USDA Pesticide Data Program

Overview

Agricultural Marketing Service Monitoring Programs Division
PDP Mission

- Provide EPA with data for dietary risk assessments and pesticide re-registration decisions
- Support marketing of U.S. commodities
- Support USDA responsibility under the Food Quality Protection Act of 1996
- Provide information to FDA on violations
States participating in PDP:
- California
- Colorado
- Connecticut
- Delaware
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Missouri
- Montana
- Nebraska
- Nevada
- New Jersey
- New Mexico
- New York
- North Carolina
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

States where produce is directly marketed from participating States:
- Alaska
- Arizona
- Arkansas
- Georgia
- Indiana
- Kentucky
- Louisiana
- Maryland
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- New York
- North Carolina
- North Dakota
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Washington
- West Virginia
- Wisconsin
- Wyoming

Location of participating State (black stars) and Federal (red stars) Laboratories:
Reevaluation of Pesticides

- Food Quality Protection Act requires that pesticide registrations be periodically re-evaluated
- EPA must accelerate registration of reduced risk pesticides
- Pesticides used on food commodities must meet new safety standard of “reasonable certainty of no harm”
- PDP provides data on actual consumer exposure (vs. farm gate or field trial residue values)
- PDP data “refine” risk assessments
Dietary Risk Assessments

- USDA Consumption Surveys
- Residue Data
  - Field trial data: provided by the registrant
    - Maximum application rates
    - Minimum pre-harvest interval
  - Monitoring data
    - USDA-PDP: statistically representative
    - FDA: targeted sampling for tolerance enforcement
  - FDA Market basket data: limited in scope but refined to reflect actual consumer exposure
Risk Assessment Data
Key Elements

- Unbiased sampling
  - Continuous sampling to reflect seasonal variability
- Use of standardized analytical methods
  - Harmonize laboratories’ capabilities
  - Low Detection Limits
- Uniform data reporting
  - Harmonize data elements to be reported
High consumption commodities and foods highly consumed by infants and children are tested for 2 consecutive years.

Data for these foods are updated frequently – must be retested every 5 years or more often if necessary.

More than 700 samples per commodity per year are tested.

FDA is notified if test results show non-compliance with U.S. Tolerances.
<table>
<thead>
<tr>
<th>Commodity Type</th>
<th>Number of Commodities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Fruit and Vegetables</td>
<td>48</td>
</tr>
<tr>
<td>Processed Fruit and Vegetables</td>
<td>35</td>
</tr>
<tr>
<td>Grains</td>
<td>8</td>
</tr>
<tr>
<td>Meat/Poultry/Fish</td>
<td>9</td>
</tr>
<tr>
<td>Dairy</td>
<td>4</td>
</tr>
<tr>
<td>Nuts</td>
<td>2</td>
</tr>
<tr>
<td>Water</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total Number of Commodities Tested</strong></td>
<td><strong>112</strong></td>
</tr>
</tbody>
</table>
PDP Commodities in Calendar Year 2014

- Bananas
- Blueberries
- Broccoli
- Carrots
- Celery
- Grape Juice
- Green Beans fresh
- Green Beans fz/cn
- Infant Formula
  - Dairy-based
  - Soy-based
- Nectarines
- Peaches
- Salmon
- Summer Squash
- Cherries (April)
- Watermelon (July)
- Potatoes (October)
- Sweet corn (October)
Goal: Obtain statistically defensible representation of U.S. food supply so that PDP data reflect actual pesticide residue exposure from food

- Rigorous statistical design
- Random sampling
- Reflects what is typically available to consumer
- Sample collectors are trained in collection techniques
- Special surveys to capture imports or regional data
Sampling

- 59 samples/commodity/month for most; 63 for selected commodities collected by North Carolina
- Sample information captured via handheld or laptop computers by inspectors onsite
- Fruit and vegetable sites at major food distribution centers and terminal markets
- Number of samples collected is apportioned according to population:

<table>
<thead>
<tr>
<th>State</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>13</td>
</tr>
<tr>
<td>New York</td>
<td>9</td>
</tr>
<tr>
<td>Colorado</td>
<td>2</td>
</tr>
<tr>
<td>N. Carolina</td>
<td>4</td>
</tr>
<tr>
<td>Florida</td>
<td>7</td>
</tr>
<tr>
<td>Ohio</td>
<td>6</td>
</tr>
<tr>
<td>Maryland</td>
<td>4</td>
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<tr>
<td>Texas</td>
<td>8</td>
</tr>
<tr>
<td>Michigan</td>
<td>6</td>
</tr>
<tr>
<td>Washington</td>
<td>4</td>
</tr>
</tbody>
</table>
Origin of Cantaloupe Samples

- Domestic
- Import
- Unknown
Origin of Sweet Bell Pepper Samples

The bar chart shows the origin of sweet bell pepper samples from January to December. The categories are Domestic, Import, and Unknown. The chart indicates the distribution of samples by origin and month.
Pesticide Residue Testing

- One or two laboratories analyze each commodity
- Lists of required compounds are commodity-specific
- State-of-the-art instrumentation
  - GC/MS and GC/MS-MS
  - LC/MS and LC/MS-MS
  - Low Limits of detection
Blanks, spikes, and process controls used with each sample set

Method validation required for each new commodity and pesticide

Limit of detection (LOD) and limit of quantitation (LOQ) determined experimentally at ppb levels (ppt for water)

Participation in National and International Proficiency Testing required

International accreditation required (ISO 17025)
Pesticides Tested

- Over 400 pesticides, metabolites, and isomers tested using multi-residue methods
- Pesticide Classes:
  - Carbamates
  - Chloroacetanilides (*alachlor, acetochlor…*)
  - Imidazolinones (*imazapyr, imazaquin…*)
  - Neonicotinyls (*acetamiprid, clothianidin…*)
  - Organochlorines
  - Organophosphates
  - Phenoxy acids (*2,4,5-T; 2,4-D…*)
  - Pyrethroids (*allethrin, bifenthrin…*)
  - Strobilurins (*azoxystrobin, Kresoxim-methyl…*)
  - Sulfonyle ureas (*bensulfuron methyl, halosulfuron.*)
  - Triazines (*atrazine, simazine, etc.*)
  - Triazoles (*difenoconazole, hexaconazole…*)
0-Phenylphenol

- Fungicide with registered uses in apples, pears, sweet potatoes, orange juice, plums...
- Tolerances ranging from 5 ppm to 125 ppm
- Limits of detection for this pesticide range from 0.003 ppm to 0.010 ppm
- o-phenylphenol also used in:
  - Manufacturing of paper products
  - Disinfectant products
Residue Levels Observed

- Overall, residue levels are much lower than tolerances
- PDP has been gradually incorporating pesticides used overseas
- The PDP database can provide:
  - Data for specific commodities and pesticides
  - Data that include/exclude imports
  - Data for specific regions/States
- FAS is receiving U.S. MRLs non-compliance reports
Remote Data Entry (RDE) System

RDE is custom-built software with two major components:

- **RDE electronic Sample Information Form (e-SIF) System**
  - Stand-alone Windows-based software for laptops/tablets/desktops
  - Used by 180+ State Sample Collectors to enter and submit e-SIFs
  - Can be used by USDA/Labs for off-line data entry of paper SIFs

- **Web–based RDE System**
  - Centralized .NET-based software
  - Used by PDP Labs to enter and submit complete data sets
  - System and database reside on USDA-AMS servers in D.C.
## PDP Output

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of samples</th>
</tr>
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<tbody>
<tr>
<td>2008</td>
<td>13381</td>
</tr>
<tr>
<td>2009</td>
<td>12244</td>
</tr>
<tr>
<td>2010</td>
<td>12845</td>
</tr>
<tr>
<td>2011</td>
<td>12737</td>
</tr>
<tr>
<td>2012</td>
<td>12546</td>
</tr>
<tr>
<td>2013</td>
<td>10399</td>
</tr>
<tr>
<td>2014 (projected)</td>
<td>10056</td>
</tr>
</tbody>
</table>
Pesticides in Honey?

- 2007: Penn State researchers raise concern
- Florida growers worried about implications for orange blossom honey
- Prompt Response – 2 months – USDA Lab, Gastonia, 164 pesticides
- 2007 - 2008: 744 samples, PT (3 samples, 12 analytes)
- Findings: 0.4% detections coumophos (35%), fluvalinate (12%), amitraz metabolite (11%), no tolerance violations (6.6%)
Testing began in October 2010

First commodities: green beans, pears, sweet potatoes

Next: applesauce, carrots, peaches, peas
Overall, small amount of pesticides found in some of the samples

A few violations were found where tolerances were not established

EPA determined that findings did not present a health risk

FDA issued statement that baby foods are in no way unsafe and parents and caregivers can continue to feed infants their regular baby foods
Began testing October 1, 2013

Test dairy-based and soy-based each

Testing for one year (over 700 samples each type)

Testing lists are commodity specific – based on milk and soybean established tolerances
Salmon Testing

- Testing began July 1, 2013
- Samples consist of:
  - One pound
  - Fresh or frozen raw salmon
  - Fillets, nuggets, strips, or steaks
  - Bones-in or no bones
  - Atlantic or Pacific
  - Farm-raised or wild, domestic or imported, organic or conventional
Salmon Testing

- Analysis for pesticide residues via QuEChERS modification
- Split sample sent to EPA/BEAD lab (Ft. Meade facility) for glyphosate/AMPA testing
10-15% of the U.S. population have domestic wells supplying potable water needs

Most of these domestic wells are in rural areas of the U.S., most frequently in agricultural regions

PDP began testing groundwater in 2007

To date 1,358 groundwater wells throughout the continental U.S. have been sampled and tested

- Privately owned wells
- State (EPA) monitoring wells
- Schools/childcare facilities
- Agricultural field wells
- Public utilities drawing from groundwater
Groundwater Locations – 1,358 samples
Groundwater

- Over 100 compounds tested at parts per trillion levels
- Most commonly detected (>10% of samples)
  - Acetochlor ESA, alachlor ESA and OA, metolachlor ESA and OA
  - Atrazine and metabolites, simazine
  - Bromacil
  - Diuron
  - Imazapyr
  - Metalaxyl
How are PDP Data Used?

- Pesticide tolerances evaluated by EPA using PDP data
- Pesticide uses re-registered or cancelled based on outcome of tolerance evaluations
- Examine impact of agricultural practices on human health and the environment
- Monitor compliance with U.S. EPA tolerances (MRLs)
- Tolerance violations reported to FDA
- Verify pesticide usage statistics
- Facilitate export of U.S. commodities
Supporting Marketing of U.S. Commodities

- Support export of U.S. products
- Test for foreign use pesticides
- Exchange information with FAS re. MRL violations that cause rejection of U.S. products
- Conduct pilot surveys of crops for which data are needed
- Data show that most produce tested have residues much lower than U.S. EPA tolerances
International Activities

- Provide information on U.S. tolerances
- Participate in Codex and Pesticide Workshops in Europe and Latin America
- PDP has provided training or information to scientists from Belize, Brazil, Chile, China, South Korea, India, Indonesia, Peru, Saudi Arabia, South Africa
Thank you!