9	
Green Leaf Lettuce	Salinas, California	14.6	
Green Leaf Lettuce	Salinas, California	16.1	
Green Leaf Lettuce	Salinas, California	21.7	
Green Leaf Lettuce	Chester, New Jersey	1.20	
Green Leaf Lettuce	Atascosa, Texas	7.60	
Iceberg Lettuce	East Yuma, Arizona	6.15	
Iceberg Lettuce	Yuma, Arizona	3.71	
Iceberg Lettuce	Yuma, Arizona	5.79	
Iceberg Lettuce	Yuma, Arizona	6.15	
Iceberg Lettuce	Yuma, Arizona	7.68	
Iceberg Lettuce	Yuma, Arizona	7.73	
Iceberg Lettuce	Yuma, Arizona	7.82	
Iceberg Lettuce	Yuma, Arizona	10.4	
Iceberg Lettuce	Yuma, Arizona	12.9	
Iceberg Lettuce	Yuma, Arizona	21.4	
Iceberg Lettuce	Brawley, California	7.51	
Iceberg Lettuce	Brawley, California	11.7	
Iceberg Lettuce	El Centro, California	7.19	
Iceberg Lettuce	El Centro, California	7.67	
	El Centro		

Iceberg Lettuce	El Centro, California	8.27
Iceberg Lettuce	El Centro, California	9.70
Iceberg Lettuce	El Centro, California	9.96
Iceberg Lettuce	Gonzales, California	ND
Iceberg Lettuce	Holtville, California	6.20
Iceberg Lettuce	Salinas, California	ND
Iceberg Lettuce	Salinas, California	ND
Iceberg Lettuce	Salinas, California	ND
Iceberg Lettuce	Salinas, California	ND
Iceberg Lettuce	Salinas, California	ND
Iceberg Lettuce	Salinas, California	0.40*
Iceberg Lettuce	Salinas, California	0.88*
Iceberg Lettuce	Salinas, California	2.28
Iceberg Lettuce	Salinas, California	2.28
Iceberg Lettuce	Salinas, California	3.31
Iceberg Lettuce	Salinas, California	3.50
Iceberg Lettuce	Salinas, California	4.00
Iceberg Lettuce	Salinas, California	4.46
Iceberg Lettuce	Salinas, California	5.70
Iceberg Lettuce	Salinas, California	5.90
Iceberg Lettuce	Salinas, California	8.10
Iceberg Lettuce	Salinas, California	29.6
Iceberg Lettuce	Salinas, California	32.4
Iceberg Lettuce	Santa Maria, California	2.27
Iceberg Lettuce	Santa Maria, California	7.10
Iceberg Lettuce	Belle Glade, Florida	1.30
	Belle Glade, Florida	

Iceberg Lettuce	Delle Glade, Florida	71.6	
Iceberg Lettuce	Cedarville, New Jersey	2.70	
Red Leaf Lettuce	Gadsen, Arizona	8.25	ND=LOD 11.19 ND=LOD/2 11.19 ND=0 11.18
Red Leaf Lettuce	Yuma, Arizona	6.84	
Red Leaf Lettuce	Yuma, Arizona	7.75	
Red Leaf Lettuce	Yuma, Arizona	8.41	
Red Leaf Lettuce	Yuma, Arizona	9.30	
Red Leaf Lettuce	Yuma, Arizona	12.2	
Red Leaf Lettuce	Yuma, Arizona	16.1	
Red Leaf Lettuce, organic	El Centro, California	2.80	
Red Leaf Lettuce, organic	El Centro, California	3.00	
Red Leaf Lettuce, organic	El Centro, California	26.8	
Red Leaf Lettuce, organic	El Centro, California	52.0	
Red Leaf Lettuce	Salinas, California	0.78*	
Red Leaf Lettuce	Salinas, California	ND	
Red Leaf Lettuce	Salinas, California	1.70	
Red Leaf Lettuce	Salinas, California	2.50	
Red Leaf Lettuce	Salinas, California	5.97	
Red Leaf Lettuce	Salinas, California	6.65	
Red Leaf Lettuce	Salinas, California	10.8	
Red Leaf Lettuce	Salinas, California	11.1	
Red Leaf Lettuce	Salinas, California	12.5	
Red Leaf Lettuce	Salinas, California	12.9	
Red Leaf Lettuce	Salinas, California	13.5	
Red Leaf Lettuce	Salinas, California	16.5	
Red Leaf Lettuce	Salinas, California	16.6	
Red Leaf Lettuce	Salinas, California	17.2	
Red Leaf Lettuce	Hondo, Texas	8.51	
Romaine Lettuce	Yuma, Arizona	7.15	ND=LOD 11.76

Romaine Lettuce	Yuma, Arizona	7.35	ND=LOD/2 11.75 ND=0 11.75
Romaine Lettuce	Yuma, Arizona	7.50	
Romaine Lettuce, organic, Romaine hearts	Yuma, Arizona	9.17	
Romaine Lettuce	Yuma, Arizona	9.46	
Romaine Lettuce	Yuma, Arizona	11.5	
Romaine Lettuce	Yuma, Arizona	14.6	
Romaine Lettuce	Yuma, Arizona	17.0	
Romaine Lettuce	Yuma, Arizona	24.7	
Romaine Lettuce, red	Yuma, Arizona	129	
Romaine Lettuce	Brawley, California	12.5	
Romaine Lettuce	Brawley, California	17.1	
Romaine Lettuce	Brawley, California	22.2	
Romaine Lettuce, organic	El Centro, California	5.80	
Romaine Lettuce, organic	El Centro, California	5.90	
Romaine Lettuce	El Centro, California	11.3	
Romaine Lettuce	Salinas, California	0.89*	
Romaine Lettuce	Salinas, California	1.07	
Romaine Lettuce	Salinas, California	1.10	
Romaine Lettuce	Salinas, California	1.48	
Romaine Lettuce	Salinas, California	1.60	
Romaine Lettuce	Salinas, California	2.30	
Romaine Lettuce	Salinas, California	2.48	
Romaine Lettuce	Salinas, California	3.79	
Romaine Lettuce	Salinas, California	4.16	
Romaine Lettuce	Salinas, California	4.50	
Romaine Lettuce	Salinas, California	5.80	
Romaine Lettuce	Salinas, California	8.35	

Romaine Lettuce	Salinas, California	8.40
Romaine Lettuce	Salinas, California	13.0
Romaine Lettuce	Salinas, California	16.2
Romaine Lettuce	Salinas, California	23.9
Romaine Lettuce	Watsonville, California	0.54*
Romaine Lettuce	Belle Glade, Florida	ND
Romaine Lettuce	Belle Glade, Florida	13.7
Romaine Lettuce	Blairstown, New Jersey	7.07
Romaine Lettuce	Bridgeton, New Jersey	4.46
Romaine Lettuce	Cedarville, New Jersey	10.1
Romaine Lettuce	Emerson, New Jersey	3.70
Romaine Lettuce	Newfield, New Jersey	14.2
Romaine Lettuce	Toms River, New Jersey	21.6
Romaine Lettuce, red, certified organic	Austin, Texas	6.85

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 1.00 ppb for lettuce.
- (3) The estimated limit of detection (LOD) is 0.30 ppb for lettuce.
- (4) * =Estimate, Below LOQ and above LOD.

Table 2: Perchlorate Values in Bottled Water Samples

Type of Bottled Water	Location of Source Water	Perchlorate (ppb) ($\mu\text{g/L}$)
Artesian Water	Augusta, Georgia	ND
Distilled Water	Parkville, Missouri	ND
Distilled	Parkville, Missouri	ND

Water	Fairville, Missouri	ND
Drinking Water	Anaheim, California	ND
Drinking Water	Brea, California	ND
Drinking Water	El Monte, South El Monte, Rosemead, and Baldwin Park, California	ND
Drinking Water	El Monte, South El Monte, Rosemead, and Baldwin Park, California	ND
Drinking Water	Irvine, California	ND
Drinking Water	Ontario, California	ND
Drinking Water	Independence, Missouri	ND
Drinking Water	Parkville, Missouri	ND
Drinking Water	Parkville, Missouri	ND
Drinking Water	Jamestown, North Carolina	ND
Drinking Water	Jamestown, North Carolina	ND
Drinking Water	Abilene, Texas	ND
Drinking Water	San Antonio, Texas	ND
Drinking Water	Unknown	ND
Drinking Water	Unknown	ND
Purified Rain Water	Dripping Spring, Texas	ND
Purified Water	Brea, California	ND
Purified Water	Claremont, California and northern California	ND
Purified Water	Cucamonga, California	ND
Purified Water	Denver, Colorado	ND

Purified Water	WSSC Tara Road Facility, Maryland	ND
Purified Water	WSSC Tara Road Facility, Maryland	ND
Purified Water	Eagan, Minnesota	ND
Purified Water	Norfolk, Nebraska	ND
Purified Water	Omaha, Nebraska	ND
Purified Water	Bishopville, South Carolina	ND
Purified Water	Richland County, South Carolina	ND
Purified Water	Corpus Christi, Texas	ND
Purified Water	Corpus Christi, Texas	ND
Purified Water	San Antonio, Texas	ND
Purified Water	Unknown	ND
Purified Water	Unknown	ND
Purified Well Water	Anaheim, California	ND
Spring Water	Benton County, Arkansas, Dickinson County, Kansas, or Lafayette Township, Wisconsin	ND
Spring Water	Gento County, Arkansas, Dickinson County, Kansas, or Lafayette Township, Wisconsin	ND
Spring Water	Highland, California	0.56
Spring Water	Ontario, California	ND
Spring Water	New Tripoli, Bangor, Stroudsberg, Negins, South Coventry, and Pine Grove, Pennsylvania, and/or Oakland, Maryland	ND
Spring Water	Pine Grove, Pennsylvania	ND
Spring Water	Pine Grove, Pennsylvania	ND

Spring Water	Jasper, Texas	ND
Spring Water	Jasper, Texas	ND
Spring Water	Keller, Texas	ND
Spring Water	Keller, Texas	0.45*
Spring Water	Wood County, Texas	ND
Spring Water	Unknown	ND
Spring Water	Unknown	ND
Spring Water	Unknown	ND

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 0.50 ppb for water.
- (3) The estimated limit of detection (LOD) is 0.20 ppb for water.
- (4) * =Estimate, Below LOQ and above LOD.

Table 3: Perchlorate Values in Milk Samples

Type of Milk	Location Samples Collected	Perchlorate (ppb) ($\mu\text{g/L}$)	Mean Perchlorate (ppb)
Raw Milk, batch 1	Maryland	3.40	ND=LOD 5.77 ND=LOD/2 5.76 ND=0 5.75
Raw Milk, batch 2	Maryland	4.23	
Raw Milk, batch 3	Maryland	4.83	
Fat Free Milk	California	5.70	
Fat Free Milk	Pennsylvania	2.00*	
1% Milk	California	4.69	
1% Milk	California	5.86	
1% Milk	California	6.39	
1% Milk	California	6.99	

1% Milk	California	8.33
1% Milk	Pennsylvania	4.30
1% Milk	Virginia	7.60
1% Milk, chocolate	Virginia	7.20
2% Milk	California	4.31
2% Milk	Missouri	9.10
Whole Milk	Arizona	ND
Whole Milk	Arizona	3.16
Whole Milk	Arizona	3.46
Whole Milk	Arizona	3.84
Whole Milk	Arizona	4.20
Whole Milk	Arizona	4.60
Whole Milk	Arizona	4.70
Whole Milk	Arizona	4.81
Whole Milk	Arizona	4.90
Whole Milk	Arizona	5.10
Whole Milk	Arizona	5.50
Whole Milk	Arizona	5.60
Whole Milk	Arizona	6.18
Whole Milk	Arizona	6.20
Whole Milk	Arizona	7.30
Whole Milk	Arizona	7.40
Whole Milk	Arizona	8.80
Whole Milk	Arizona	9.40
Whole Milk	Arizona	10.2
Whole Milk	Arizona	10.4
Whole Milk, organic	California	ND
Whole Milk	California	1.91*
Whole Milk	California	3.19
Whole Milk	California	3.40
Whole Milk	California	3.90

Whole Milk	California	4.04
Whole Milk	California	4.26
Whole Milk	California	4.30
Whole Milk	California	4.50
Whole Milk	California	4.50
Whole Milk	California	4.60
Whole Milk	California	4.60
Whole Milk	California	4.77
Whole Milk	California	5.00
Whole Milk	California	5.00
Whole Milk	California	5.03
Whole Milk	California	5.30
Whole Milk	California	5.30
Whole Milk	California	5.32
Whole Milk	California	5.52
Whole Milk	California	5.60
Whole Milk	California	5.60
Whole Milk	California	5.60
Whole Milk	California	5.60
Whole Milk	California	5.70
Whole Milk	California	5.80
Whole Milk	California	5.80
Whole Milk	California	5.87
Whole Milk	California	5.92
Whole Milk	California	5.95
Whole Milk	California	6.10
Whole Milk	California	6.43
Whole Milk	California	7.49
Whole Milk	California	7.70
Whole Milk	California	7.80
Whole Milk	California	9.15
Whole Milk	California	9.90

Whole Milk	Georgia	ND
Whole Milk	Georgia	3.85
Whole Milk	Georgia	8.40
Whole Milk	Georgia	9.06
Whole Milk	Iowa	7.80
Whole Milk	Iowa	8.00
Whole Milk	Iowa	8.50
Whole Milk	Iowa	8.70
Whole Milk	Kansas	5.43
Whole Milk	Kansas	10.0
Whole Milk	Kansas	10.4
Whole Milk	Louisiana	3.20
Whole Milk	Louisiana	3.80
Whole Milk	Louisiana	3.90
Whole Milk	Louisiana	4.10
Whole Milk	Louisiana	7.00
Whole Milk	Maryland	4.78
Whole Milk	Maryland	5.21
Whole Milk	Maryland	5.50
Whole Milk	Maryland	7.30
Whole Milk	Maryland	7.70
Whole Milk, organic	Maryland	11.3
Whole Milk	Missouri	4.60
Whole Milk	Missouri	5.90
Whole Milk	Missouri	6.70
Whole Milk	Missouri	6.78
Whole Milk	Missouri	6.84
Whole Milk	Missouri	7.90
Whole Milk	Missouri	9.00
Whole Milk	New Jersey	3.40
Whole Milk	New Jersey	3.60

Whole Milk	New Jersey	4.08
Whole Milk	New Jersey	4.44
Whole Milk	New Jersey	4.85
Whole Milk	North Carolina	5.12
Whole Milk	Pennsylvania	6.10
Whole Milk	Pennsylvania	6.90
Whole Milk	Pennsylvania	7.20
Whole Milk	South Carolina	6.31
Whole Milk	South Carolina	6.70
Whole Milk	Texas	3.84
Whole Milk	Texas	4.77
Whole Milk	Texas	5.62
Whole Milk	Texas	6.83
Whole Milk	Texas	7.15
Whole Milk	Virginia	3.40
Whole Milk	Virginia	6.80
Whole Milk, organic	Washington	3.20
Whole Milk	Washington	3.80
Whole Milk	Washington	4.20
Whole Milk	Washington	5.40
Whole Milk	Washington	6.54
Whole Milk	Washington	7.47
Whole Milk	Washington	7.70

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 3.00 ppb for milk.
- (3) The estimated limit of detection (LOD) is 1.00 ppb for milk.
- (4) * = Estimate, Below LOQ and above LOD.

Table 4: Perchlorate Values in Tomato Samples

Type of Tomato	Location of Grower	Perchlorate (ppb)	Mean Perchlorate (ppb)

Tomatoes	California	ND	ND=LOD 13.67 ND=LOD/2 13.63 ND=0 13.59
Tomatoes	Camarillo, California	ND	
Tomatoes	Camarillo, California	2.80	
Tomatoes, Cherokee	Camarillo, California	3.00	
Tomatoes	Carlsbad, California	5.20	
Tomatoes	City of Industry, California	1.83	
Tomatoes, Heirloom variety	Fallbrook, California	2.25	
Tomatoes	Fallbrook, California	3.00	
Tomatoes	Fillmore, California	4.60	
Tomatoes, Supersteak	Lake Elsinore, California	1.04	
Tomatoes, Sweet Mama	Lake Elsinore, California	1.70	
Tomatoes	Mission Hills, California	ND	
Tomatoes	Moorpark, California	7.01	
Tomatoes	Oceanside, California	ND	
Tomatoes, Grape	Oxnard, California	1.03	
Tomatoes	Pico Rivera, California	ND	
Tomatoes	Piru, California	ND	
Tomatoes, Roma	Piru, California	ND	
Tomatoes	Redlands, California	1.40	
Tomatoes	Riverside, California	1.40	
Tomatoes	Riverside, California	2.40	
Tomatoes, Roma	Riverside, California	3.00	
Tomatoes	Riverside, California	3.84	
Tomatoes	Selma, California	0.76*	
Tomatoes	Selma, California	6.84	
Tomatoes	Somis, California	38.8	
Tomatoes, Brandywine Heirloom	Tustin, California	ND	
Tomatoes, Heirloom	Tustin, California	1.90	
Tomatoes, Roma	Vista, California	3.87	

Tomatoes	Florida	5.66
Tomatoes	Boca Raton, Florida	5.15
Tomatoes, Italian Plum	Florida City, Florida	21.1
Tomatoes	Fort Pierce, Florida	12.1
Tomatoes, Italian Plum	Homestead, Florida	3.14
Tomatoes, Green	Palmetto, Florida	6.79
Tomatoes, Green	Palmetto, Florida	12.3
Tomatoes, Green Roma	Quincy, Florida	10.0
Tomatoes, Grape	Quincy, Florida	11.1
Tomatoes, Grape	Wimauma, Florida	5.28
Tomatoes	Brookhaven, Mississippi	2.43
Tomatoes	Crystal Springs, Mississippi	ND
Tomatoes	Mize, Mississippi	ND
Tomatoes	Magee, Mississippi	ND
Tomatoes	Yazoo City, Mississippi	2.17
Tomatoes	Fenton, Missouri	5.91
Tomatoes, Beefsteak	Cedarville, New Jersey	5.58
Tomatoes	Cherry Hill, New Jersey	ND
Tomatoes, Beefsteak	Chester, New Jersey	3.36
Tomatoes	East Brunswick, New Jersey	ND
Tomatoes, Plum	Glen Gardner, New Jersey	6.48
Tomatoes	Hillsborough, New Jersey	16.4
Tomatoes	Jamesburg, New Jersey	1.04
Tomatoes	Lakewood, New Jersey	2.60
Tomatoes	Long Valley, New Jersey	1.30
Tomatoes	Monmouth Junction, New Jersey	0.38*
Tomatoes	Monroeville, New Jersey	ND
Tomatoes, Beefsteak	Swedesboro, New Jersey	ND

Tomatoes, DeEstean	Jersey	ND
Tomatoes	Thorofare, New Jersey	ND
Tomatoes	Mount Olive, North Carolina	9.97
Tomatoes	Evans City, Pennsylvania	ND
Tomatoes	New Ringgold, Pennsylvania	4.30
Tomatoes	Valencia, Pennsylvania	1.10
Tomatoes	Yardley, Pennsylvania	ND
Tomatoes	Yardley, Pennsylvania	1.80
Tomatoes	Summerton, South Carolina	4.32
Tomatoes	Mexico	22.1
Tomatoes	Mexico	27.1
Tomatoes	Mexico	29.0
Tomatoes	Mexico	174
Tomatoes	Mexico	286
Tomatoes	Mexico	0.37*
Tomatoes	Mexico	ND
Tomatoes, Grape	Mexico	195

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 1.00 ppb for tomatoes.
- (3) The estimated limit of detection (LOD) is 0.30 ppb for tomatoes.
- (4) * =Estimate, Below LOQ and above LOD.

Table 5: Perchlorate Values in Carrot Samples

Type of Carrot	Location of Grower	Perchlorate (ppb)	Mean Perchlorate (ppb)
Carrots	Tolleson, Arizona	27.8	ND=LOD 15.86 ND=LOD/2 15.85 ND=0 15.85
Carrots	Tolleson, Arizona	36.1	
Carrots	Tolleson, Arizona	32.9	
Carrots	Acampo, California	10.0	

Carrots, baby	Arvin, California	2.24
Carrots	Arvin, California	4.53
Carrots	Arvin, California	7.01
Carrots	Arvin, California	33.0
Carrots, organic	Arvin, California	87.6
Carrots	Bakersfield, California	ND
Carrots	Bakersfield, California	11.9
Carrots	Bakersfield, California	13.7
Carrots	Bell Gardens, California	0.56*
Carrots	Camarillo, California	5.24
Carrots	Camarillo, California	5.40
Carrots	Camarillo, California	14.8
Carrots	Camarillo, California	15.5
Carrots	Camarillo, California	111
Carrots	Carpinteria, California	2.00
Carrots	Carson, California	1.17
Carrots	Coachella, California	1.39
Carrots	Coachella, California	1.39
Carrots	Coachella, California	31.5
Carrots	Garden Grove, California	1.20
Carrots	Goleta, California	ND
Carrots, organic	Lamont, California	14.2
Carrots	Linden, California	13.2
Carrots	Long Beach, California	2.39
Carrots	Moorpark, California	81.3
Carrots	Ontario, California	9.40
Carrots	Oxnard, California	3.40
Carrots	Santa Maria, California	7.59
Carrots	Greeley, Colorado	ND
Carrots	Lake Park, Georgia	21.7
Carrots	Kansas City, Kansas	20.1

Carrots	Wichita, Kansas	1.54
Carrots	Wichita, Kansas	2.70
Carrots	Hudsonville, Michigan	9.23
Carrots	Edinburg, Texas	2.36
Carrots	Prosser, Washington	0.84*
Carrots	Prosser, Washington	5.10
Carrots	Prosser, Washington	5.20
Carrots	Prosser, Washington	5.30
Carrots	Prosser, Washington	7.00
Carrots	Prosser, Washington	7.30
Carrots	Prosser, Washington	8.00
Carrots	Prosser, Washington	9.47
Carrots	Prosser, Washington	10.5
Carrots	Prosser, Washington	10.9
Carrots	Prosser, Washington	11.2
Carrots	Prosser, Washington	12.5
Carrots	Prosser, Washington	23.8
Carrots	Prosser, Washington	27.4
Carrots	Prosser, Washington	36.1
Carrots	Mexico	8.10
Carrots	Mexico	9.23
Carrots	Mexico	9.76
Carrots	Mexico	17.1
Carrots	Mexico	63.1

(1) ND = not detected

(2) The estimated limit of quantitation (LOQ) is 1.00 ppb for carrots

(3) The estimated limit of detection (LOD) is 0.30 ppb for carrots.

(4) * =Estimate, Below LOQ and above LOD.

Table 6: Perchlorate Values in Spinach Samples

Type of Spinach	Location of Grower	Perchlorate (ppb)	Mean Perchlorate (ppb)
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Spinach	Arroyo Grande, California	5.94
Spinach, baby	Brawley, California	154
Spinach, baby	Brawley, California	927
Spinach	Carlsbad, California	96.0
Spinach	Carson, California	8.83
Spinach	Castroville, California	19.9
Spinach	Fillmore, California	47.8
Spinach	Lompoc, California	13.5
Spinach	Long Beach, California	266
Spinach	Moorpark, California	16.7
Spinach	Moorpark, California	259
Spinach	Moss Landing, California	137
Spinach	Oceano, California	7.32
Spinach	Oceano, California	56.3
Spinach	Oxnard, California	14.8
Spinach	Oxnard, California	19.9
Spinach	Oxnard, California	117
Spinach	Oxnard, California	131
Spinach	Pico Rivera, California	13.5
Spinach	Placentia, California	167
Spinach, Asian	Riverside, California	680
Spinach	Salinas California	32.8
Spinach	Salinas, California	51.5
Spinach	Sanata Maria, California	12.2
Spinach	Sanata Maria, California	12.7
Spinach	Santa Maria, California	38.0
Spinach	Santa Maria, California	39.2
Spinach, baby	Sanata Maria, California	111
Spinach	Santa Paula, California	7.87
Spinach	Somis, California	72.0
Spinach	East Windsor, New	9.15

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Spinach	Jersey	0.13
Spinach	Vineland, New Jersey	40.9
Spinach, baby	Wayne, New Jersey	6.02
Spinach	Mexico	145
Spinach	Mexico	163
Spinach	Mexico	252

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 1.00 ppb for spinach.
- (3) The estimated limit of detection (LOD) is 0.30 ppb for spinach.
- (4) * = Estimate, Below LOQ and above LOD.

Table 7: Perchlorate Values in Melon Samples

Type of Melon	Location of Grower	Perchlorate (ppb)	Mean Perchlorate (ppb)
Cantaloupes	Goodyear, Arizona	37.1	28.62
Cantaloupes	Goodyear, Arizona	38.0	
Cantaloupes	Goodyear, Arizona	57.8	
Cantaloupes	Goodyear, Arizona	63.3	
Cantaloupes	Goodyear, Arizona	66.6	
Cantaloupes	Parker, Arizona	6.72	
Cantaloupes	Parker, Arizona	9.31	
Cantaloupes	Parker, Arizona	10.6	
Cantaloupes	Yuma, Arizona	3.15	
Cantaloupes	Yuma, Arizona	3.23	
Cantaloupes	Yuma, Arizona	4.04	
Cantaloupes	Yuma, Arizona	5.16	
Cantaloupes	Yuma, Arizona	6.33	
Cantaloupes	Yuma, Arizona	14.2	
Cantaloupes	Yuma, Arizona	16.1	
Cantaloupes	Yuma, Arizona	16.1	
Cantaloupes	Yuma, Arizona	17.9	

Cantaloupes	Yuma, Arizona	18.6
Cantaloupes	Yuma, Arizona	114
Cantaloupes	Brawley, California	11.4
Cantaloupes	Brawley, California	19.9
Cantaloupes	Blythe, California	4.72
Cantaloupes	Blythe, California	7.66
Cantaloupes	Blythe, California	8.08
Cantaloupes	Huron, California	1.06
Cantaloupes	Huron, California	0.95*
Cantaloupes	Huron, California	7.47
Cantaloupes	Los Angeles, California	6.16
Cantaloupes	Los Angeles, California	6.35
Cantaloupes	Los Angeles, California	6.36
Cantaloupes	Mendota, California	8.83
Cantaloupes	Mendota, California	14.1
Cantaloupes	Rich Hill, Missouri	0.87*
Cantaloupes	Bainbridge, Pennsylvania	3.00
Cantaloupes	New Ringgold, Pennsylvania	2.90
Cantaloupes	Pleasant, Pennsylvania	0.52*
Cantaloupes	Valencia, Pennsylvania	4.90
Cantaloupes	Yardley, Pennsylvania	11.5
Cantaloupes	Carrizo Springs, Texas	2.06
Cantaloupes	Jacksonville, Texas	3.81
Cantaloupes	McKinney, Texas	8.86
Cantaloupes	Mount Selman, Texas	1.62
Cantaloupes	Pecos, Texas	2.57
Cantaloupes	Uvalde, Texas	2.02
Cantaloupes	Uvalde, Texas	2.62
Cantaloupes	Costa Rica	1.34
Cantaloupes	Dominican Republic	713
Cantaloupes	Costa Rica	0.99*

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 1.00 ppb for melons
- (3) The estimated limit of detection (LOD) is 0.30 ppb for melons
- (4) ** =Estimate, Below LOQ and above LOD.

Table 8: Perchlorate Values in Fruit Samples

Type of Fruit	Location of Grower	Perchlorate (ppb)	Mean Perchlorate (ppb)
Apples, Gala	Acampo, California	ND	ND=LOD 0.30 ND=LOD/2 0.15 ND=0 0.0
Apples, Gravenstein	Sebastopol, California	ND	
Apples, Gravenstein	Sebastopol, California	ND	
Apples, Gravenstein	Sebastopol, California	ND	
Apples, Pink Pearl	Sebastopol, California	ND	
Apples, Arkansas Black	Taylorsville, North Carolina	ND	
Apples, Granny Smith	Hendersonville, North Carolina	ND	
Apples, Rome	Flat Rock, North Carolina	ND	
Apple, Gala	Monroeville, New Jersey	ND	
Grapes, Green	Exeter, California	ND	ND=LOD 8.58 ND=LOD/2 8.51 ND=0 8.44
Grapes, Red	Exeter, California	1.30	
Grapes, Red Flame	Esparto, California	ND	
Grapes, Red Seedless	Hughson, California	ND	
Grapes	Marysville, California	4.00	
Grapes, Concord	Avondale, Pennsylvania	ND	
Grapes, Chardonnay	Gap, Pennsylvania	0.94*	
Grapes	Girard, Pennsylvania	ND	
Grapes	Chile	27.9	
Grapes	Chile	28.5	
Grapes	Chile	38.6	

Grapes	Chile	ND	
Oranges	Riverside, California	1.29	ND=LOD 3.47 ND=LOD/2 3.39 ND=0 3.32
Oranges	Redlands, California	3.27	
Oranges	Redlands, California	23.3	
Oranges	Riverside, California	ND	
Oranges	Riverside, California	ND	
Oranges, Valencia	Immokalee, Florida	ND	
Oranges, Valencia	Lantana, Florida	ND	
Oranges, Valencia	Titusville, Florida	1.82	
Oranges, Valencia	Winter Garden, Florida	3.49	
Oranges, Valencia	Winter Garden, Florida	ND	
Strawberries	Buellton, California	2.68	
Strawberries	Cardiff, California	1.39	
Strawberries	Carlsbad, California	1.46	
Strawberries	Carlsbad, California	1.95	
Strawberries	Del Mar, California	1.66	
Strawberries	Escondido, California	2.13	
Strawberries	Fallbrook, California	ND	
Strawberries	Oceanside, California	ND	
Strawberries	Salinas, California	11.3	
Strawberries	Watsonville, California	1.51	
Strawberries	Watsonville, California	1.61	
Strawberries	Watsonville, California	1.63	
Strawberries	Watsonville, California	1.83	
Strawberries	Watsonville, California	2.39	
Strawberries	Watsonville, California	6.31	
Strawberries	Watsonville, California	ND	
Strawberries	Watsonville, California	ND	
Strawberries	Watsonville, California	0.80*	
Strawberries	Watsonville, California	0.80*	
Watermelon	Gilbert, Arizona	1.00	ND=LOD 1.96 ND=LOD/2 1.91

Watermelon	Picacho, Arizona	ND	ND=0 1.85
Watermelon	Carlsbad, California	ND	
Watermelon	Carlsbad, California	ND	
Watermelon	Coachella, California	ND	
Watermelon	Hemet, California	3.28	
Watermelon	Lake Elsinore, California	2.96	
Watermelon	Mendota, California	1.31	
Watermelon	Newport Beach, California	ND	
Watermelon	Avon Park, Florida	1.65	
Watermelon, seedless	Dover, Florida	2.71	
Watermelon	Hawthorne, Florida	ND	
Watermelon	Plant City, Florida	8.34	
Watermelon	Hessmer Louisiana	1.35	
Watermelon	Hessmer Louisiana	2.19	
Watermelon	Lucedale, Mississippi	6.99	
Watermelon	Port Arthur, Texas	ND	
Watermelon	Unknown	2.29	
Watermelon	Unknown	1.13	

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 1.00 ppb for fruits.
- (3) The estimated limit of detection (LOD) is 0.30 ppb for fruits.
- (4) * =Estimate, Below LOQ and above LOD.

Table 9: Perchlorate Values in Fruit Juice Samples

Type of Fruit Juice	Purchase Location	Perchlorate (ppb)	Mean Perchlorate (ppb)
Apple juice	La Jolla, California	1.49	2.15
Apple juice from concentrate	La Jolla, California	2.52	
Apple juice from concentrate	San Diego, California	2.35	

Apple juice concentrate	China	2.19	
Apple juice concentrate	China	3.45	
Apple juice concentrate, clear	China	1.28	
Apple nectar	El Salvador	1.56	
Apple nectar	El Salvador	3.11	
Apple juice nectar	Venezuela	1.39	
Orange juice	Houston, Texas	2.27	2.59
Orange juice	Houston, Texas	2.43	
Orange juice	Houston, Texas	2.53	
Orange juice	Houston, Texas	2.58	
Orange juice	Houston, Texas	3.15	
Orange juice	Houston, Texas		

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 1.00 ppb for fruit juices.
- (3) The estimated limit of detection (LOD) is 0.30 ppb for fruit juices.
- (4) * =Estimate, Below LOQ and above LOD.

Table 10: Perchlorate Values in Vegetable Samples

Type of Vegetables	Location of Grower	Perchlorate (ppb)	Mean Perchlorate (ppb)
Broccoli	Castroville, California	10.3	ND=LOD 8.49 ND=LOD/2 8.47 ND=0 8.44
Broccoli	King City, California	9.87	
Broccoli	Moorpark, California	3.00	
Broccoli	Oceano, California	ND	
Broccoli	Oxnard, California	23.1	
Broccoli	Oxnard, California	ND	
Broccoli	Salinas, California	2.48	
Broccoli	Santa Maria, California	4.82	
Broccoli	East Windsor, New Jersey	6.96	
Broccoli	Hackettstown, New Jersey	3.60	
Broccoli	Buckingham,	7.68	

Broccoli	Pennsylvania	7.00	
Broccoli, organic	Greensburg, Pennsylvania	40.2	
Broccoli	Richland, Pennsylvania	4.67	
Broccoli	Uvalde County, Texas	1.60	
Cabbage, green	Carlsbad, California	10.9	ND=LOD 8.80 ND=LOD/2 8.74 ND=0 8.68
Cabbage, green	Dove Canyon, California	25.6	
Cabbage, red	Fallbrook, California	24.3	
Cabbage, red	Long Beach, California	8.07	
Cabbage, green	Redlands, California	4.10	
Cabbage, green	Riverside, California	24.7	
Cabbage	Salinas, California	5.13	
Cabbage, red	Westminster, California	ND	
Cabbage	Canada	10.1	
Cabbage	Canada	ND	
Cabbage	Canada	ND	
Cabbage	Canada	ND	
Cabbage	Canada	ND	
Collard Greens	Oxnard, California	39.1	
Collard Greens	Watsonville, California	135	
Collard Greens	Mount Olive, North Carolina	238	
Collard Greens	Murphy, North Carolina	142	
Collard Greens	Newton Grove, North Carolina	47.8	
Collard Greens	Raleigh, North Carolina	39.7	
Collard Greens	Raleigh, North Carolina	316	
Collard Greens	Peleion, South Carolina	69.1	
Collard Greens	Unknown	8.61	
Collard Greens	Unknown	17.3	
Collard Greens	Unknown	26.8	
Collard Greens	Unknown	42.2	
Collard Greens	Unknown	58.2	

Mustard Greens	Oxnard, California	114	ND=LOD 6.64 ND=LOD/2 6.62 ND=0 6.59
Cucumbers	Buellton, California	3.26	
Cucumbers	Fillmore, California	27.2	
Cucumbers	Fountain Valley, California	3.63	
Cucumbers	Highland, California	0.66*	
Cucumbers	Oceanside, California	14.1	
Cucumbers	Oxnard, California	3.08	
Cucumbers	Pico Rivera, California	18.02	
Cucumbers	Riverside, California	3.53	
Cucumbers	Riverside, California	3.69	
Cucumbers	Riverside, California	14.6	
Cucumbers	Westminster, California	4.39	
Cucumbers	Starke, Florida	4.93	
Cucumbers	Norman Park, Georgia	2.20	
Cucumbers	Hudsonville, Michigan	ND	
Cucumbers	South Haven, Michigan	3.84	
Cucumbers	Dominican Republic	ND	
Cucumbers	Dominican Republic	0.30*	
Cucumbers	Dominican Republic	7.73	
Cucumbers, baby	Dominican Republic	14.0	
Cucumbers, seedless	Canada	ND	
Green Beans	Acampo, California	6.62	ND=LOD 6.12 ND=LOD/2 6.09 ND=0 6.05
Green Beans	Arvin, California	8.88	
Green Beans	Carlsbad, California	5.09	
Green Beans	Carlsbad, California	9.73	
Green Beans	Carlsbad, California	10.2	
Green Beans	Fountain Valley, California	25.9	
Green Beans	Linden, California	5.34	
Green Beans	Long Beach, California	ND	
Green Beans	Sacramento, California	1.36	
Green Beans	Sacramento, California	3.29	

Green Beans	Sacramento, California	4.63		
Green Beans	Sacramento, California	5.39		
Green Beans	Sacramento, California	7.46		
Green Beans	Westminster, California	4.82		
Green Beans	Canada	7.18		
Green Beans	Canada	9.17		
Green Beans	Canada	ND		
Green Beans	Canada	ND		
Green Beans (string beans)	Canada	ND		
Onions, red	Carlsbad, California	0.32*	ND=LOD 0.53 ND=LOD/2 0.42 ND=0 0.31	
Onions, red	Fallbrook, California	ND		
Onions, red	Ramona, California	1.79		
Onions, red	Valley Center, California	ND		
Onions, sweet	Columbus, New Mexico	ND		
Onions, white	Lancaster, California	ND		
Onions, yellow	Five Points, California	ND		
Onions, yellow	Deming, New Mexico	ND		
Onions, yellow	Hatch, New Mexico	ND		
Onions, yellow	Las Cruces, New Mexico	ND		
Green Onions	Moorpark, California	ND		
Green Onions w/o bulbs	Oxnard, California	1.56		
Potatoes, white, Shepody	Mountain Home, Idaho	ND		ND=LOD 0.30 ND=LOD/2 0.15 ND=0 0.00
Potatoes, white, Shepody	E Declo, Idaho	ND		
Potatoes, Russet	Clear Lake, Minnesota	ND		
Potatoes, white	Clear Lake, Minnesota	ND		
Potatoes, Yukon Gold	Clear Lake, Minnesota	ND		
Potatoes, red	Hoople, North Dakota	ND		
Sweet Potatoes	Atwater, California	0.85*	ND=LOD 1.24	
Sweet Potatoes	Atwater, California	1.47		

Sweet Potatoes	Pauma Valley, California	0.97*
Sweet Potatoes	Unknown	1.00
Sweet Potatoes	Unknown	1.07
Sweet Potatoes	Unknown	2.07

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 1.00 ppb for vegetables.
- (3) The estimated limit of detection (LOD) is 0.30 ppb for vegetables.
- (4) * =Estimate, Below LOQ and above LOD.

Table 11: Perchlorate Values in Grain Samples

Type of Grain	Purchase Location	Perchlorate (ppb)	Mean Perchlorate (ppb)
Corn masa mix, instant	Yakima, Washington	ND	ND=LOD 1.16 ND=LOD/2 0.68 ND=0 0.20
Corn meal	Wichita, Kansas	ND	
Corn meal	Houston, Texas	ND	
Corn meal, Polenta type	Phoenix, Arizona	4.46	
Corn meal, Polenta type	San Francisco, California	ND	
Corn meal, 100% stone ground	Phoenix, Arizona	ND	
Corn meal, white	Phoenix, Arizona	ND	
Corn meal, white	Oakland, California	ND	
Corn meal, white	Des Moines, Iowa	ND	
Corn meal, white	Omaha, Nebraska	ND	
Corn meal, yellow	Phoenix, Arizona	ND	
Corn meal, yellow	Phoenix, Arizona	ND	
Corn meal, yellow	Davenport, Iowa	ND	
Corn meal, yellow	Helena, Montana	ND	
Corn meal, yellow	Helena, Montana	ND	
Corn meal, yellow	Dallas, Texas	ND	
Corn meal, yellow	San Antonio, Texas	ND	
Corn meal, yellow	San Antonio, Texas	ND	

Corn meal, yellow	Yakima, Washington	ND	
Corn meal, yellow	Yakima, Washington	ND	
Corn meal, yellow, organic	San Antonio, Texas	ND	
Grits (cornmeal)	Pacifica, California	ND	
Oatmeal	Little Rock, Arkansas	1.88*	ND=LOD 3.96 ND=LOD/2 3.85 ND=0 3.74
Oatmeal	Little Rock, Arkansas	4.11	
Oatmeal	Little Rock, Arkansas	6.42	
Oatmeal	Phoenix, Arizona	2.58*	
Oatmeal	Phoenix, Arizona	12.2	
Oatmeal	Phoenix, Arizona	ND	
Oatmeal	Phoenix, Arizona	ND	
Oatmeal	Alameda, California	4.16	
Oatmeal	Oakland, California	ND	
Oatmeal	Pacifica, California	8.85	
Oatmeal	Pacifica, California	ND	
Oatmeal	San Francisco, California	4.12	
Oatmeal	Boise, Idaho	1.68*	
Oatmeal	Boise, Idaho	3.45	
Oatmeal	Cedar Rapids, Iowa	8.22	
Oatmeal	Des Moines, Iowa	ND	
Oatmeal	Wichita, Kansas	3.54	
Oatmeal	Omaha, Nebraska	8.36	
Oatmeal	Mill Creek, Washington	2.21*	
Oatmeal	Mill Creek, Washington	3.71	
Oatmeal cereal for baby	Phoenix, Arizona	1.67*	
Oat flakes, baby	San Francisco, California	5.03	
Rice, Brown	Chicago, Illinois	ND	ND=LOD 1.00 ND=LOD/2 0.50 ND=0 0.00
Rice, Brown	Chicago, Illinois	ND	

Rice, Brown	Indianapolis, Indiana	ND	ND=LOD 1.00 ND=LOD/2 0.50 ND=0 0.00
Rice, Brown	Indianapolis, Indiana	ND	
Rice, Brown, instant	Chicago, Illinois	ND	
Rice, Brown, instant, whole grain	Chicago, Illinois	ND	
Rice, Brown, instant	Chicago, Illinois	ND	
Rice, Brown, instant	Indianapolis, Indiana	ND	
Rice, Brown, instant	Indianapolis, Indiana	ND	
Rice, Brown, instant	Indianapolis, Indiana	ND	
Rice, white	Wichita, Kansas	ND	
Rice, white	Omaha, Nebraska	ND	
Rice, white	Grandview, Missouri	ND	
Rice, white	Kirkwood, Missouri	ND	
Rice, white	Medina, Ohio	ND	
Rice, white	Medina, Ohio	ND	
Rice, white	Stronsville, Ohio	ND	
Rice, white, instant	Medina, Ohio	ND	
Rice, white, instant	Medina, Ohio	ND	
Whole Wheat Flour	Chicago, Illinois	3.78	
Whole Wheat Flour	Chicago, Illinois	5.18	
Whole Wheat Flour	Chicago, Illinois	5.61	
Whole Wheat Flour	Chicago, Illinois	9.39	
Whole Wheat Flour	Chicago, Illinois	ND	
Whole Wheat Flour	Wichita, Kansas	7.75	
Whole Wheat Flour	Grandview, Missouri	6.68	
Whole Wheat Flour	Kirkwood, Missouri	ND	
Whole Wheat Flour	Helena, Montana	ND	
Whole Wheat Flour	Helena, Montana	ND	
Whole Wheat Flour	Omaha, Nebraska	7.64	
Whole Wheat Flour	Medina, Ohio	6.51	
Whole Wheat Flour	Medina, Ohio	ND	
Whole Wheat Flour	Stronsville, Ohio	ND	

Whole Wheat Flour	Stronsville, Ohio	ND
Whole Wheat Flour	Beaverton, Oregon	2.98*
Whole Wheat Flour	Beaverton, Oregon	5.39
Whole Wheat Flour	Beaverton, Oregon	8.35
Whole Wheat Flour, white	Medina, Ohio	4.91

Notes:

- (1) ND = not detected
- (2) The estimated limit of quantitation (LOQ) is 3.00 ppb for grains.
- (3) The estimated limit of detection (LOD) is 1.00 ppb for grains
- (4) * =Estimate, Below LOQ and above LOD.

Table 12: Perchlorate Values in Fish and Seafood Samples

Type of Fish or Seafood	Purchase Location	Perchlorate (ppb)	Mean Perchlorate (ppb)
Catfish, whole	Clarksdale, Mississippi	ND	ND=LOD 1.02 ND=LOD/2 0.60 ND=0 0.17
Catfish, whole	Itta Bena, Mississippi	ND	
Catfish, whole	Itta Bena, Mississippi	ND	
Catfish, whole	Sunflower, Mississippi	1.17*	
Catfish	Ayden, North Carolina	ND	
Catfish	Roper, North Carolina	ND	
Catfish	Williamston, North Carolina	ND	
Salmon, aquaculture	Bucks Harbor, Maine	ND	ND=LOD 1.06 ND=LOD/2 0.65 ND=0 0.24
Salmon, aquaculture	Eastport, Maine	ND	
Salmon, aquaculture	Canada	ND	
Salmon, aquaculture	Canada	ND	
Salmon, aquaculture	Canada	ND	
Salmon, aquaculture	Canada	ND	
Salmon, aquaculture	Chile	1.23*	
Salmon fillets, aquaculture	Chile	1.42*	
Salmon fillets,	Chile	ND	

aquaculture	Origin	ND	
Salmon fillets, aquaculture	Chile	ND	
Salmon, wild	California	ND	
Shrimp	India	ND	ND=LOD 19.83 ND=LOD/2 19.63 ND=0 19.43
Shrimp, Black Tiger	India	23.2	
Shrimp	Indonesia	ND	
Shrimp	Thailand	23.5	
Shrimp	Vietnam	50.5	

Notes:

- (1) ND = non-quantifiable
- (2) The estimated limit of quantitation (LOQ) is 3.00 ppb for fish and seafoods.
- (3) The estimated limit of detection (LOD) is 1.00 ppb for fish and seafoods
- (4) * =Estimate, Below LOQ and above LOD.

(1) Bottled water was not included among the 27 types of foods and beverages because only 2 out of 51 samples were found to contain perchlorate levels near the limit of quantitation (i.e., 0.5 parts per billion) and therefore was not included in estimating human exposure.

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