Pesticide Residue Monitoring Program Fiscal Year 2014 Pesticide Report

U.S. Food and Drug Administration

http://www.fda.gov/food/foodborneillnesscontaminants/pesticides/default.htm

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Acknowledgments

This report was compiled through the efforts of the following FDA staff: Laurie A. Bates, Terry Councell, Mallory Kelly, Standra Purnell, Lauren Robin, Charlotte Liang, Michael Wehr, Chris Sack and Xuhui Zhao, in the Center for Food Safety and Applied Nutrition; Krisztina Z. Atkinson and Randall Lovell, in the Center for Veterinary Medicine.

FDA Pesticide Residue Monitoring Program

For more information about FDA pesticide residue monitoring program reports, see http://www.fda.gov/Food/FoodborneIllnessContaminants/Pesticides/ucm2006797.htm. Since 1987, annual pesticide reports have been prepared to summarize results of the Food and Drug Administration's (FDA or the Agency) pesticide residue monitoring program. Reports from Fiscal Year (FY) 1987 to FY 1993 were published in the Journal of the Association of Official Analytical Chemists/Journal of AOAC International. FY 1993 and FY 1994 reports were published in the journal and also made available on the public FDA website (www.fda.gov). Subsequent reports are only available on the FDA website. Each report is available in the format(s) used at the time they were written.

In addition to the annual reports, specific pesticide monitoring data and statistical analyses of human foods for each year are also available in text format on the FDA website as "database" files. The database files include statistical analysis of findings by multiple country/commodity/pesticide combinations, along with data for individual samples from which the summary information was compiled. Instructions and explanations of the data and statistical analyses are provided for each database file. The database files are available from FY 1996 on.

Executive Summary

This report summarizes the results of FDA's pesticide residue monitoring program for FY 2014. Results in this report continue to demonstrate that levels of pesticide residues measured by FDA in the U.S. food supply are generally in compliance with the U.S. Environmental Protection Agency's (EPA's) permitted pesticide tolerances. This report includes findings obtained during FY 2014 (October 1, 2013 through September 30, 2014) under the regulatory pesticide residue monitoring program and the Total Diet Study (TDS).

Under the Federal Food, Drug, and Cosmetic Act (FFDCA), FDA has the responsibility to enforce EPA-established pesticide tolerances in foods imported into the U.S. and domestic foods shipped in interstate commerce (with the exception of meat, poultry, and certain egg products regulated by the Food Safety Inspection Service (FSIS) of the U.S. Department of Agriculture (USDA). The Agency employs a threefold strategy to accomplish this task. In its regulatory pesticide residue monitoring program, FDA selectively monitors a broad range of imported and domestic commodities. FDA may also carry out focused sampling surveys for commodities of interest. In addition to these two regulatory approaches, FDA monitors the levels of pesticides in foods prepared for consumption in its Total Diet Study (TDS). This multi-faceted approach allows FDA both to regulate foods introduced into U.S. commerce and to gather information on the levels of pesticides in foods representative of the U.S. diet.

In FY 2014, FDA analyzed 6,638 samples under the regulatory monitoring program, of which 6,272 were human foods and 366 were animal foods. Consistent with previous years, the majority of human foods sampled were import samples; i.e., 4,814 import samples and 1,458 domestic samples were analyzed. Domestic human food samples were collected from 47 different states and U.S. territories and import samples represented commodities shipped from 98 different countries.

No residues were found in 70.9 % of domestic and 52.9 % of imported human food samples analyzed in FDA's regulatory pesticide residue monitoring program. Violative residues (i.e., residues for which there is no tolerance or residues found above the tolerance) were found in 1.4 % of domestic samples and 11.8 % of import samples.

Typically, fruits and vegetables comprise the majority of the human foods tested in the FDA regulatory pesticide program. This was the case in FY 2014 for import samples, of which 75.7 % were fruits and vegetables. However, only 36.1 % of FY 2014 domestic samples were fruits and vegetables because FDA conducted two focused sample surveys that comprised about half the domestic samples, "Collection of Domestic and Domestic Import Tea Samples for Pesticide Residue Analysis" (Tea assignment) and "European Union Audit Field Assignment" (EU assignment).

In FY 2014, FDA also analyzed 366 (218 domestic and 148 import) animal food samples for pesticides. No residues were found in 52.3 % of the domestic animal food samples or in 54.7 % of the import animal food samples. Less than 2 % of the animal foods (7 samples) were found to contain violative pesticide residues.

FDA analyzed three market baskets consisting of 801 total samples in the TDS program. No foods contained violative pesticide levels. The most frequently observed pesticide residues are consistent with those reported in FY 2013. Residues of 166 different pesticides were found in the TDS foods, most at trace levels. Almost 89 percent of all residues were found at levels below the trace level of 0.01 ppm, and fewer than 2 % were above 0.1 ppm.

Findings for the FY 2014 FDA pesticide regulatory program indicate pesticide residue levels in foods are generally well below EPA tolerances. The elevated violation rate of import samples confirms the effectiveness of the regulatory program to target imported commodities and countries that are anticipated to contain violative pesticide residues, and the comprehensiveness of FDA's pesticide analytical protocols.

Glossary and Abbreviations

Term	Definition
Action level	Food or feed may contain a pesticide residue from sources of contamination that cannot be avoided by good agricultural or manufacturing practices, such as contamination by a pesticide that persists in the environment. In the absence of a tolerance, or tolerance exemption, FDA may establish an "action level" for such unavoidable pesticide residues. An action level specifies the level below which FDA may exercise its discretion not to take enforcement action. (http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ucm077969.htm)
Agency	U.S. Food and Drug Administration, unless otherwise denoted
APEC	Asia Pacific Economic Cooperation
CFR	U.S. Code of Federal Regulations
CFSAN	FDA Center for Food Safety and Applied Nutrition
Codex	Codex Alimentarius Commission
CVM	FDA Center for Veterinary Medicine
Domestic sample	Sample of a commodity produced and held for sale in the U.S.
DWPE	Detention Without Physical Examination
EPA	U.S. Environmental Protection Agency
FFDCA	Federal Food, Drug, and Cosmetic Act
FDA	U.S. Food and Drug Administration
FSCF	Food Safety Cooperation Forum
FSIS	USDA Food Safety and Inspection Service
FY	Fiscal Year
Import sample	Sample of products, which originate from another country, collected while the goods are in import status."
JIFSAN	Joint Institute for Food Safety and Applied Nutrition
ORA	FDA Office of Regulatory Affairs

Term	Definition
LOD	Limit of Detection – The minimum concentration of a pesticide chemical residue that can be reliably distinguished from zero.[1]
LOQ	Limit of Quantitation – The minimum concentration of a pesticide chemical residue that can be quantified with acceptable precision.[1]
MOU	Memorandum of Understanding
MRL	Maximum Residue Level
MRM	Multiresidue Method – FDA pesticide method designed to analyze multiple pesticide chemical residues during a single analysis
No-tolerance violation	Pesticide chemical residue found at, or above, a quantifiable level for pesticides in a commodity in which EPA has not established a tolerance for that particular pesticide/commodity combination
Over-tolerance violation	Pesticide chemical residue found above an EPA tolerance, or in the absence of a tolerance, a pesticide chemical residue subject to an FDA action level and found at a level which subjects the food to removal from the market.
PDP	USDA Pesticide Data Program
PPB	Parts per billion – residue concentration equivalent to microgram/kilogram
PPM	Parts per million – residue concentration equivalent to milligram/kilogram
SPS	Sanitary and Phytosanitary
SRM	Selective Residue Method – FDA pesticide method designed to analyze specific selected pesticide chemicals or a single pesticide chemical
TDS	FDA Total Diet Study
Tolerance	The EPA established maximum residue level of a specific pesticide chemical that is permitted in or on a human or animal food in the United States. The tolerances are listed in 40 CFR Part 180 – Tolerances and Exemptions for Pesticide Chemical Residues in Food
Trace level	Residue level less than the LOQ but greater than, or equal to, the LOD
USDA	U.S. Department of Agriculture
WTO	World Trade Organization

FDA Pesticide Residue Monitoring Program

Three federal government agencies share responsibility for the regulation of pesticides. The U. S. Environmental Protection Agency (EPA) registers (i.e., approves) the use of pesticides and establishes tolerances, i.e., the EPA established maximum residue level of a specific pesticide chemical that is permitted in or on a human or animal food in the United States.[2] EPA also provides a strong U.S. preventative controls program by licensing pesticide applicators, conducting pesticide use inspections, and establishing and enforcing pesticide labelling provisions. FDA enforces tolerances in both imported foods and in domestic foods shipped in interstate commerce, except for meat, poultry, and certain egg products for which the Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture (USDA) is responsible. FDA also monitors pesticides levels in commodities representative of the U.S. diet by carrying out market basket surveys under the TDS.

Regulatory Monitoring and Enforcement

FDA samples individual lots of domestically produced and imported foods and analyzes them to determine whether they contain pesticide chemical residues that are "unsafe" within the meaning of the FFDCA. This activity is carried out pursuant to the enforcement of tolerances established by EPA and includes the monitoring of food for residues of cancelled pesticides used in the past that persist in the environment, which are addressed by FDA action levels. Domestic samples of foods produced and held for sale in the U.S. are typically collected close to the point of production in the distribution system, e.g., growers, packers, and distributors. Import samples are collected when products are offered for entry into U.S. commerce. Because the EPA tolerances are established primarily for raw agricultural commodities, the emphasis of FDA's sampling is on the unwashed, whole (unpeeled) raw commodity; some processed foods are also sampled.

FDA may take regulatory action against food commodities containing pesticide chemical residues when they are found:

- at a level above an EPA tolerance for the pesticide/commodity combination
- at a level above an FDA action level for the pesticide/commodity combination
- at a quantifiable level for pesticides in a commodity for which EPA has not established a tolerance for that particular pesticide/commodity combination ("no tolerance" violations)

For domestic foods, FDA has the authority to issue Warning Letters to the responsible growers and invoke other sanctions such as seizure to remove the food from commerce, or injunction to correct the cause of the violation. Imported shipments are refused entry into U.S. commerce. Firms may be placed under an Import Alert (http://www.accessdata.fda.gov/cms_ia/ialist.html) and "Detention Without Physical Examination," or DWPE, may be invoked for future imported shipments of that firm's commodity based on the finding of a single violative shipment. Congress has authorized FDA to refuse admission of regulated articles based on information, other than the results of examination of entries per se, that causes an article to appear to violate the FFDCA.

Entries of imported foods that are suspected of containing "unsafe" pesticide residues based on the results obtained from previous examinations of the same foods may be considered to appear to violate the FFDCA. DWPE can be applied to a product or products from specific growers, manufacturers, or shippers, or to a geographic area or country if the problem is demonstrated to be sufficiently broad-based.

FDA's Import Alerts describe current DWPEs for pesticide residues and other food issues. There are currently four Import Alerts that address food products that are under DWPE for pesticides:

- Import Alert 99-05, "Detention Without Physical Examination of Raw Agricultural Products for Pesticides"
- Import Alert 99-08, "Detention Without Physical Examination of Processed Foods for Pesticides"
- Import Alert 99-14, "Countrywide Detention Without Physical Examination of Raw Agricultural Products for Pesticides"
- Import Alert 99-15, "Countrywide Detention Without Physical Examination of Processed Foods for Pesticides"

Growers, manufacturers, and shippers that have products under import alert must provide evidence of compliance for each lot of product exported to the U.S. This procedure places the burden of demonstrating product compliance with U.S. residue tolerances on the importer before the entry can be released into domestic commerce. Firms can have their product(s) removed from DWPE under an FDA Import Alert by providing evidence establishing that the conditions that gave rise to the appearance of a violation have been resolved and that there is sufficient evidence for the Agency to have confidence that future entries will be in compliance with the FFDCA. Additionally, a minimum of five consecutive non-violative commercial shipments, as demonstrated by providing FDA with acceptable reports of private laboratory analyses, is required to remove a grower's, manufacturer's, or shipper's product from Import Alert. Removal of a countrywide or geographic area Import Alert would typically require submission to FDA of an effective, detailed approach to correcting the problem, along with acceptable laboratory reports demonstrating compliance of the commodity in question.

Regulatory Monitoring Program Sampling Design

The goal of FDA's pesticide residue monitoring program is to carry out selective monitoring to achieve an adequate level of consumer protection. FDA samples are primarily of the surveillance type; i.e., there is no specific prior knowledge or evidence that a particular food shipment contains illegal residues. However, FDA's monitoring is not random or statistically designed; rather, emphasis is given to the sampling of commodities most frequently consumed or imported, commodities and places of origin with a history of violations, and to a lesser extent, larger-size shipments.

Some of the factors considered by FDA in planning the types and origin of commodities to sample include the following:

- analysis of past problem areas
- commodity/pesticide findings from state, USDA, and FDA monitoring

- foreign pesticide usage data and regional intelligence on pesticide use
- dietary significance of the food
- volume and product value of individual commodities of domestic food produced and entered into interstate commerce and of imported food offered for entry into the U.S.
- origin of imported food
- chemical characteristics and toxicity of the pesticide(s) used

One important consideration when designing the FDA pesticide residue monitoring program is the distinction between domestic and imported commodities. Historically, the violation rate of import samples is 3-5 times higher than the rate for domestic samples. For example, in FY 2012 – 2013 the violation rate for domestic samples ranged from 1.6 – 2.8 %, whereas the rate for import samples ranged from 7.1 – 12.6 %. Because the violation rate of import samples is higher than for domestic samples, FDA allocates more of its resources towards testing imported compared with domestic commodities. Typically, imported commodities comprise about 75 % of all samples analyzed each year.

In addition to increased sampling of imported commodities, FDA further targets specific commodities and countries that might warrant special attention based upon historically high violation rates and trends. FDA also utilizes available foreign pesticide usage data and data from the USDA's Pesticide Data Program (PDP), a statistically representative survey of pesticide residues in selected food commodities, to develop sampling guidance.

Other federal agencies and several states have their own monitoring programs for pesticides. Through collaboration and agreements, they provide FDA information and data on violative samples found in domestic commerce (see Cooperative Agreements and International Agreements section). FDA leverages that data to focus its resources where they are most efficiently and effectively used.

Sampling levels and bias for particular imported or domestic commodities can vary significantly from year to year, e.g., changing weather patterns, new or re-emergent pests, new invasive pest species, or developed resistance to pesticides. Pesticide use changes due to such factors and some countries historically have more problems than others. Targeted commodities may not be the largest imports by volume from a particular country. A high violation rate for a targeted commodity does not mean that a country's overall violation rate for all commodities is high; rather it is an indicator of the effectiveness of FDA's targeted sampling.

Considering the above and available Agency resources, FDA has not attempted to develop a monitoring program that would be statistically based. The current pesticide sampling program, coupled with broad-based enforcement strategies for imports, allows FDA to achieve the program's main objective of consumer protection by selective enforcement.

Focused Sampling

In addition to samples collected for routine regulatory monitoring, FDA may conduct special "focused sampling" assignments to target specific food commodities for analysis. Focused sampling is generally used to follow up on suspected problem areas or to acquire

residue data on selected commodities not usually covered during regulatory monitoring. Typically, samples collected for a focused sampling assignment are analyzed using routine pesticide procedures; however, in some cases, targeted residues of interest are analyzed.

In the early 1990s, FDA conducted statistically based comprehensive incidence and level monitoring studies of four major foods and published the results.[3,4] However, due to resource constraints, incidence and level monitoring was replaced by regulatory based "focused sampling." Incidence and level monitoring data are provided by FDA's TDS program and the USDA PDP, a non-regulatory program focused on obtaining a statistically valid representation of pesticide exposure from selected commodities in the U.S. food supply; more information is available at https://www.ams.usda.gov/datasets/pdp.

Animal Foods

In addition to monitoring foods for human consumption, FDA also samples and analyzes domestic and imported animal foods for pesticide residues. FDA's Center for Veterinary Medicine (CVM) directs this portion of the Agency's surveillance program via its Animal Food Contaminants Program. Although animal foods containing violative pesticide residues may present a potential hazard to a number of different categories of animals, e.g., laboratory animals, pets, wildlife, CVM's program focuses on foods for livestock and poultry animals that ultimately become or produce foods for human consumption.

Analytical Methods and Pesticide Coverage

To analyze the large numbers of samples whose pesticide treatment history is usually unknown, FDA utilizes multiple pesticide procedures including multi-residue methods (MRMs) capable of simultaneously determining many different pesticide residues, and selective residue methods (SRMs) that target specific pesticide(s). The complete list of pesticides analyzed in FY 2014 is provided in Appendix A.

The FDA MRMs can detect the majority of the approximately 400 pesticides with EPA tolerances, and many others that have no tolerances. They are also able to detect many metabolites, impurities, and alteration products of pesticides. FDA pesticide SRMs are optimized to determine one or several specific pesticide residues in foods. They are more resource intensive and therefore employed more judiciously. SRMs are sometimes needed to analyze pesticides that are not adequately recovered using standard MRMs or to target specific pesticide/commodity combinations.

The lower limit of residue measurement in FDA's determination of a specific pesticide is well below typical tolerance levels, which range from 0.1 to 50 parts per million (ppm). Most pesticides analyzed are easily quantified at FDA's default limit of quantitation (LOQ) of 0.01 ppm[5]. Residue levels detected above the limit of detection (LOD) but below the LOQ are designated as "trace" values.

FDA conducts ongoing research to update its pesticide residue monitoring program. This research includes testing the behavior of new or previously untested pesticides through existing analytical methods, as well as developing new methods to improve efficiencies and detection capabilities. Newer extraction procedures and more sensitive detection techniques have increasingly replaced older methods, allowing for a greater level of

pesticide coverage.

FDA Total Diet Study

An important complement to FDA's regulatory pesticide residue monitoring program is its Total Diet Study (TDS) program. The TDS is distinct from FDA's regulatory pesticide residue monitoring program. The TDS monitors levels of pesticides in foods representing the totality of the American diet. Data from the TDS are used to calculate exposures to the pesticides in the U.S. diet.

Regulatory monitoring determines pesticide residues in raw commodities, but the TDS monitors foods prepared table-ready for consumption. The TDS food samples are washed, peeled, and/or cooked before analysis, simulating typical consumer handling. In addition to being analyzed for pesticide residues, TDS foods also are selectively analyzed for toxic and nutrient elements, industrial chemicals, and other chemical contaminants.

Another distinction from FDA's pesticide-residue regulatory monitoring is that TDS foods are analyzed at levels 10–100 times lower than the regulatory monitoring program. TDS residue levels as low as 0.1 parts per billion (ppb) routinely are reported.

TDS foods are collected for sampling as "market baskets," with each market basket comprising samples of about 267 different foods that represent the average U.S. consumer's diet, bought from the same retail venues from which consumers buy them. Each year, the market baskets are collected from four different regions of the country, from three different cities in each of those regions. For each region, samples from the three cities are combined to form a single composite prior to analysis.

Analytical results and additional information about the history and design of the TDS can be found on FDA's TDS website.[6] The Agency is in the process of updating the website with additional TDS data.

Cooperative Agreements and International Activities

FDA collaborates with local, state, federal, and international authorities, leveraging their programs and capacities to maximize the effectiveness of its pesticide program. For example, the FDA and USDA have a Memorandum of Understanding (MOU) in which USDA alerts FDA monthly of presumptive tolerance violations they find in the PDP. FDA uses this information when designing the annual pesticide residue monitoring program, and to direct immediate sample collection efforts, as appropriate.

FDA-State Cooperation

FDA field offices interact with their counterparts in many states to enhance the effectiveness of the Agency's pesticide residue monitoring program. Partnership Agreements and MOUs have been established between FDA and many state agencies. These agreements provide for more efficient residue monitoring by both parties by coordinating efforts, broadening coverage, and eliminating duplication of effort. These agreements are specific to each state and take into account available resources. The agreements stipulate how FDA and the state will jointly plan work for collecting and

analyzing samples, sharing data, and enforcing compliance follow-up responsibilities for individual commodities of imported and domestic products.

International Activities

FDA is subject to the obligations placed on countries by the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). Pesticide residue tolerances and monitoring activities are included as sanitary measures under the SPS Agreement. FDA's obligations under this agreement include the requirement that standards are based on an assessment, as appropriate to the circumstances, of the risk to human and animal life or health, and on international standards except when a more stringent standard can be scientifically supported. The standards must also be applied equally to domestic and imported products unless there is scientifically based justification for doing otherwise.

Similarly, FDA is subject to obligations arising from several free trade agreements, the most notable of which is the North American Free Trade Agreement (NAFTA). These bilateral or multilateral free trade agreements contain provisions on sanitary measures that are consistent with the provisions of the SPS Agreement. As with the SPS Agreement, the sanitary provisions of these agreements include provisions relating to pesticide residues.

FDA pesticide residue monitoring activities, for domestic and imported products, are a part of the Agency's overall food safety programs and are in keeping with these international obligations. Additionally, arrangements FDA makes with other countries with respect to food safety programs, and the activities that FDA carries out internationally with respect to food safety, can also affect how some of our monitoring is conducted.

FDA maintains a number of cooperative arrangements with counterpart agencies in foreign governments. Such arrangements include MOUs, Confidentiality Agreements, or other formal communications. These arrangements most often contain information-sharing provisions that include the ability to share analytical findings about pesticide residues. Several of the MOUs have specific provisions relating to pesticide residue information sharing or cooperative efforts relating to pesticide residues.

FDA participates regularly in meetings with food safety regulatory agencies of foreign governments, in a variety of settings including bilateral and multilateral fora, and in formal and informal technical and policy meetings. FDA carries out bilateral discussions on food safety with our regulatory partners from around the world; pesticide control programs and pesticide residue issues can be subjects for discussion at these meetings. Multilateral fora in which FDA participates include the Food Safety Cooperation Forum (FSCF) of the Asia Pacific Economic Cooperation (APEC), which promotes regulatory cooperation in food safety including pesticide Maximum Residue Levels (MRLs).

FDA participates in the work of international standards-setting organizations, including that of the Codex Alimentarius Commission (Codex). Within Codex, FDA is an active participant in the work of the Codex Committee on Pesticide Residues. In addition, FDA supports the Joint Institute for Food Safety and Applied Nutrition (JIFSAN), which implements several training programs on pesticide risk assessment and the use of pesticide

residue analytical methods.

Results and Discussion

This report discusses results of the FY 2014 FDA pesticide residue monitoring program in accordance with the threefold design of the program, i.e., the regulatory pesticide monitoring program, focused sampling surveys, and the TDS program. Additionally, the report examines data to evaluate imported products that may warrant special attention.

In FY 2014, FDA analyzed 6,638 samples under the regulatory monitoring program, of which 6,272 were human foods and 366 were animal foods. Results for the testing of human and animal foods are reviewed under separate headings, "Regulatory Monitoring of Human Foods" and "Regulatory Monitoring of Animal Foods."

Regulatory Monitoring of Human Foods

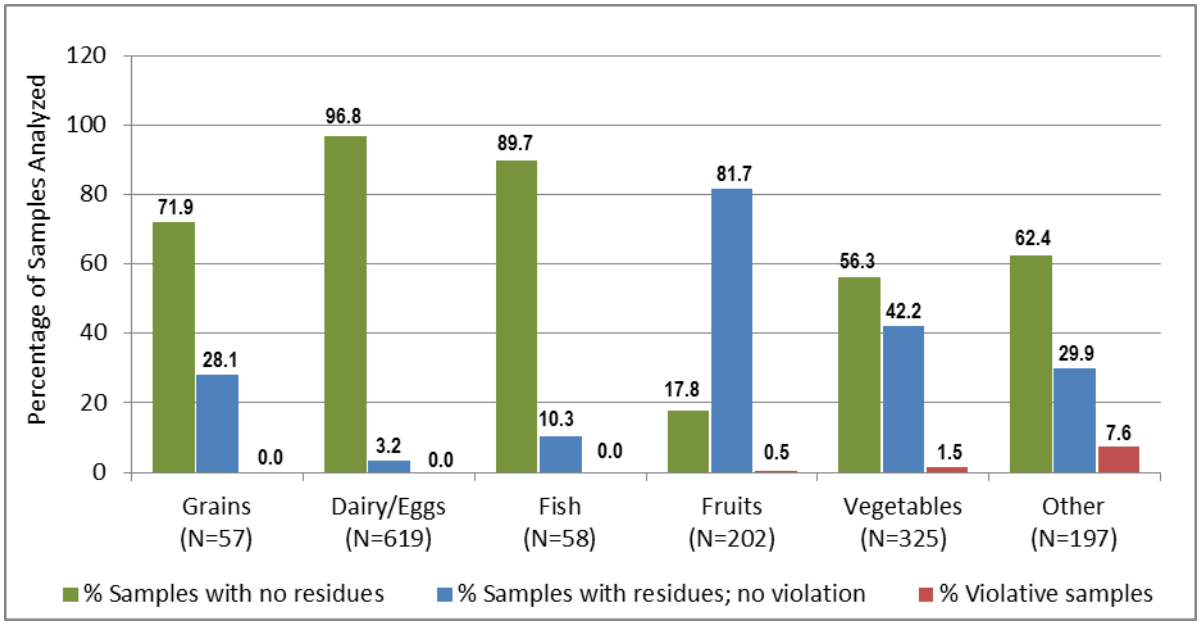
The 6,272 human foods analyzed include results from two focused sampling assignments, i.e., "Collection of Domestic and Domestic Import Tea Samples for Pesticide Residue Analysis," and "European Union Audit Field Assignment." Results of these assignments are discussed separately in the section "Focused Sampling"; however, the findings are included in the sample summaries and statistics for human foods.

Of the human foods analyzed for pesticides in FY 2014, 1,458 were domestic samples and 4,814 were import samples. Results for the domestic samples are tabulated in Appendix B, "Analysis of Domestic Samples by Commodity Group in FY 2014," and results for the import samples are tabulated in Appendix C, "Analysis of Import Samples by Commodity Group in FY 2014." Each appendix includes information on the total number of samples analyzed, the number and percentage of samples with no residues detected, and the number and percentage of violative samples including the nature of the violation (over-tolerance vs. no-tolerance). Results are summarized for all samples analyzed, by commodity groups, and by subgroups.

Discussion

The domestic violation rate was 1.4 % and the import violation rate was 11.8 %, based on testing for the pesticides listed in Appendix A. The violation rates for FY 2014 are consistent with those from FY 2012 and FY 2013, i.e., 2.8 % for domestic samples and 11.1 – 12.6 % for import samples. Of the 1,458 domestic samples in FY 2014, 98.6 % were in compliance and 70.9 % had no detectable residues (Appendix B). Because of the atypically large number of milk and egg samples analyzed for the European Union Audit Field Assignment, dairy and egg products accounted for the largest proportion, 619 samples (42.5 percent), of the domestic samples analyzed in FY 2014.

Figure 1 - Results of Domestic Samples by Commodity Group

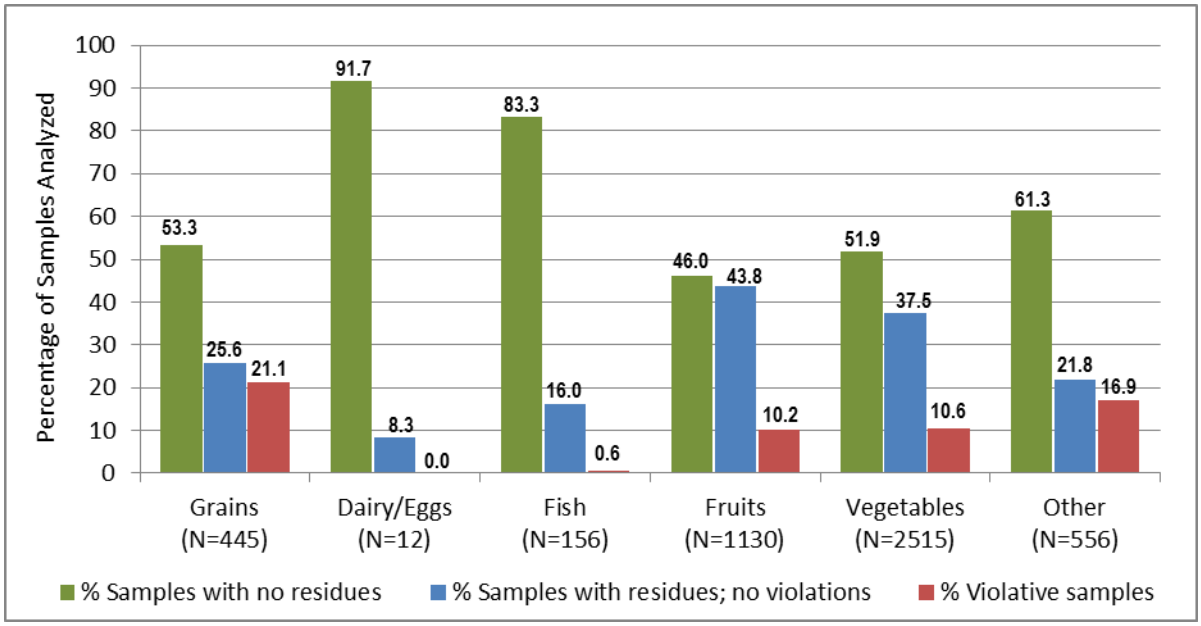


N = Number of samples analyzed for commodity group

Figure 1 summarizes the number of samples analyzed and the residue findings in domestic samples by commodity groups. For fruits and vegetables, 17.8 % and 56.3 % of the samples, respectively, had no residues detected; 0.5 % of the fruit samples and 1.5 % of the vegetable samples contained violative residues. In the grains and grain products group, 71.9 % of the samples had no residues detected, and no samples contained violative residues. In the fish/shellfish/other aquatic products group, 89.7 % had no detectable residues and none of the samples had violative residues. In the milk/dairy products/eggs group, 96.8 % of the samples analyzed had no detectable residues and none had violative residues. In the "Other" foods group that covers nuts, seeds, snack foods, beverages, and spices among other foods, 62.4 % of the samples analyzed had no detectable residues, and 7.6 % had violative residues. The higher violation rate for this group can be attributed to the 19 retail tea samples collected for the tea assignment, which had a violation rate of 52.6 %. (Tea samples are discussed further in the Focused Sampling section.)

For imported foods, of the 4,814 samples analyzed, 88.2 % were in compliance and 52.9 % had no residues detected (Appendix C). Fruits and vegetables accounted for 75.7 % of import samples.

Figure 2 - Results of Import Samples by Commodity Group



N = Number of samples analyzed for commodity group

Figure 2 summarizes the number of samples analyzed and the residue findings in import samples by commodity groups. No residues were detected in 46.0 % of imported fruit samples and 10.2 % of imported fruit samples had violative residues. Of the vegetable samples, 51.9 % of samples had no residues detected and 10.6 % of samples had violative residues. No residues were found in 91.7 % of samples of the imported milk/dairy products/eggs group and none had violative residues. No residues were found in 83.3 % of samples of the imported fish/shellfish group and 0.6 % had violative residues. In the imported grains and grain products group, 53.3 % had no detectable residues, and 21.1 % contained violative residues. In the "Other" foods group consisting largely of nuts, seeds, oils, honey, candy, beverages, spices, multiple food products, and dietary supplements, 61.3 % of the samples analyzed had no residues detected, while 16.9 % of the samples (mostly dietary supplements and spices) had violative residues.

Geographic Coverage

Domestic: A total of 1,458 domestic samples were collected from 46 states and Puerto Rico. Table 1 lists the number of domestic samples from each state and territory, in descending order.

Table 1. Domestic Samples Collected and Analyzed per State/Territory

State/Territory	Samples (#)	State/Territory	Samples (#)
California	170	Maine	18
Texas	127	Arizona	18
Washington	104	Georgia	16
New York	90	Kentucky	15
Minnesota	88	Indiana	13
Florida	69	Tennessee	13
Michigan	61	Mississippi	12
Wisconsin	53	Iowa	11
Pennsylvania	45	Wyoming	10
Oregon	44	New Hampshire	9
Kansas	44	Connecticut	8
Illinois	41	Rhode Island	8
New Jersey	36	New Mexico	7
Ohio	33	Vermont	7
Idaho	33	Arkansas	6
Colorado	32	North Carolina	6
Montana	30	Puerto Rico	5
Massachusetts	26	Delaware	5
Virginia	26	Oklahoma	3
North Dakota	25	Alabama	2
Louisiana	25	South Carolina	2
Maryland	20	Alaska	2
Missouri	19	South Dakota	2
Utah	19		

No domestic samples were collected from the District of Columbia or the states of Hawaii, Nebraska, Nevada and West Virginia.

Imports: A total of 4,814 samples representing food shipments from 99 countries were collected. Table 2 lists the number of samples and names of countries from which ten or more samples were collected. Table 2a lists the countries of origin that had fewer than ten samples collected.

Table 2. Import Samples Collected and Analyzed per Country of Origin for Countries with Ten or More Samples Collected

Country	Samples (#)	Country	Samples (#)
Mexico	1776	Israel	31
China	414	Poland	30
India	268	Argentina	29
Canada	264	United Kingdom	23
Chile	190	Lebanon	22
Dominican Republic	183	Indonesia	21
Italy	140	Taiwan	21
Peru	132	United Arab Emirates	20
Vietnam	108	Brazil	19
Guatemala	105	Jamaica	19
Turkey	83	Afghanistan	17
Pakistan	77	Honduras	17
Thailand	67	Australia	16
Ecuador	63	Philippines	15
Netherlands	59	Germany	14
Spain	58	Hong Kong SAR	14
Costa Rica	50	Morocco	14
Egypt	50	Bulgaria	12
United States	41	Norway	12
South Korea	36	South Africa	12
Greece	34	Ghana	11
France	32	Colombia	10
Belgium	31	Japan	10

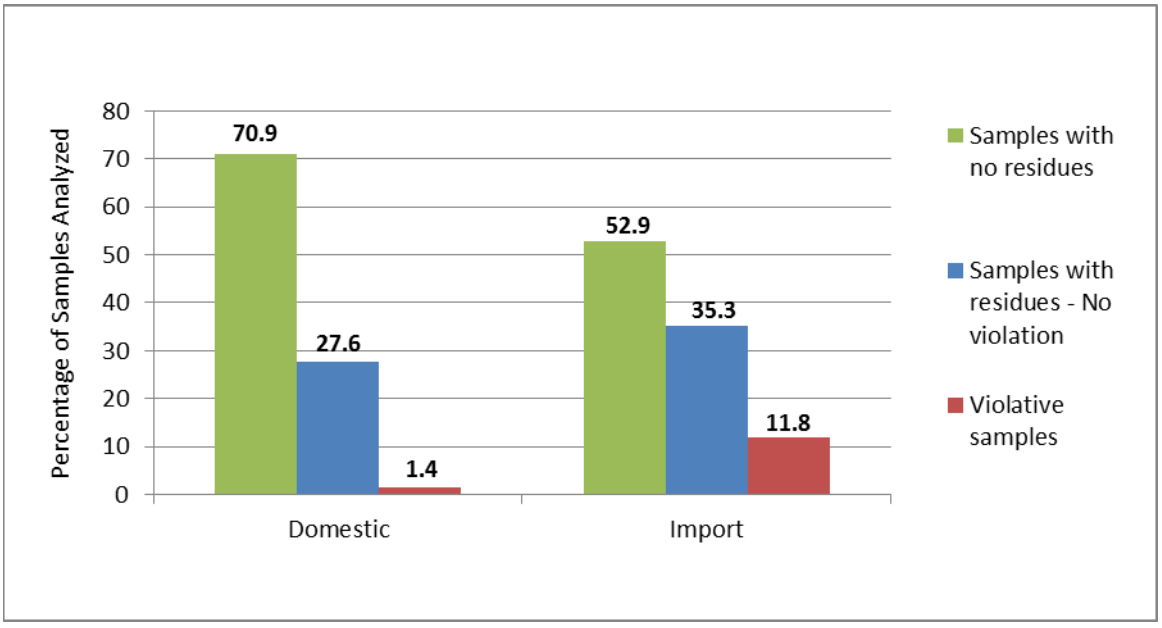
Table 2a. Countries from Which Fewer Than Ten Samples Were Collected and Analyze

Countries		
Bolivia	Austria	Croatia
Serbia	Azerbaijan	Ireland
Faroe Islands	Bangladesh	Jordan
Nicaragua	Switzerland	Kenya
Tunisia	Denmark	Cambodia
Malaysia	Fiji	Kazakhstan
Russia	Iraq	Macedonia
El Salvador	Iceland	Mauritius
Uruguay	Nigeria	Maldives
Ivory Coast	New Zealand	Nepal
Cyprus	Paraguay	Panama
Haiti	Togo	Romania
Sri Lanka	Tonga	Saudi Arabia
Lithuania	Trinidad & Tobago	Singapore
Portugal	Burkina Faso	Syrian Arab Republic
Ukraine	Cameroon	Tajikistan
West Bank	Algeria	Vanuatu
Latvia	Finland	

Comparison of Domestic/Import Violation Rates

1,458 domestically produced and 4,814 imported human food samples were collected and analyzed. Violative residues were found in 1.4 % of the domestic samples and 11.8 % of the import samples. No residues were found in 70.9 % of domestic and 52.9 % of import samples (Figure 3).

Figure 3 - Summary of Results of Domestic vs. Import Food Samples



For several commodity groups, the violation rate was higher for import samples; e.g., 21.1 % for imported grains vs. 0 percent for domestic grains; 10.2 % for imported fruit vs. 0.5% for domestic fruit; and 10.6 % of imported vegetables vs 1.5 % domestic vegetables. In the category "Other" (mostly nuts, seeds, oils, honey, candy, beverages, spices, multiple food products, and botanical dietary supplements), the violation rate was 7.6 % for domestic samples and 16.9 % for import samples. Botanicals and herbal supplements accounted for most of the violative samples for the import "Other" foods group.

Of the 21 domestic violative samples, 18 were found to contain pesticide residues that have no published EPA tolerance, i.e., "no-tolerance" violations; and 7 were found to contain pesticide residues that exceeded a tolerance, i.e., "over-tolerance" violations. Four samples had both a no-tolerance violation and an over-tolerance violation.

Of the 570 import violative samples, 553 were found to contain no-tolerance, violative pesticide residues; and 33 were found to contain over-tolerance/action level pesticide residues. Additionally, 16 samples had both a no-tolerance violation and an over-tolerance violation.

Pesticides Found

In FY 2014, FDA pesticide methods could detect 705 pesticides and industrial chemicals (Appendix A). Of these chemicals, 212 different pesticides were actually found in the samples analyzed. They are listed in Table 3 in order of frequency of detection along with the number of samples in which they were found.

Table 3. Pesticides Found in FY 2014

Pesticides		
Boscalid (365)	Chlorpyrifos (345)	Imidacloprid (331)
Carbendazim (317)	Azoxystrobin (290)	Pyraclostrobin (217)
Myclobutanil (180)	Acetamiprid (177)	Tebuconazole (176)
Piperonyl butoxide (161)	Malathion (148)	Cypermethrin (142)
Bifenthrin (138)	Cyprodinil (137)	Thiamethoxam (130)
Metalaxyl (128)	Chlorantraniliprole (126)	Ethoxyquin (119)
Thiabendazole (114)	Difenoconazole (113)	Pyrimethanil (108)
Flonicamid (106)	Fludioxonil (106)	Iprodione (103)
Clothianidin (93)	Spinosad (93)	Trifloxystrobin (91)
Permethrin (87)	Endosulfan (84)	Buprofezin (82)
Fenhexamid (82)	Thiophanate-methyl (82)	Lambda-cyhalothrin (80)
Propamocarb (77)	Thiacloprid (76)	Propiconazole (75)
Tricyclazole (73)	Captan (71)	Methoxyfenozide (64)
Imazalil (63)	Methamidophos (62)	Dimethoate (60)
Chlorothalonil (55)	Dimethomorph (55)	Methomyl (53)
Triazophos (51)	Pirimiphos methyl (49)	Oxamyl (47)
Phosmet (46)	Chlorpropham (45)	Omethoate (45)
Acibenzolar-S-methyl	Indoxacarb (39)	Flubendiamide (37)
Dinotefuran (36)	Cyfluthrin (33)	DCPA (33)
Spiromesifen (32)	Acephate (30)	Fenpropathrin (30)
Carbaryl (29)	Chlorfenapyr (29)	Linuron (29)
Mandipropamid (29)	Propargite (29)	Spirotetramat (29)
Carbofuran (28)	DDT (28)	Quinoxyfen (28)
Fenpyroximate, e- (27)	Pyridaben (27)	Monocrotophos (26)
Bifenazate (25)	Isoprothiolane (25)	Kresoxim-methyl (24)
Spinetoram (24)	Phenylphenol, o- (23)	Pendimethalin (22)
Chlorpyrifos methyl (21)	Ethion (21)	Pyriproxyfen (21)
Diflubenzuron (19)	Fenbuconazole (19)	Hexythiazox (19)
Deltamethrin (18)	Diazinon (18)	Fipronil (17)
Methidathion (17)	Novaluron (16)	Profenofos (16)
Triadimenol (16)	Procymidone (15)	Cyazofamid (14)
Cyromazine (14)	Diphenylamine (13)	Famoxadone (13)
Dichlorvos (12)	Fenamidone (12)	Spirodiclofen (12)

Pesticides		
Triphenyl PO_4 (12)	Fenvalerate (11)	Fluopicolide (11)
Flusilazole (11)	Methoprene (11)	Dicloran (10)
Etoxazole (10)	Prochloraz (10)	Metrafenone (9)
Triadimefon (9)	Triflumizole (9)	Atrazine (8)
Etofenprox (8)	Penconazole (8)	Pymetrozine (8)
Dichlobenil (6)	Dicofol (6)	Flufenoxuron (6)
Tetraconazole (6)	Azinphos-methyl (5)	Diethofencarb (5)
Emamectin benzoate (5)	Fenazaquin (5)	Folpet (5)
Isoprocarb (5)	Lufenuron (5)	Quintozene (5)
Trichlorfon (5)	Bitertanol (4)	Coumaphos (4)
Cyproconazole (4)	Dieldrin (4)	Dodine (4)
Fenarimol (4)	Iprovalicarb (4)	Metolachlor (4)
Oxadixyl (4)	Oxyfluorfen (4)	Phoxim (4)
Tebufenozide (4)	Biphenyl (3)	DEF (3)
Hexachlorobenzene (3)	Hexaconazole (3)	Hexaflumuron (3)
Methoxychlor (3)	MGK 264 (3)	Paclobutrazol (3)
Parathion methyl (3)	Propoxur (3)	Rotenone (3)
Terbuthylazine (3)	Abamectin (2)	Aldicarb (2)
Bupirimate (2)	Diuron (2)*	Esfenvalerate (2)
Etobenzanid (2)	Fenobucarb (2)	Fenpropimorph (2)
Flutriafol (2)	Metconazole (2)	Metribuzin (2)
Napropamide (2)	Picoxystrobin (2)	Prometryn (2)
Resmethrin (2)	Spiroxamine (2)	Tetramethrin (2)
Triflumuron (2)	3,4-dichloroaniline (1)	Acequinocyl (1)*
Acetochlor (1)	Acrinathrin (1)	Ametryn (1)
BHC (1)	Bromopropylate (1)	Captafol (1)
Carbosulfan (1)	Carboxin (1)	Chlorfluazuron (1)
Clofentezine (1)	Cyflufenamid (1)	Diniconazole (1)
Dioxacarb (1)	Ethirimol (1)	Ethoprop (1)
Fenitrothion (1)	Fluopyram (1)*	Fluquinconazole (1)
Fluridone (1)	Flutolanil (1)	Heptachlor (1)
Isocarbophos (1)	Ivermectin (1)	Maleic hydrazide (1)*
Mepanipyrim (1)	Methiocarb (1)	Mevinphos (1)
Penthiopyrad (1)*	Phenmedipham (1)	Phorate (1)

Pesticides		
Phosalone (1)	Pirimicarb (1)	Tebufenpyrad (1)
Tecnazene (1)	Thidiazuron (1)	Tolclofos methyl (1)
Tolylfluanid (1)	Tri-allate (1)	Triforine (1)*
Uniconazole (1)	Vinclozolin (1)	

*Pesticide not found previously in FDA regulatory monitoring program.

Regulatory Monitoring of Animal Foods

In FY 2014, a total of 366 animal food samples were analyzed for pesticides by the FDA. The breakdown of samples by type of animal food and number of positive and violative samples is shown in Table 4.

Of the 366 animal food samples, 218 samples were domestic and 148 samples were imports. Of the 218 domestic surveillance samples, 114 (52.3%) contained no detectable residues and 104 (47.7%) contained one or more residues, of which 2 (0.9%) were violative. Of the 148 import samples, 81 (54.7%) contained no detectable residues and 67 (45.3%) contained one or more residues, of which 5 (3.4%) were violative.

The two domestic samples found to contain one or more violative residues were from different commodities. A mixed feed ration from Texas contained 0.025 ppm propoxur, which is not registered for use in the US. Bulk cottonseed from Utah contained 0.079 ppm permethrin; there is no tolerance established for this commodity.

The five import samples found to contain one or more violative residues were from several countries. A sample of ground organic soybeans from Canada was found to contain 1.29 ppm thiophanate methyl, exceeding the tolerance of 0.2 ppm in soybeans. Dehydrated celery imported from Chile contained chlorpyrifos at 0.034 ppm, diphenylamine at 0.019 ppm, and thiophanate methyl at 0.094 ppm. Because no tolerances for these pesticides are listed for celery, the samples are violative. Canadian canary seed was found to contain 0.017 ppm dimethoate; dimethoate has tolerances for a variety of commodities, but not canary grass. A sample of mixed grain feed pellets from China contained 0.045 ppm diphenylamine; no tolerance for any grains is listed for diphenylamine. A sample of ground corn husk from Mexico was found to contain 0.032 ppm carbofuran for which a tolerance is not established in corn.

Table 4. Summary of Animal Foods Analyzed for Pesticides

Commodity Type	Samples Analyzed #	Without Residues # (%†)	Violative Samples # (%†)
Totals – All Samples	**366**	**195 (53.3)**	**7 (1.9)**
Sample Origin			
Domestic	218	114 (52.3)	2 (0.9)
Import	148	81 (54.7)	5 (3.4)
Commodity Type			
Whole and Ground Grains/Seeds	176	127 (72.2)	3 (1.7)
Mixed Livestock Food Rations	96	29 (30.2)	4 (4.2)
Medicated Livestock Food Rations	15	2 (13.3)	0 (0)
Plant Byproducts	34	24 (70.6)	0 (0)
Hay and Silage	10	5 (50)	0 (0)
Animal Byproducts	1	0 (0)	0 (0)
Pet Food/Treats	31	7 (22.6)	0 (0)
Other Animal Food Ingredients	3	1 (66.7)	0 (0)

†Percentage of the number of samples analyzed per commodity type

A total of 65 different pesticides were found in animal foods. Table 5 lists the 33 pesticides detected in at least two samples; 32 other pesticides were found in only one sample each, and are not shown in the table. Of the 366 samples analyzed, 171 were found to contain at least one pesticide (includes both violative and non-violative samples), 104 in domestic samples and 67 in imported samples. A total of 311 residues were detected in all samples, 202 in domestic samples and 109 in import samples. For all samples, ethoxyquin and malathion were the most frequently found pesticides and together accounted for 45.7 % of all residues detected (Table 5). Piperonyl butoxide was the third most commonly detected residue contributing 5.5 % to the total.

Table 5. Pesticides Most Commonly Reported in Samples of Foods for Animals

Pesticide*	Samples # (%)†	Median††	Range
Ethoxyquin	90 (24.6)	0.564	Trace - 148
Malathion	52 (14.2)	0.044	Trace - 0.669
Piperonyl butoxide	17 (4.6)	0.010	Trace - 0.222
Chlorpyrifos methyl	10 (2.7)	0.034	Trace - 0.417
Methoprene	10 (2.7)	0.059	0.011 - 1.067
Phenylphenol, o-	9 (2.5)	0.018	Trace - 0.278
Azoxystrobin	8 (2.2)	0.010	Trace - 0.045
Tebuconazole	8 (2.2)	0.011	Trace - 0.042
Boscalid	6 (1.6)	0.018	Trace - 0.239
Chlorpyrifos	6 (1.6)	0.016	Trace - 0.034
Pyraclostrobin	4 (1.4)	Trace	Trace - 0.019
Diflubenzuron	4 (1.1)	0.036	0.020 - 0.237
Imidacloprid	4 (1.1)	Trace	Trace - 0.022
Permethrin	4 (1.1)	0.018	Trace - 0.079
Propiconazole	4 (1.1)	0.026	Trace - 0.595
Thiabendazole	4 (1.1)	0.017	0.015 - 0.834
Diphenylamine	3 (0.8)	0.019	Trace - 0.045
Imazalil	3 (0.8)	0.010	Trace - 0.010
Metalaxyl	3 (0.8)	Trace	Trace - 0.011
Methamidophos	3 (0.8)	Trace	Trace - 0.059
MGK 264	3 (0.8)	0.016	Trace - 0.038
Acetamiprid	2 (0.5)	0.039	0.019 - 0.058
Bifenthrin	2 (0.5)	0.011	Trace - 0.013
Carbendazim	2 (0.5)	0.021	Trace - 0.037
Chlorantraniliprole	2 (0.5)	0.071	0.018 - 0.123
Chlorpropham	2 (0.5)	0.026	0.011 - 0.041
DEF	2 (0.5)	0.036	0.014 - 0.058
Dimethoate	2 (0.5)	0.013	Trace - 0.017
Etofenprox	2 (0.5)	0.317	0.315 - 0.319
Pirimiphos methyl	2 (0.5)	0.038	Trace - 0.067
Propargite	2 (0.5)	0.010	Trace - 0.011
Spinosad	2 (0.5)	0.202	0.019 - 0.384

Pesticide*	Samples # (%)†	Median††	Range
Thiophanate-methyl	2 (0.5)	0.692	0.094 - 1.29

*65 different pesticides were found in foods for animals. The 33 pesticides with frequency of finding in at least 2 samples are listed. 32 additional pesticides were identified in a single sample only and were not presented in this table.

† Number of samples in which the residue was found with percentage () of all 366 samples tested

†† Median level determination includes trace levels

Focused Sampling

In FY 2014, FDA issued two pesticide-related field assignments: "Collection of Domestic and Domestic Import Tea Samples for Pesticide Residue Analysis" and "European Union Audit Field Assignment."

Collection of Domestic and Domestic Import Tea Samples for Pesticide Residue Analysis

In FY 2013 FDA conducted a survey of black, green and white teas collected from retail outlets with the intention of determining pesticide levels in teas. In FY 2014, FDA repeated the tea survey to obtain additional data on the levels of pesticides in teas. FDA analyzed 21 samples of black and green tea leaves collected from retail outlets for pesticide residues. Of the 21 samples analyzed, no residues were detected in 5 samples, and 12 (57.1 %) were found to contain violative pesticide residues. Table 6a lists the 26 different pesticide residues found in the tea samples, the frequency and range of residue levels at which they were detected, and the tolerance level allowed on tea leaves.

Table 6a. Pesticides Found in 21 Collected Tea Samples

Compound	Samples with Residues # (%)	Range of detected residues (ppm)	Tolerance (ppm)
Bifenthrin	11 (52.4)	0.013-0.341	30
Chlorpyrifos	11 (52.4)	0.013-0.115	None
Buprofezin	10 (47.6)	0.026-0.128	20
Propargite	10 (47.6)	0.011-0.406	10
Carbendazim	9 (42.9)	0.014-0.095	None
Acetamiprid	8 (38.1)	0.014-0.447	50
Imidacloprid	8 (38.1)	0.019-0.121	None
Chlorfenapyr	7 (33.3)	0.032-0.258	0.01
Lambda-cyhalothrin	6 (28.6)	0.076-0.186	0.01
Pyridaben	6 (28.6)	0.027-0.037	None
Thiacloprid	6 (28.6)	0.012-0.101	None
Triazophos	6 (28.6)	0.013-0.035	None
Endosulfan	5 (23.8)	0.019-0.113	24*
Indoxacarb	5 (23.8)	0.018-0.036	None
Thiamethoxam	4 (19)	0.017-0.079	20
Carbofuran	3 (14.3)	Trace	None
Dicofol	2 (9.5)	0.035-0.035	50
Hexaflumuron	2 (9.5)	0.062-0.064	None
Lufenuron	2 (9.5)	0.023-0.073	None
Profenofos	2 (9.5)	Trace	None
Tricyclazole	2 (9.5)	Trace	None
Acephate	1 (4.8)	Trace	0.02
Cypermethrin	1 (4.8)	Trace	0.05
Ethion	1 (4.8)	0.031	None
Etofenprox	1 (4.8)	0.015	5
Methomyl	1 (4.8)	0.035	None

*Tolerance was later revoked in 2016

The violative findings for tea are not unexpected, because EPA has established very few pesticide tolerances for tea, a crop that is not produced domestically. These findings are unlikely to be a safety concern for several reasons, including that the violative pesticides found are approved for use on tea internationally and the levels found on tea leaves is much higher than the trace levels found in brewed tea drink, as seen in the TDS program.

European Union Audit Field Assignment

In 2010, the European Union (EU) conducted an audit of the FDA pesticide program and found differences between the approaches that EU and FDA use to monitor pesticide residues in domestically produced animal-derived foods. As a result, FDA has issued multiple assignments to analyze pesticide levels in domestically produced milk, shell eggs, honey, and farmed game meat. In 2014, FDA completed the collection and analysis of 725 retail samples as part of the EU audit; i.e., 322 milk samples, 283 egg samples and 120 honey samples. The number of samples collected and analyzed in FY 2014, and the residues found for each of the three commodities are listed in Table 6b.

Table 6b. Pesticides Found in Selected Commodities for the European Union Audit Field Assignment

Commodity Samples (#)	Pesticide	Samples with Residues # (%)	Range of residue levels (ppm)	Tolerance (ppm)
Milk (322)	Flubendiamide	8 (2.5)	Trace-0.016	0.15
Eggs (283)	Piperonyl butoxide	2 (0.7)	0.041-0.285	1
Honey (120)	Piperonyl butoxide	18 (15.0)	Trace-0.036	10
	Carbendazim	7 (5.8)	Trace-0.014	None
	Flonicamid	6 (5.0)	Trace-0.018	None
	Permethrin	3 (2.5)	Trace-0.012	None
	Coumaphos	3 (2.5)	Trace	0.15
	2,6-Dichlorobenzamide*	2 (1.7)	Trace	NA†
	THPI**	2 (1.7)	0.014-0.045	None
	Boscalid	1 (0.8)	Trace	NA†
	Imidacloprid	1 (0.8)	Trace	NA†

*Degradant of fluopicolide or dichlobenil

** Degradant of captan

†Tolerances are not applicable to trace residue levels.

Of the 725 samples analyzed for the assignment in FY 2014, six samples contained pesticide residues (flonicamid, carbendazim, THPI, or permethrin) slightly above trace level in the absence of a tolerance. Low level residues in honey are likely due to inadvertent contamination introduced by bees as they collect nectar from flowers.

Eight milk samples were found to contain non-violative levels of flubendiamide, which can sometimes be found in milk at low levels due to its use on animal food crops. Piperonyl butoxide was found at non-violative levels in two egg samples and 18 honey samples. Piperonyl butoxide has no pesticidal activity, but rather is a widely used synergist added to pesticide formulations to enhance the effectiveness of pesticides.

Total Diet Study

In FY 2014, FDA analyzed three market baskets (Market Baskets 2013-4, 2014-2, and 2014-3) in the TDS program; market basket 2014-1 was not collected due to resource constraints and scheduling conflicts. Each market basket consisted of 267 different foods; i.e., 801 samples were analyzed altogether. Residues of 166 different pesticides were found in the TDS foods, most at trace levels. The residue levels of 88.9 % were less than 0.01 ppm, and less than 2 % were above 0.1 ppm; all were below the tolerance levels.

Table 7 lists the most frequently found pesticide residues (i.e., residues found in at least 2 % of the samples) in TDS foods, the total number of findings, and the occurrence as a percentage of all 801 items analyzed in FY 2014. The most frequently observed pesticide residues are consistent with those reported in FY 2013.

Table 7. Frequency of Occurrence of Pesticide Residues in the Total Diet Study

Pesticide[1]	Findings #	Occurrence %[2]	Range (ppm)
Boscalid	289	36	0.0001-1.410
Imidacloprid	213	27	0.0002-0.296
DDT	162	20	0.0001-0.0067
Malathion	144	18	0.0002-0.142
Azoxystrobin	135	17	0.0001-0.068
Piperonyl butoxide	128	16	0.0002-0.043
Bifenthrin	123	15	0.0001-0.038
Methoxyfenozide	115	14	0.0001-0.253
Chlorantraniliprole	114	14	0.0001-0.481
Acetamiprid	108	13	0.0001-0.019
Carbendazim	89	11	0.0004-0.035
Thiabendazole	86	11	0.0002-0.326
Chlorpyrifos methyl	83	10	0.0001-0.050
Chlorpyrifos	79	10	0.0001-0.016
Lambda-cyhalothrin	78	10	0.0003-0.093
Thiamethoxam	78	10	0.0002-0.018
Difenoconazole	71	9	0.0001-0.074
Myclobutanil	67	8	0.0001-0.038
Chlorpropham	66	8	0.0004-5.100
Pyraclostrobin	59	7	0.0001-0.175
Metalaxyl	58	7	0.0001-0.014
Clothianidin	57	7	0.0002-0.030
Tebuconazole	56	7	0.0002-0.155

Fludioxonil	56	7	0.0001-0.952
Pyrimethanil	47	6	0.0007-0.688
Flubendiamide	46	6	0.0001-0.038
Phenylphenol, *o*-	42	5	0.0004-0.144
Captan	41	5	0.003-0.567
2,4-D[3]	39	5	0.0003-0.009
Cyprodinil	39	5	0.0003-0.069
Novaluron	38	5	0.0002-0.030
Deltamethrin	38	5	0.001-0.070
Carbaryl	37	5	0.0001-0.004
Clopyralid[3]	37	5	0.0004-0.039
Propamocarb	37	5	0.0002-0.634
MGK 264	36	4	0.0003-0.012
Bifenazate	34	4	0.0002-0.054
Buprofezin	31	4	0.0001-0.074
Fluopicolide	29	4	0.0002-2.090
Trifloxystrobin	27	3	0.0001-0.009
Thiacloprid	27	3	0.0002-0.005
Metribuzin	27	3	0.0003-0.033
DCPA	26	3	0.0001-0.042
Propiconazole	24	3	0.0008-0.016
Imazamox[3]	23	3	0.0001-0.005
Quinoxyfen	23	3	0.0001-0.057
Dichlobenil	22	3	0.0002-0.007
Propargite	22	3	0.0002-0.002
Hexythiazox	22	3	0.0001-0.011
Acephate	22	3	0.0005-0.025
Fenhexamid	22	3	0.001-0.666
Dimethomorph	22	3	0.0002-0.358
Fenpyroximate, e-	20	2	0.0002-0.036
Imazalil	20	2	0.0008-0.220
Quinclorac[3]	20	2	0.0001-0.023
Permethrin	18	2	0.001-1.902
Flonicamid	18	2	0.0004-0.010
Spinetoram	18	2	0.0003-0.015

Etofenprox	18	2	0.0005-0.005
Diphenylamine	17	2	0.0004-0.376
Mandipropamid	17	2	0.0003-0.306
Methamidophos	17	2	0.0002-0.013
Diflubenzuron	17	2	0.0002-0.002
Dimethoate	16	2	0.0001-0.002
Ethion	16	2	0.0002-0.006
Thiophanate-methyl	16	2	0.0002-0.003
Iprodione	16	2	0.002-0.543
Fenpropathrin	16	2	0.001-0.057
Linuron	15	2	0.0005-0.027
Omethoate	14	2	0.0001-0.0009
Dinotefuran	14	2	0.001-0.012
Indoxacarb	14	2	0.0006-0.163
Spirotetramat	13	2	0.0002-0.008
Pirimiphos methyl	13	2	0.0002-0.134

[1] Isomers, metabolites, and related compounds are included with the 'parent' pesticide.

[2] Based on 3 market baskets consisting of 801 total items.

[3] Reflects overall incidence; i.e., based on analysis of all samples, though only 21-64 selected foods per market basket (146 items total) were analyzed for acid herbicides. (Samples not analyzed are counted as negative for the residues of acid herbicides.)

Imported Products That May Warrant Special Attention

The design of the FDA pesticide program focuses on products that have a history of violations or are suspected of violations based on available intelligence. Historically, the violation rate for imported foods is much higher than for domestic foods; results from FY 2014 continue that trend. The violation rate for imported foods (11.8 %) was over eight times higher than the rate for domestic foods (1.4 %). Examination of the FY 2014 pesticide data from the analysis of imported human foods indicates that the commodities listed in Table 8 may warrant special attention in FY 2015.

An elevated violation rate does not necessarily equate to risk and must be viewed in the proper context. The majority of the violations in Tables 8 and 9 are no-tolerance violations and about 80 % of them are at low levels (< 0.1 ppm). Also, in most cases, the pesticide associated with a no-tolerance violation is allowed to be used in other commodities in the U.S., or an international MRL exists for the commodity, e.g., the Codex Alimentarius.

The following criteria were applied to the FY 2014 data to select imported commodities that may warrant special attention:

- Commodities with at least 20 samples analyzed OR with a minimum of 3 violations, AND

- A violation rate of 10 % or higher

Table 8 lists the imported commodities analyzed in FY 2014 that meet the above criteria. The commodities are sorted alphabetically and include the total number of samples analyzed and violation rate per commodity. Countries of origin that contributed most significantly to the violation rate are listed in parentheses next to the commodity.

Some of the commodity counts in Table 8 differ from those found in Appendix C because of differences in the way commodities are grouped. To simplify reporting in Appendix C, similar commodities have sometimes been consolidated; however, in Table 8, those same commodities might be extracted and reported separately. For example, Appendix C indicates FDA analyzed 268 imported rice and rice products in FY 2014. Of those, 259 samples (16 whole grain and 243 processed) have been flagged as warranting special attention in Table 8. The other nine rice samples have been excluded from Table 8 because they are highly processed products that would be impractical to follow up.

Table 8. Imported Commodities That Warrant Special Attention

Commodity†	Samples Analyzed	Violation Rate (%)
Celery	20	15.0
Cherries	29	10.3
Cilantro (Mexico)	35	34.3
Culantro (Costa Rica)	9	66.7
Ginger root	25	12.0
Honeydew melon	8	37.5
Leek	28	10.7
Lime (Mexico)	60	25.0
Mango* (Ecuador)	60	15.0
Mushroom (China, Vietnam)	50	38.0
Olive oil* (Spain)	78	15.4
Papaya (Mexico)	75	13.3
Pasta, wheat (Peru, Italy)	53	17.0
Peas* (Guatemala)	88	13.6
Pepper, hot* (Mexico, Dominican Republic)	381	10.2
Pineapple (Mexico)	17	17.7
Prickly pear* (Mexico)	23	30.4
Prickly pear cactus* (Mexico)	35	42.9
Quinoa seed (Peru)	18	33.3
Raspberries, dried or paste* (China)	8	50.0
Rice, processed* (Vietnam, Pakistan)	243	27.2
Rice, whole grain* (India)	16	25.0
Squash (Mexico)	95	17.9
Strawberries, dried or paste (China)	9	55.6
Taro*	25	12.0
Wheat gluten (Poland)	25	36.0

† Data listed for the commodities in this table are based upon specific product definitions, and may not be directly comparable to product summary subcategories listed in Appendix B.
*Commodity was on the FY 2013 table of imported commodities warranting special attention.

References

[1]Guidelines for the Validation of Chemical Methods for the FDA FVM Program, 2nd Edition, 2015
http://www.fda.gov/downloads/ScienceResearch/FieldScience/UCM273418.pdf

[2]Code of Federal Regulations, Title 40, Part 180, http://www.ecfr.gov/cgi-bin/text-idx?SID=186c36f172c2a5f98f740677f73ae152&node=40:24.0.1.1.27&rgn=div5.

[3]Roy, Ronald R., *et al*. (1995) U.S. Food and Drug Administration Pesticide Program: Incidence/Level Monitoring of Domestic and Imported Pears and Tomatoes. *J. AOAC Int.* **78**, 930-940.

[4]Roy, Ronald, R., *et al*. (1997) Monitoring of Domestic and Imported Apples and Rice by the U.S. Food and Drug Administration Pesticide Program, *J. AOAC Int,* **80**, 883-894.

[5]Pesticide Analytical Manual Volume I, 3rd Ed., 1999, Chapter 1, Section 105, http://www.fda.gov/downloads/Food/FoodScienceResearch/ucm111496.pdf

[6]FDA Total Diet Study, http://www.fda.gov/Food/FoodScienceResearch/TotalDietStudy/default.htm.

Appendices

Appendix A lists the 705 pesticides and industrial chemicals analyzed using FDA methods in 2014. In addition to these chemicals, FDA analytical procedures detect other metabolites and isomers associated with the pesticides listed below.

All residue findings are summarized in Appendices B and C based upon their origin, domestic or import. In FY 2014, 212 different domestic food commodities and 810 different imported food commodities were tested. In both appendices, all commodities have been assigned to the same six commodity group categories:

Grains and Grain Products
Milk/Dairy Products/Eggs
Fish/Shellfish/Other Aquatic Products
Fruits
Vegetables
Other Food Products

Within each commodity group, the commodities are further categorized. The subcategories include commodities derived from a single agricultural commodity and commodities derived from multiple ingredients. For example, the subcategory "Wheat and wheat products" includes multiple types of whole wheat grain and several processed wheat products that contain only wheat such as milled wheat, wheat flour, wheat germ, wheat malt, wheat bran, wheat gluten, etc. Multiple-ingredient, processed-food products consisting primarily of grains are listed in the subcategory "Other grains and grain products."

Although the commodity groups are the same for both the domestic and import appendices, the subcategories are different because the numbers and kinds of individual imported commodities are different than for domestic commodities. For example, 20 "Fruit" subcategories are listed for the domestic samples, but over 50 "Fruit" subcategories are listed for the import samples. The additional import "Fruit" subcategories are mostly for fruits not available domestically.

A. Pesticides Analyzed by FDA Pesticide Methods in FY 2014

Pesticides		
2,3,4,6-tetrachlorophenol	2,4,5-T	2,4,5-Trichlorophenol
2,4,6-Trichlorophenol	2,4-D	2,4-DB
2,4-Dichlorophenol	2,6-dimethylaniline	2,6-DIPN
3,4-Dichloroaniline	3-chloroaniline	Abamectin
Acephate	Acequinocyl	Acetamiprid
Acetochlor	Acibenzolar-S-methyl	Acifluorfen methyl ester
Aclonifen	Acrinathrin	Alachlor
Alanycarb	Aldicarb	Aldrin
Allethrin	Allidochlor	Ametoctradin
Ametryn	Amicarbazone	Amidithion
Aminocarb	Amisulbrom	Amitraz
Ancymidol	Anilofos	Aramite
Aspon	Atraton	Atrazine
Azaconazole	Azamethiphos	Azinphos ethyl
Azinphos-methyl	Aziprotryne	Azocyclotin
Azoxystrobin	Barban	Beflubutamid
Benalaxyl	Bendiocarb	Benfluralin
Benfuracarb	Benfuresate	Benodanil
Benoxacor	Bentazon	Bentazone methyl
Benthiavalicarb-	Benzoximate	Benzoylprop ethyl
BHC	Bifenazate	Bifenox
Bifenthrin	Binapacryl	Bioresmethrin
Biphenyl	Bitertanol	Bithionol
Bixafen	Boscalid	Bromacil
Bromfenvinphos ethyl	Bromfenvinphos methyl	Bromobutide
Bromocyclen	Bromophos	Bromophos-ethyl
Bromopropylate	Bromoxynil	Bromoxynil octanoate
Bromuconazole	Bufencarb	Bupirimate
Buprofezin	Butachlor	Butafenacil
Butamifos	Butocarboxim	Butoxycarboxim
Butralin	Butylate	Cadusafos
Cafenstrole	Captafol	Captan

Pesticides		
Carbaryl	Carbendazim	Carbetamide
Carbofuran	Carbophenothion	Carbosulfan
Carboxin	Carfentrazone ethyl ester	Carpropamid
Chloramben	Chlorantraniliprole	Chlorbromuron
Chlorbufam	Chlordane	Chlordecone
Chlordimeform	Chlorethoxyfos	Chlorfenapyr
Chlorfenethol	Chlorfenprop-methyl	Chlorfenvinphos
Chlorfenvinphos methyl	Chlorfluazuron	Chlormephos
Chlorobenzilate	Chloroneb	Chloropropylate
Chlorothalonil	Chlorotoluron	Chloroxuron
Chlorpropham	Chlorpyrifos methyl	Chlorpyrifos
Chlorthiamid	Chlorthion	Chlorthiophos
Chlozolinate	Cinidon-ethyl	Clethodim
Clodinafop-propargyl	Cloethocarb	Clofentezine
Clomazone	Cloquintocet-mexyl	Clothianidin
Coumaphos	Crimidine	Crotoxyphos
Cumyluron	Cyanazine	Cyanofenphos
Cyanophos	Cyazofamid	Cyclafuramid
Cycloate	Cycloxydime	Cycluron
Cyenopyrafen	Cyflufenamid	Cyflumetofen
Cyfluthrin	Cyhalofop butyl ester	Cyhalothrin, gamma-
Cymiazole	Cymoxanil	Cypermethrin
Cyphenothrin	Cyprazine	Cyproconazole
Cyprodinil	Cyprofuram	Cyromazine
Cythioate	Daimuron	Dazomet
DCPA	DDT	DEET
DEF	Deltamethrin	Demeton
Desmedipham	Desmetryn	Diafenthiuron
Dialifor	Diallate	Diazinon
Dicamba	Dicapthon	Dichlobenil
Dichlofenthion	Dichlofluanid	Dichlormid
Dichlorobenzene, 1,3-	Dichlorprop	Dichlorvos
Diclobutrazol	Diclocymet	Diclofop
Diclomezine	Dicloran	Dicofol

Pesticides		
Dicrotophos	Dicyclanil	Dieldrin
Diethatyl-ethyl	Diethofencarb	Difenoconazole
Difenoxuron	Diflubenzuron	Diflufenican
Diflumetorim	Dimefluthrin	Dimefox
Dimepiperate	Dimethachlone	Dimethachlor
Dimethametryn	Dimethenamid	Dimethipin
Dimethirimol	Dimethoate	Dimethomorph
Dimetilan	Dimoxystrobin	Diniconazole
Dinitramine	Dinoseb acetate	Dinoseb methyl esther
Dinoseb	Dinotefuran	Dinoterb acetate
Diofenolan	Diothyl	Dioxacarb
Dioxathion	Diphacinone	Diphenamid
Diphenylamine	Dipropetryn	Disulfoton
Ditalimfos	Dithianon	Dithiopyr
Diuron	DMST	DNOC
Dodemorph	Dodine	Doramectin
Drazoxolon	Edifenphos	Emamectin benzoate
Endosulfan	Endrin	EPN
Epoxiconazole	Eprinomectin	EPTC
Esfenvalerate	Esprocarb	Etaconazole
Ethalfluralin	Ethidimuron	Ethiofencarb
Ethiolate	Ethion	Ethiprole
Ethirimol	Ethofumesate	Ethoprop
Ethoxyquin	Ethychlozate	Etobenzanid
Etofenprox	Etoxazole	Etridiazole
Etrimfos	Famoxadone	Famphur
Fenamidone	Fenamiphos	Fenarimol
Fenazaquin	Fenbuconazole	Fenbutatin oxide
Fenchlorazole-ethyl	Fenclorim	Fenfuram
Fenhexamid	Fenitrothion	Fenobucarb
Fenothiocarb	Fenoxanil	Fenoxaprop-ethyl
Fenoxycarb	Fenpiclonil	Fenpropathrin
Fenpropidin	Fenpropimorph	Fenpyrazamine
Fenpyroximate, e-	Fenson	Fensulfothion

Pesticides		
Fenthion	Fenuron	Fenvalerate
Ferimzone	Fipronil	Flamprop-isopropyl
Flamprop-methyl	Flonicamid	Fluacrypyrim
Fluazifop butyl ester	Fluazifop-p-butyl	Fluazolate
Fluazuron	Flubendiamide	Flubenzimine
Fluchloralin	Flucycloxuron	Flucythrinate
Fludioxonil	Fluensulfone	Flufenacet
Flufenoxuron	Flumetralin	Flumiclorac-pentyl
Flumioxazin	Flumorph	Fluometuron
Fluopicolide	Fluopyram	Fluoranthene
Fluorene	Fluorochloridone	Fluorodifen
Fluoroglycofen	Fluoroimide	Fluotrimazole
Fluoxastrobin	Fluquinconazole	Flurenol n-butyl ester
Flurenol-methyl ester	Fluridone	Fluroxypyr
Flurprimidol	Flurtamone	Flusilazole
Flusulfamide	Fluthiacet-methyl	Flutolanil
Flutriafol	Fluvalinate	Fluxapyroxad
Folpet	Fomesafen	Fonofos
Forchlorfenuron	Formetanate	Formothion
Fosthiazate	Fuberidazole	Furalaxyl
Furametpyr	Furathiocarb	Furilazole
Furmecyclox	Gardona	Halfenprox
Halofenozide	Haloxyfop	Heptachlor
Heptenophos	Hexachlorobenzene	Hexachlorobutadiene
Hexaconazole	Hexaflumuron	Hexazinone
Hexythiazox	Hydramethylnon	Hydroprene
IBP	Imazalil	Imazamethabenz methyl
Imazapyr	Imazasulfuron	Imazethapyr
Imibenconazole	Imidacloprid	Indaziflam
Indoxacarb	Ioxynil	Ipconazole
Iprodione	Iprovalicarb	Isazofos
Isobenzan	Isocarbamid	Isocarbophos
Isodrin	Isofenphos	Isomethiozin
Isoprocarb	Isopropalin	Isoprothiolane

Pesticides		
Isoproturon	Isopyrazam	Isoxaben
Isoxadifen-ethyl	Isoxaflutole	Isoxathion
Ivermectin	Jodfenphos	Karbutilate
Kresoxim-methyl	Lactofen	Lambda-cyhalothrin
Lenacil	Leptophos	Lindane
Linuron	Lufenuron	Malathion
Maleic hydrazide	Mandipropamid	MCPA
MCPA-butoxyethyl ester	MCPB methyl ester	Mecarbam
Mecoprop	Mefenacet	Mefenpyr-diethyl
Mefluidide	Mepanipyrim	Mephosfolan
Mepronil	Mesotrione	Metaflumizone
Metalaxyl	Metaldehyde	Metamitron
Metazachlor	Metconazole	Methabenzthiazuron
Methacrifos	Methamidophos	Methfuroxam
Methidathion	Methiocarb	Methomyl
Methoprene	Methoprotryne	Methoxychlor
Methoxyfenozide	Metobromuron	Metolachlor
Metolcarb	Metominostrobin	Metoxuron
Metrafenone	Metribuzin	Metsulfuron methyl
Mevinphos	Mexacarbate	MGK 264
Mirex	Molinate	Monalide
Monocrotophos	Moxidectin	Myclobutanil
Naftalofos	Naled	Naphthalene
Naphthaleneacetamide	Napropamide	Naptalam
Neburon	Nicotine	Nitenpyram
Nitrapyrin	Nitrofen	Nitrothal-isopropyl
Norflurazon	Novaluron	Noviflumuron
Nuarimol	Octhilinone	Octyldiphenyl PO4
Ofurace	Omethoate	Orbencarb
Orysastrobin	Oryzalin	Ovex
Oxabetrinil	Oxadiazon	Oxadixyl
Oxamyl	Oxydemeton-methyl	Oxyfluorfen
Oxythioquinox	Paclobutrazol	Parathion
Parathion methyl	Pebulate	Penconazole

Pesticides		
Pencycuron	Pendimethalin	Penflufen
Pentachlorophenol	Pentanochlor	Penthiopyrad
Permethrin	Perthane	Phenkapton
Phenmedipham	Phenothrin	Phenthoate
Phenylphenol, *o*-	Phorate	Phosalone
Phosfolan	Phosmet	Phosphamidon
Phoxim	Phthalide	Picloram
Picolinafen	Picoxystrobin	Pindone
Pinoxadin	Piperalin	Piperonyl butoxide
Piperophos	Pirimicarb	Pirimiphos ethyl
Pirimiphos methyl	Plifenate	Potasan
Prallethrin	Pretilachlor	Probenazole
Prochloraz	Procymidone	Prodiamine
Profenofos	Profluralin	Prohydrojasmon
Promecarb	Prometon	Prometryn
Pronamide	Propachlor	Propamocarb
Propanil	Propaphos	Propargite
Propazine	Propetamphos	Propham
Propiconazole	Propisochlor	Propoxur
Propoxycarbazone	Proquinazid	Prosulfocarb
Prothioconazole	Prothioconazole-desthio	Prothiofos
Prothoate	Pymetrozine	Pyracarbolid
Pyraclofos	Pyraclostrobin	Pyraflufen ethyl
Pyrazon	Pyrazophos	Pyrazoxyfen
Pyrene	Pyributicarb	Pyridaben
Pyridalyl	Pyridaphenthion	Pyridate
Pyrifenox	Pyrifluquinazon	Pyriftalid
Pyrimethanil	Pyrimidifen	Pyriminobac-methyl
Pyriofenone	Pyriproxyfen	Pyroquilon
Pyroxasulfone	Quinalphos	Quinoclamine
Quinoxyfen	Quintozene	Quizalofop ethyl
Rabenzazole	Resmethrin	Ronnel
Rotenone	Salithion	Schradan
Sebuthylazine	Secbumeton	Sedaxane

Pesticides		
Siduron	Silafuofen	Silthiofam
Silvex	Simazine	Simeconazole
Simetryne	Spinetoram	Spinosad
Spirodiclofen	Spiromesifen	Spirotetramat
Spiroxamine	Sulfallate	Sulfentrazone
Sulfluramid	Sulfotepp	Sulfoxaflor
Sulprofos	Swep	Tebuconazole
Tebufenozide	Tebufenpyrad	Tebupirimfos
Tebutam	Tebuthiuron	Tecnazene
Teflubenzuron	Tefluthrin	Temephos
TEPP	Tepraloxydim	Terbacil
Terbucarb	Terbufos	Terbumeton
Terbuthylazine	Terbutryn	Tetraconazole
Tetradifon	Tetramethrin	Tetrasul
Thenylchor	Thiabendazole	Thiacloprid
Thiamethoxam	Thiazopyr	Thidiazuron
Thifluzamide	Thiobencarb	Thiocyclam
Thiofanox	Thiometon	Thionazin
Thiophanate-methyl	Thioquinox	Tiadinil
Tiocarbazil	Tolclofos methyl	Tolfenpyrad
Tolylfluanid	Transfluthrin	Triadimefon
Triadimenol	Tri-allate	Triamiphos
Triapenthenol	Triazophos	Triazoxide
Tributoxy PO_4	Trichlamide	Trichlorfon
Trichlorobenzene, 1,2,4-	Trichloronat	Triclopyr butoxyethyl
Tricyclazole	Tridemorph	Trietazine
Trifenmorph	Trifloxystrobin	Trifloxysulfuron sodium
Triflumizole	Triflumuron	Trifluralin
Triflusulfuron methyl	Triforine	Trimethacarb
Triphenyl PO_4	Tris(1,3-dichloro-2-propyl)	Tris(beta-chloroethyl)
Tris(chloropropyl)	Triticonazole	Tycor
Uniconazole	Vamidothion	Vernolate
Vinclozolin	XMC	Zoxamide

B. Analysis of Domestic Samples by Commodity Group in FY 2014

Commodity Group	Samples Analyzed #	Without Residues # (%†)	Violative Samples* # (%†)	Over Tolerance Violations #	No Tolerance Violations #
Totals - All Domestic Samples	**1458**	**1034 (70.9)**	**21 (1.4)**	**7**	**18**
Grains and Grain Products					
Barley and barley products	2	2 (100)	0	0	0
Corn and corn products	8	7 (87.5)	0	0	0
Rice and rice products	3	0	0	0	0
Soybeans and soybean products	7	5 (71.4)	0	0	0
Wheat and wheat products	22	14 (63.6)	0	0	0
Other grains and grain products	15	13 (100)	0	0	0
Group Subtotal	**57**	**41 (71.9)**	**0**	**0**	**0**
Milk/Dairy Products/Eggs					
Eggs	284	272 (95.8)	0	0	0
Milk/cream and milk products	335	327 (97.6)	0	0	0
Group Subtotal	**619**	**599 (96.8)**	**0**	**0**	**0**
Fish/Shellfish/Other Aquatic Products					
Aquaculture seafood	22	19 (86.4)	0	0	0
Fish and fish products	25	23 (92.0)	0	0	0
Shellfish and crustaceans	11	10 (90.9)	0	0	0
Group Subtotal	**58**	**52 (89.7)**	**0**	**0**	**0**
Fruits					
Apples	42	0	0	0	0
Apricots	8	3 (37.5)	0	0	0
Avocados	9	9 (100)	0	0	0
Blackberries	9	0	0	0	0
Blueberries	3	1 (33.3)	0	0	0
Cantaloupe	7	2 (28.6)	0	0	0
Cherries	11	0	1 (9.1)	1	1
Cranberries	11	2 (18.2)	0	0	0
Fruit jams, jellies, preserves, syrups, toppings	5	2 (40.0)	0	0	0
Fruit juices	2	2 (100)	0	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%†)	Violative Samples* # (%†)	Over Tolerance Violations #	No Tolerance Violations #
Grapefruit	9	0	0	0	0
Grapes, raisins	11	0	0	0	0
Nectarines	3	0	0	0	0
Oranges	5	0	0	0	0
Peaches	5	1 (20.0)	0	0	0
Pears	3	1 (33.3)	0	0	0
Plums/prunes	4	1 (25.0)	0	0	0
Raspberries	19	2 (10.5)	0	0	0
Strawberries	26	6 (23.1)	0	0	0
Watermelon	10	4 (40.0)	0	0	0
Group Subtotal	**202**	**36 (17.8)**	**1 (0.5)**	**1**	**1**
Vegetables					
Asparagus	8	6 (75)	0	0	0
Broccoli	3	2 (66.7)	0	0	0
Cabbage	6	5 (83.3)	0	0	0
Carrots	13	5 (38.5)	0	0	0
Cauliflower	6	3 (50.0)	0	0	0
Celery	3	0	0	0	0
Collards	8	1 (12.5)	1 (12.5)	0	1
Corn	11	11 (100)	0	0	0
Cucumbers	12	7 (58.3)	0	0	0
Eggplant	9	7 (77.8)	0	0	0
Kale	6	2 (33.3)	0	0	0
Lettuce, head	8	6 (75.0)	1 (12.5)	0	1
Lettuce, leaf	5	2 (40.0)	0	0	0
Mushrooms and truffles	28	22 (78.6)	0	0	0
Mustard greens	1	0	0	0	0
Onions/leeks/scallions/shallots	12	11 (91.7)	0	0	0
Peas (green/snow/sugar/sweet)	10	4 (40.0)	0	0	0
Peppers, hot	6	3 (50.0)	0	0	0
Peppers, sweet	9	2 (22.2)	0	0	0
Potatoes	32	15 (46.9)	0	0	0
Radishes	6	2 (33.3)	1 (16.7)	1	0
Red beets	1	1 (100)	0	0	0
Spinach	7	3 (42.9)	0	0	0
Squash	25	14 (56.0)	0	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%†)	Violative Samples* # (%†)	Over Tolerance Violations #	No Tolerance Violations #
String beans (green/snap/pole/long)	16	6 (37.5)	1 (6.2)	0	1
Sweet potatoes	11	7 (63.6)	0	0	0
Tomatoes	20	13 (65.0)	0	0	0
Turnips	1	0	0	0	0
Other bean and pea products	11	7 (63.6)	0	0	0
Other leaf and stem vegetables	5	2(40.0)	0	0	0
Other root and tuber vegetables	13	4 (30.8)	1 (7.7)	1	0
Other vegetables/vegetable products	13	10 (76.9)	0	0	0
Group Subtotal	**325**	**183 (56.3)**	**5 (1.5)**	**2**	**3**
Other Food Products					
Tea	19	5 (26.3)	10 (52.6)	3	10
Confections	1	1 (100)	0	0	0
Edible seeds and seed products	5	3 (60.0)	1 (20.0)	1	0
Honey	135	91 (67.4)	4 (3.0)	0	4
Miscellaneous foods	35	21 (60.0)	0	0	0
Other nuts	2	2 (100)	0	0	0
Group Subtotal	**197**	**123 (62.4)**	**15 (7.6)**	**4**	**14**

†Percentage of the number of samples analyzed per commodity group

*Total number of violative samples may not equal sum of samples with “Over Tolerance” and “No Tolerance” violations because one sample can contain pesticide residues of both violation types.

C. Analysis of Import Samples by Commodity Group in FY 2014

Commodity Group	Samples Analyzed #	Without Residues # (%†)	Violative Samples* # (%†)	Over Tolerance Violations #	No Tolerance Violations #
Totals - All Import Samples	**4814**	**2545 (52.9)**	**570 (11.8)**	**33**	**553**
Grains and Grain Products					
Bakery products, doughs, crackers	22	10 (45.5)	1 (4.5)	0	1
Barley and barley products	5	3 (60.0)	1 (20.0)	0	1
Breakfast cereals	8	7 (87.5)	1 (12.5)	0	1
Corn and corn products	9	7 (77.8)	0	0	0
Macaroni and noodles	62	28 (45.2)	9 (14.5)	0	9
Rice and rice products	268	151 (56.3)	70 (26.1)	2	70
Soybeans and soybean products	3	3 (100)	0	0	0
Wheat and wheat products	44	15 (34.1)	10 (22.7)	0	10
Other grains and grain products	24	13 (54.2)	2 (8.3)	0	2
Group Subtotal	**445**	**237 (53.3)**	**94 (21.1)**	**2**	**94**
Milk/Dairy Products/Eggs					
Cheese and cheese products	1	1 (100)	0	0	0
Eggs	1	1 (100)	0	0	0
Milk/cream and milk products	10	9 (90.0)	0	0	0
Group Subtotal	**12**	**11 (91.7)**	**0**	**0**	**0**
Fish/Shellfish/Other Aquatic Products					
Aquaculture seafood	102	86 (84.3)	0	0	0
Fish and fish products	46	36 (78.3)	1 (2.2)	0	1
Shellfish and crustaceans	6	6 (100)	0	0	0
Other aquatic animals and products	2	2 (100)	0	0	0
Group Subtotal	**156**	**130 (83.3)**	**1 (0.6)**	**0**	**1**
Fruits					
Ackees, lychees, longans	5	2 (40.0)	2 (40.0)	0	2
Apple juice	18	11 (61.1)	0	0	0
Apples	25	5 (20.0)	4 (16)	2	4
Apricots	17	6 (35.3)	0	0	0
Avocados	20	19 (95.0)	0	0	0
Bananas, plantains	17	9 (52.9)	0	0	0
Berry juice	12	8 (66.7)	1 (8.3)	0	1
Bitter melon	2	2 (100)	0	0	0
Blackberries	37	16 (43.2)	0	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%†)	Violative Samples* # (%†)	Over Tolerance Violations #	No Tolerance Violations #
Blueberries	45	14 (31.1)	1 (2.2)	0	1
Breadfruit, jackfruit	2	2 (100)	0	0	0
Cantaloupe	8	2 (25.0)	0	0	0
Cherries	32	3 (9.4)	3 (9.4)	0	3
Citrus juice	9	7 (77.8)	0	0	0
Clementines	9	0	0	0	0
Cranberries	13	11 (84.6)	0	0	0
Currants	4	2 (50.0)	1 (25)	0	1
Dates	22	19 (86.4)	2 (9.1)	0	2
Figs	15	12 (80.0)	0	0	0
Fruit jams, jellies, preserves, syrups, toppings	36	27 (75.0)	1(2.8)	0	1
Grapefruit	2	0	0	0	0
Grapes, raisins	66	12 (18.2)	5 (7.6)	0	5
Guavas	7	3 (42.9)	1 (14.3)	0	1
Honeydew	8	4 (50.0)	3 (37.5)	2	1
Kiwi fruit	5	2 (40.0)	0	0	0
Lemons	6	0	1 (16.7)	0	1
Limes	60	24 (40.0)	15 (25.0)	0	15
Mangoes	67	42 (62.7)	9 (13.4)	0	9
Mixed fruits	12	2 (16.7)	1 (8.3)	0	1
Nectarines	38	0	3 (7.9)	1	2
Olives	38	34 (89.5)	3 (7.9)	0	3
Oranges	15	9 (60.0)	0	0	0
Papaya	78	20 (25.6)	10 (12.8)	1	9
Peaches	27	7 (25.9)	1 (3.7)	0	1
Pear juice	3	3 (100)	0	0	0
Pears	10	2 (20.0)	0	0	0
Pineapple	20	12 (60.0)	3 (15.0)	0	3
Plums/Prunes	25	17 (68.0)	1 (4.0)	0	1
Pomegranate fruit/juice	6	6 (100)	0	0	0
Prickly pear	58	29 (50.0)	22 (37.9)	0	22
Raspberries	43	21 (48.8)	6 (14.0)	0	6
Stone fruit juice	6	3 (50.0)	0	0	0
Strawberries	59	12 (20.3)	6 (10.2)	1	5
Subtropical juice	23	23 (100)	0	0	0
Watermelon	14	3 (21.4)	0	0	0
Other berries	25	14 (56.0)	3 (12)	0	3
Other fruit juices	9	6 (66.7)	0	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%†)	Violative Samples* # (%†)	Over Tolerance Violations #	No Tolerance Violations #
Other fruits and fruit products	19	11 (57.9)	4 (21.1)	1	4
Other melons/vine fruit	3	1 (33.3)	0	0	0
Other stone fruit	2	2 (100)	0	0	0
Other pome/core fruit	3	0	2 (66.7)	0	2
Other sub-tropical fruit	25	19 (76.0)	1 (4.0)	0	1
Group Subtotal	**1130**	**520 (46)**	**115 (10.2)**	**8**	**110**
Vegetables					
Artichokes	18	15 (83.3)	0	0	0
Asparagus	67	62 (92.5)	1 (1.5)	0	1
Bamboo shoots	2	2 (100)	0	0	0
Bok choy & Chinese cabbage	2	0	0	0	0
Broccoli	30	19 (63.3)	1 (3.3)	0	1
Brussels sprouts	43	13 (30.2)	2 (4.7)	0	2
Cabbage	6	2 (33.3)	2 (33.3)	0	2
Carrots	29	16 (55.2)	2 (6.9)	0	2
Cassava	26	26 (100)	0	0	0
Cauliflower	11	11 (100)	0	0	0
Celery	20	10 (50.0)	3 (15.0)	0	3
Choyote	5	4 (80.0)	1 (20.0)	0	1
Cilantro	35	10 (28.6)	12 (34.3)	0	12
Collards	2	0	0	0	0
Corn	24	22 (91.7)	0	0	0
Cucumbers	161	62 (38.5)	13 (8.1)	1	12
Eggplant	30	20 (66.7)	2 (6.7)	0	2
Endive	7	4 (57.1)	0	0	0
Garbanzo beans	19	15 (78.9)	0	0	0
Garlic	15	13 (86.7)	1 (6.7)	0	1
Ginger	29	23 (79.3)	3 (10.3)	0	3
Kale	23	2 (8.7)	1 (4.3)	0	1
Kidney beans	9	8 (88.9)	0	0	0
Leeks	29	17 (58.6)	3 (10.3)	0	3
Lettuce, head	4	1 (25.0)	1 (25.0)	0	1
Lettuce, leaf	16	6 (37.5)	0	0	0
Mung beans	17	13 (76.5)	1 (5.9)	0	1
Mushrooms/truffles/fungi	131	81 (61.8)	33 (25.2)	3	31
Mustard greens	9	7 (77.8)	1 (11.1)	0	1
Okra	33	16 (48.5)	2 (6.1)	0	2
Onions	22	21 (95.5)	0	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%†)	Violative Samples* # (%†)	Over Tolerance Violations #	No Tolerance Violations #
Peas (green/snow/sweet)	53	35 (66.0)	3 (5.7)	0	3
Peppers, hot	403	141 (35.0)	42 (10.4)	0	42
Peppers, pimiento	7	6 (85.7)	0	0	0
Peppers, sweet	98	32 (32.7)	5 (5.1)	1	4
Potatoes	41	9 (22.0)	1 (2.4)	0	1
Pumpkins	4	2 (50.0)	0	0	0
Radishes	26	14 (53.8)	0	0	0
Red beets	9	5 (55.6)	1 (11.1)	0	1
Scallions & shallots	83	51 (61.4)	2 (2.4)	0	2
Soybeans	13	9 (69.2)	1 (7.7)	0	1
Spinach	51	20 (39.2)	5 (9.8)	1	5
Squash	95	44 (46.3)	17 (17.9)	0	17
String beans (green/snap/pole/long)	57	28 (49.1)	3 (5.3)	0	3
Sugar snap peas	36	14 (38.9)	9 (25.0)	0	9
Sweet potatoes	38	32 (84.2)	1 (2.6)	0	1
Taro/dasheen	25	21 (84.0)	3 (12)	1	3
Tomatoes/tomatillos	243	127 (52.3)	10 (4.1)	2	8
Turnips	1	1 (100)	0	0	0
Vegetable juice/drinks	3	3 (100)	0	0	0
Vegetables, breaded, or with sauce	19	15 (78.9)	0	0	0
Vegetables, other, or mixed	48	27 (56.2)	3 (6.2)	1	2
Water chestnuts	2	2 (100)	0	0	0
Other beans & pea products	73	60 (82.2)	1 (1.4)	0	1
Other cucurbit vegetables	2	1 (50.0)	0	0	0
Other leaf & stem vegetables	195	77 (39.5)	72 (36.9)	5	71
Other root & tuber vegetables	16	9 (56.3)	2 (12.5)	1	1
Group Subtotal	**2515**	**1306 (51.9)**	**266 (10.6)**	**16**	**257**
<u>Other Food Products</u>					
Animal byproducts	1	1 (100)	0	0	0
Baby foods/formula	1	0	0	0	0
Beverage and beverage bases	6	6 (100)	0	0	0
Confections	15	10 (66.7)	0	0	0
Coconut & coconut products	4	3 (75.0)	0	0	0
Condiments & dressings	3	1 (33.3)	0	0	0
Dietary supplement, botanical/herbal , not tea	77	44 (57.1)	16 (22.2)	0	16
Dietary supplement, other (not botanicals/herbals or teas)	13	8 (61.5)	3 (23.1)	0	3
Flavorings and extracts	7	6 (85.7)	0	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%†)	Violative Samples* # (%†)	Over Tolerance Violations #	No Tolerance Violations #
Food sweeteners, not honey	15	14 (93.3)	0	0	0
Honey & honey products	22	22 (100)	0	0	0
Multi-ingredient foods (dinners, sauces, specialties)	19	8 (42.1)	0	0	0
Nuts, almonds	3	1 (33.3)	0	0	0
Nuts, cashews	21	16 (76.2)	1 (4.8)	0	1
Nuts, other nuts & nut products	10	10 (100)	0	0	0
Nuts, peanuts & peanut products	10	6 (60.0)	1 (10.0)	0	1
Nuts, pecans	23	21 (91.3)	0	0	0
Nuts, pistachios	1	1 (100)	0	0	0
Oil seed stock	6	3 (50.0)	3 (50.0)	3	0
Pepper sauce	12	5 (41.7)	0	0	0
Seeds, edible & seed products	62	46 (74.2)	8 (12.9)	0	8
Soybeans, edible	3	3 (100)	0	0	0
Spices, basil	14	0	10 (71.4)	0	10
Spices, capsicums	27	4 (14.8)	19 (70.4)	2	19
Spices, other	41	25 (61.0)	8 (19.5)	0	8
Tea	9	2 (22.2)	3 (33.3)	0	3
Tea, botanical/herbal, other	10	6 (60.0)	2 (20.0)	0	2
Vegetable oil, crude	42	29 (69)	7 (16.7)	1	7
Vegetable oil, refined	59	33 (55.9)	6 (10.2)	0	6
Other food products	17	5 (29.4)	3 (17.6)	1	3
Other nonfood items	3	2 (66.7)	0	0	0
Group Subtotal	**556**	**341 (61.3)**	**94 (16.9)**	**7**	**91**

†Percentage of the number of samples analyzed per commodity group

*Total number of violative samples may not equal sum of samples with “Over Tolerance” and “No Tolerance” violations because one sample can contain pesticide residues of both violation types.