*The Connecticut Agricultural Experiment Station, New Haven*

# Pesticide Residues in Produce Sold in Connecticut 2002-2004

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## INTRODUCTION

Beginning with the inception of the market basket study in 1963 (Hanna, 1963), Connecticut is the only state in New England that has continuously monitored its food supply for pesticide residues. Food commodities included in the study are not only grown in Connecticut, but also in other parts of the world. The results of this project have been published on an annual basis since 1988. However, due to a variety of circumstances, the data have not been published for the preceding three-year period. This bulletin, therefore, provides three years of data, from 2002 through 2004.

In the United States there are three government agencies that share responsibility for the regulation of pesticides: The Environmental Protection Agency (EPA), The Food Safety Inspection Service of the United States Department of Agriculture (FSIS-USDA), and the Food and Drug Administration (FDA, 2004).

It is the responsibility of the EPA to register (*i.e.*, approve) for use and set pesticide tolerances if the use of a particular pesticide may result in residues on food (CFR, 2004). A tolerance is defined as the maximum quantity of a pesticide permitted on a raw agricultural commodity. Tolerances impact food safety by limiting the concentration of a pesticide residue allowed on a commodity and by limiting the type of commodity on which it is allowed. Tolerances are the only tool the EPA has under Federal law to control the quantity of pesticides on the food we consume.

The FSIS branch of the USDA is responsible for monitoring and enforcing tolerances of pesticide residues on meat, poultry and certain egg products.

The FDA is charged with enforcing tolerances in imported and domestic foods (predominantly fresh fruits and vegetables); in this state, the Connecticut Department of Consumer Protection (DCP) is responsible for enforcing these tolerances (CGA, 2004). To be able to enforce the EPA mandated tolerances, both the FDA and DCP must know the quantity and the type of pesticide residue present in foodstuffs offered for sale.

The FDA approach to pesticide residue monitoring, the model adopted as closely as possible for the market basket study described in this bulletin, involves collecting samples of individual lots of domestically produced and imported foods as close as possible to their point of entry into the distribution system; both the federal and state programs include the analysis of processed and raw foods for pesticide residues. When illegal pesticide residues are found, the FDA can impose various sanctions, including seizure of the commodity or injunction. For those samples imported into the US, shipments will be stopped at the port of entry if they are found to contain illegal residues. If there is reason to believe that future lots from a particular foreign grower or geographic region may be in violation during a given season, the FDA can invoke detention without physical examination (automatic detention). In this case, the produce will be detained at the port of entry until analysis is complete (FDA, 2004).

The FDA residue monitoring program targets those states that produce and/or export the largest quantities of food. In 2002 (the last year for which FDA data are available) the FDA tested 2,122 samples from 39 states (no samples were collected from Tennessee, Alabama, West Virginia, Hawaii, Nevada, Vermont, Maine, Mississippi, Arkansas, New Hampshire, Puerto Rico, or Connecticut) and 4,644 samples from 100 countries, with the largest number of samples (1,891) coming from Mexico (FDA, 2004). Taken collectively, samples from the three states of California (216) Louisiana (210), and Washington (206) comprised about 30 percent of the total domestic samples examined for pesticide residues (FDA, 2004).

The Department of Analytical Chemistry at the Connecticut Agricultural Experiment Station (CAES) in conjunction with DCP examines foods sold in the state for pesticide residues. This market basket survey concentrates on fresh produce grown in this state, but also includes fresh produce from other states and foreign countries and some processed food. (Krol, 2002 and references cited therein) The primary goal of this program is to determine if the amounts and types of pesticides found on fruits and vegetables are in accordance with the tolerances set by EPA. Violations of the law occur when pesticides are not used in accordance with label registration and are applied in excessive amounts, or when pesticides are accidentally or deliberately applied to crops on which they are not allowed. The FDA relies on the CAES/DCP market basket project for surveillance in Connecticut.

## METHODS

Samples of produce grown in Connecticut, other states, and foreign countries are collected at various Connecticut producers, retailers, and wholesale outlets by inspectors from the DCP. The samples collected are brought to our laboratory in New Haven for pesticide residue testing. These market basket samples are collected without prior knowledge of any pesticide application.

Commodities are tested for pesticides using a multi-residue method developed in our laboratories (Pylypiw, 1993). In most cases, each sample is prepared in its natural state as received, unwashed and unpeeled. The sample is chopped and a portion is placed into a blender. Organic solvents are added and the mixture is blended to extract the pesticides from the sample. Interfering coextracted compounds are removed from the solvent extract with water. A small amount of the extract is then injected into various gas chromatographic instruments to determine how much, if any, pesticides are present. Our method is capable of determining pesticides with recoveries ranging from 81 percent to 114 percent, and has an average detection limit of 10 parts per billion. Our method is able to detect over 100 different pesticides in a wide range of foods.

## RESULTS AND DISCUSSION

Because this study encompasses a time span of three years, the data are summarized in Table 1 for each one year time period. Details of our findings are presented in Tables 2 and 3 for 2002; in Tables 4 and 5 for 2003; and in Tables 6 and 7 for 2004.

The average value over three years of 41 percent of fresh produce samples containing pesticide residues compares well with the average value since 1988, which is 43 percent. The average value of 9.8 percent for processed foods was also comparable to previous years.

Of the samples analyzed in 2002 two samples (CFR, 2002), were found to contain violative pesticide residues. A sample of imported quince was found to contain residues of Iprodione at 2.8 ppm. This fungicide is not allowed on quince. Also in 2002, there was a single sample of organically grown potatoes that were found to contain residues of the sprout inhibitor CIPC. This pesticide is commonly used post-harvest, and should not have been applied to organic produce. (See below for a discussion of the National Organic Act).

Of the samples analyzed in 2003, there were seven samples that contained violative residues on fresh produce (CFR, 2003). Three violative samples were of cucumbers, peppers, and snap beans each grown at different farms in Connecticut. These samples contained the two herbicides Benefin, and Trifluralin, commonly sold together under the trade name Team®, but also available as individual formulations. These pesticides are frequently used for pre-emergent control of weeds. There is no tolerance for these herbicides on these crops. Similarly, a sample of eggplant grown within the state contained 4.4 ppm chlorothalonil, a fungicide that is not allowed on eggplant. The fifth violation was for a sample of blueberries grown in Florida. They were found to contain a residue of 0.356 ppm endosulfan; the tolerance set by EPA is 0.1 ppm. Since this product was grown out of state, DCP worked with FDA on enforcement action. Two samples of broccoli rabe were found to contain DDE, a breakdown product of DDT. Under the action levels imposed under the FDA Compliance Guidelines (FDA, 2000), DDE is not allowed in broccoli rabe. This finding is most likely the result of soil contaminated with DDT from past usage, and not a recent application (Pylipiw, 1991). Once again, the DCP informed the FDA of this violation.

The eighth violation in 2003 was a sample of canned pears containing a residue of diphenylamine at 0.032 ppm. This post-harvest chemical is used to control storage scald, but the tolerance for this chemical on pears (0.01 ppm) was revoked as of December 2001.

In 2003 there were two samples of organically grown potatoes and one sample of organically grown apples which were found to contain residues of CIPC and diphenylamine, respectively. As stated above, while these chemicals are

Table 1: Samples analyzed in the market basket survey over the past three years.

| Year | Total Samples | Samples of Fresh Foods (% of total) | Samples of Processed Foods (% of total) | Fresh foods with residues (% of fresh foods) | Processed foods with residues (% of processed foods) |
|---|---|---|---|---|---|
| 2002 | 206 | 162 (79%) | 44 (21%) | 67 (42%) | 2 (4.5%) |
| 2003 | 298 | 235 (79%) | 62 (21%) | 96 (40%) | 7 (11%) |
| 2004 | 197 | 169 (86%) | 28 (14%) | 71 (42%) | 4 (14%) |


allowed on these commodities, they should not have been applied to organic produce (See below).

In 2004 four samples of fresh produce contained violative residues (CFR, 2004). The first was a sample of true yams imported from Jamaica that contained the systemic fungicide imazalil at 1.6 ppm. This is a "no tolerance" violation, as imazalil is not allowed for use on yams. The second was a sample of collard greens which were found to contain the fungicide captan at 3 ppm. The EPA tolerance for captan is 2 ppm, and this proved to be an over tolerance violation. In both of these cases the FDA was provided with the results and raw data, so that they could act on the violations. The other two violations were strawberries grown in Connecticut. One sample contained 0.38 ppm of the fungicide chlorothalonil which is not allowed on this commodity. The second sample was found to contain residues of the fungicide vinclozolin, at 0.05 ppm. This pesticide was common on strawberries until its use was banned in September of 1998 (CFR, 1999). The new labels on the product reflect the termination of uses on strawberries by its manufacturer. Since the strawberry season was over at the time the violative results were confirmed, no action was possible regarding limitation of sale of the crop. Letters were, however, sent to both growers indicating that they were in violation of tolerances on their produce.

## THE NATIONAL ORGANIC ACT

The organic food market is the fastest growing niche segment in the food industry. US sales grew from $6 billion in 1999 to $7.8 billion in 2000. Exports to the UK are more than $40 million, and growing by 15% per year. Exports to Japan are $40 - $60 million, and increasing by 30% – 50% per year. The reason for the demand is that consumers are seeking better nutrition and health, and they see organic products as contributing to these goals.

While organic agricultural products have existed for over 50 years, there were no national standards, and the term "organic" varied from state to state. On October 21, 2002, the Federal Government enacted a law, known as the National Organic Act (CFR 2004, § 205.2), to standardize the meaning of organic throughout the United States. It specifically defines the term organic as "A labeling term that refers to an agricultural product produced in accordance with this Act and the regulations in this part" (CFR 2004, § 205.2). Effective October 21, 2002 all produce claiming to be organic must comply with the regulations of the act (CFR 2004, § 205.2) and failure to do so could result in a $10,000 fine.
The sample cereal boxes above illustrate the four labeling categories. The green and white label as depicted above would appear on boxes labeled 100 percent organic, or organic cereal. From left: cereal with 100 percent organic ingredients; cereal with 95-100 percent organic ingredients; cereal made with 70-95 percent organic ingredients; and cereal with up to 70 percent organic ingredients. The makers of the cereal with up to 70 percent organic ingredients may list specific organically produced ingredients on the information panel of the box-but may not make any organic claims on the front of the box. Organic ingredients are those ingredients that have been grown, and processed using only those methods specified in (CFR 2004, § 205.105).

## FOOD EMERGENCY RESPONSE NETWORK (FERN)

The market basket survey described in this bulletin is an attempt by the State of Connecticut to assure the safety of foods offered for sale within the state. A national program which expands on food safety concerns is the Food Emergency Response Network (FERN) which is being developed and implemented by directive of the White House Homeland Security Council's Interagency Food Working Group. On the federal level, FDA and FSIS (USDA) are the lead agencies. The mission of the FERN is to integrate the nation's food-testing laboratories at the local, state and federal levels into a network that is able to respond to emergencies involving biological, chemical or radiological contamination of food. The FERN structure has been organized to ensure federal and state interagency participation and cooperation. The FERN will provide a national surveillance program that will offer means of detecting threat agents in the American food supply. FERN will also offer significant surge capacity that will allow our nation to respond to widespread and diverse emergencies related to agents in food, and the network of laboratories will enhance the ability of the country to restore the public's confidence in the food supply either after an emergency or in response to threats.

As is apparent in the opening discussion of this bulletin, the Department of Analytical Chemistry at the Connecticut Agricultural Experiment Station has had a great deal of experience analyzing food products for chemical residues. As a result of this decades-long experience, we were selected as one of four state labs to participate in the formation and implementation of FERN. Dr. MaryJane Incorvia Mattina or her alternate, Dr. Walter Krol, have participated in several face-to-face meetings with federal and state laboratory counterparts, monthly conference calls, and four laboratory analytical exercises from 2003 through 2004. Dr. Mattina was also one of the organizers of the regional FERN meeting held in July 2004 in Amherst, Massachusetts. Our laboratory was one of the first state labs to be accepted into the FERN program for the analysis of chemicals in food and the first lab nationally to upload its chemical analysis data into the electronic communication network, eLEXNET. We are eager to continue and to expand our participation within the FERN system in the future.

## CONCLUSIONS

In conclusion, as can be seen in Table 8, over the past three years (2002-2004) of this study, the average value for food samples containing NO pesticide residues is 64%, up slightly from the average value from the previous years (1990-2001) which was 63%. From 1990 through 2004 a total of 4681 food samples were analyzed. A total of 3010 samples were found to contain no residues, and a total of 1612 samples were found to contain residues within EPA tolerances. Over the complete 15-year time span (1990-2004) there were 8 samples that contained pesticide residues that were over EPA tolerance levels. Since 1990, a total of 51 samples were found to contain residues with no EPA tolerance, most likely due to spray drift or misapplication of pesticides to food products. Over the past three years there were eleven samples with residues with no EPA tolerance.

## ACKNOWLEDGEMENTS

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Table 2. Summary of pesticides found in fresh fruits and vegetables sold in Connecticut, 2002.

| Commodity / Pesticide | Samples with Residues | No. of Times Detected | Residue Range (ppm) | EPA Tolerance (ppm) |
|---|---|---|---|---|
| Apples (38 samples) | 15 | | | |
| Captan | | 2 | 0.024-0.39 | 25 |
| Carbaryl | | 1 | 0.28 | 10.0 |
| Diphenylamine | | 4 | 0.01-5.2 | 10 |
| Endosulfan | | 8 | 0.017-0.087 | 2.0 |
| Fenpropathrin | | 3 | 0.076-0.96 | 5.0 |
| Permethrin | | 1 | 0.04 | 0.05 |
| Beans, Snap (5 samples) | 3 | | | |
| Chlorothalonil | | 2 | 0.036-0.56 | 5.0[(a)] |
| Endosulfan | | 1 | 0.2 | 2.0 |
| Blueberries (18 samples) | 9 | | | |
| Captan | | 9 | 0.068-2.6 | 25 |
| Endosulfan | | 1 | 0.008 | 0.1 |
| Cherries (4 samples) | 1 | | | |
| Endosulfan | | 1 | 0.022 | 2.0 |
| Corn (4 samples) | 0 | | | |
| Cucumbers (8 samples) | 4 | | | |
| Bifenthrin | | 1 | 0.022 | 0.4 |
| Chlorothalonil | | 1 | 0.017 | 5.0 |
| DDE | | 1 | 0.034 | 0.1[(b)] |
| Endosulfan | | 2 | 0.018-0.12 | 2.0 |
| Eggplant (2 samples) | 0 | | | |
| Lettuce (3 samples) | 0 | | | |
| Limes (2 samples) | 0 | | | |
| Oranges (2 samples) | 1 | | | |
| Imazalil | | 1 | 2.8 | 10.0 |
| Peaches (9 samples) | 6 | | | |
| Captan | | 3 | 0.44-3.8 | 50 |
| Endosulfan | | 2 | 0.75-1 | 2.0 |
| Iprodione | | 1 | 0.22 | 20.0 |
| Permethrin | | 1 | 0.16 | 5.0 |
| Pears (6 samples) | 2 | | | |

| | | | | |
|---|---|---|---|---|
| | Captan | 1 | 0.18 | 25 |
| | Ortho-Phenylphenol | 1 | 0.11 | 25.0 |
| Peppers (3 samples) | 0 | | | |
| Plums (2 samples) | 2 | | | |
| | Endosulfan | 1 | 0.046 | 2.0 |
| | Iprodione | 1 | 1.4 | 20.0 |
| Potatoes (5 samples) | 3 | | | |
| | CIPC | 3 | 0.03-1.1 | 50[a] |
| Quince (2 samples) | 1 | | | |
| | Iprodione | 1 | 2.8 | 0[c] |
| Radish Tops (1 sample) | 1 | | | |
| | DDE | 1 | 0.016 | 0.2[b] |
| Radishes (1 sample) | 1 | | | |
| | DDE | 1 | 0.008 | 0.2[b] |
| Raspberries (1 sample) | 1 | | | |
| | Captan | 1 | 1.8 | 25 |
| | Iprodione | 1 | 2.8 | 15.0 |
| Squash, Summer (11 samples) | 4 | | | |
| | Bifenthrin | 1 | 0.048 | 0.4 |
| | Chlordane | 1 | 0.034 | 0.1[b] |
| | DDE | 1 | 0.012 | 0.1[b] |
| | Endosulfan | 2 | 0.01-0.1 | 2.0 |
| Strawberries (15 samples) | 12 | | | |
| | Captan | 7 | 0.006-5.6 | 25 |
| | DCPA | 1 | 0.044 | 2 |
| | Endosulfan | 8 | 0.03-0.94 | 2.0 |
| | Fenhexamid | 1 | 0.13 | 3.0 |
| | Fenpropathrin | 2 | 0.11-0.29 | 2.0 |
| Tomatoes (11 samples) | 1 | | | |
| | Chlorothalonil | 1 | 0.1 | 5 |
| Miscellaneous (1 each) | 0 | | | |

Asparagus, Broccoli, Celery, Collards, Grapefruit, Kale, Mangoes, Sweet Potatoes and Winter Squash

[a] One sample was labeled as organic. [b] Action level as per FDA Compliance Policy Guidelines.
[c] Violative sample, residue not allowed on this commodity.

Table 3. Summary of pesticides found in processed foods sold in Connecticut, 2002.

| Commodity / Pesticide | Samples Analyzed | Samples with residues | No. of times detected | Residue range (ppm) |
|---|---|---|---|---|
| **Juices** | | | | |
| Apple Cider/Juice | 32 | 0 | | |
| Cranberry Juice | 1 | 0 | | |
| **Fruits & Vegetables*** | | | | |
| Beets | 1 | 0 | | |
| Carrots | 2 | 0 | | |
| Green Beans | 1 | 0 | | |
| Peas | 2 | 0 | | |
| Spinach | 4 | 2 | | |
| Permethrin | | | 2 | 1.8-5.2 |
| Squash, winter | 1 | 0 | | |

*The beets, green beans, peas, and the two spinach samples that contained residues were canned. The carrots, squash, and remaining two spinach samples had been washed and/or chopped and packaged.

Table 4. Summary of pesticides found in fresh fruits and vegetables sold in Connecticut, 2003.

| Commodity / Pesticide | Samples with Residues | No. of Times Detected | Residue Range (ppm) | EPA Tolerance (ppm) |
|---|---|---|---|---|
| Apples (40 samples) | 15 | | | |
| Captan | | 1 | 0.89 | 25 |
| Chlorpyrifos | | 2 | 0.052-0.5 | 1.5 |
| Dicofol | | 1 | 1.6 | 5 |
| Diphenylamine | | 7 | 0.044-2 | 10[a] |
| Endosulfan | | 4 | 0.015-0.14 | 2.0 |
| Fenpropathrin | | 1 | 0.24 | 5.0 |
| Asparagus (3 samples) | 0 | | | |
| Avocadoes (2 samples) | 0 | | | |
| Bananas (4 samples) | 1 | | | |
| Imazalil | | | 0.9 | 3.00 |
| Beans, Fava (2 samples) | 0 | | | |
| Beans, Snap (8 samples) | 4 | | | |
| Benefin | | 1 | 0.024 | 0[b] |
| Chlorothalonil | | 1 | 0.21 | 5 |
| Endosulfan | | 1 | 0.126 | 2.0 |
| Vinclozolin | | 1 | 0.05 | 2.0 |
| Sulfur | | 1 | 1.1 | GRAS[e] |
| Trifuralin | | 1 | 0.014 | 0[b] |
| Blackberries (1 sample) | 1 | | | |
| Dicofol | | | 0.54 | 5 |
| Blueberries (14 samples) | 7 | | | |
| Captan | | 6 | 0.4-1.9 | 25 |
| Endosulfan | | 2 | 0.022-0.365 | 0.1[c] |
| Broccoli (2 samples) | 0 | | | |
| Broccoli Rabe (2 samples) | 2 | | | |
| DCPA | | 1 | 0.016 | 5 |
| DDE | | 2 | 0.014-0.024 | 0[d] |
| Cabbage (2 samples) | 0 | | | |
| Chayote (2 samples) | 0 | | | |
| Cherries (2 samples) | 2 | | | |

| | | | | |
|---|---|---|---|---|
| Captan | | 1 | 2 | 100 |
| Fludioxinil | | 1 | 4 | 5.0 |
| Propiconazole | | 1 | 0.86 | 1.0 |
| Clementines (2 samples) | 2 | | | |
| Chlorpyrifos | | 2 | 0.17-0.72 | 1.0 |
| Dicofol | | 1 | 1.3 | 10 |
| Imazalil | | 2 | 1.4-2 | 10.0 |
| Malathion | | 1 | 0.62 | 8 |
| Ortho-Phenylphenol | | 1 | 0.47 | 10 |
| Corn (2 samples) | 0 | | | |
| Cucumbers (10 samples) | 5 | | | |
| Benefin | | 1 | 0.1 | 0[b] |
| Carbaryl | | 1 | 1.2 | 10 |
| Chlordane | | 3 | 0.044-0.062 | 0.1[d] |
| DDE | | 2 | 0.016-0.034 | 0.1[d] |
| Endosulfan | | 3 | 0.01-0.266 | 2.0 |
| Trifluralin | | 1 | 0.064 | 0[b] |
| Eggplant (7 samples) | 1 | | | |
| Chlorothalonil | | | 4.4 | 0[b] |
| Grapes (4 samples) | 3 | | | |
| Captan | | 1 | 6 | 50 |
| Sulfur | | 3 | 0.26-8 | GRAS[e] |
| Kiwifruit (3 samples) | 2 | | | |
| Iprodione | | 1 | 8.2 | 10.0 |
| Phosmet | | 1 | 0.76 | 25 |
| Vinclozolin | | 1 | 5.6 | 10.0 |
| Lettuce (5 samples) | 1 | | | |
| Permethrin | | 1 | 0.8 | 20.0 |
| Mangoes (2 samples) | 0 | | | |
| Mushrooms (2 samples) | 0 | | | |
| Nectarines (2 samples) | 0 | | | |
| Oranges (3 samples) | 3 | | | |
| Imazalil | | 3 | 0.5-3.6 | 10.0 |
| Peaches (10 samples) | 6 | | | |

| | | | | |
|---|---|---|---|---|
| | Captan | 1 | 0.12 | 50 |
| | Endosulfan | 5 | 0.75-1 | 2.0 |
| | Propiconazole | 1 | 0.018-0.74 | 1.0 |
| Pears (7 samples) | 1 | | | |
| | Fenpropathrin | 1 | 0.48 | 5.0 |
| Peppers (7 samples) | 2 | | | |
| | Benefin | 1 | 0.005 | 0[(b)] |
| | Chlorothalonil | 1 | 0.42 | 5.0 |
| | Trifluralin | 1 | 0.003 | 0[(b)] |
| Peppers, Hot (2 samples) | 0 | | | |
| Plums (3 samples) | 0 | | | |
| Potatoes (11 samples) | 4 | | | |
| | CIPC | 4 | 0.003-0.034 | 50[(a)] |
| | DDE | 1 | 0.004 | 1[(d)] |
| Potatoes, Sweet (2 samples) | 1 | | | |
| | DCNA | | 0.9 | 10 |
| Spinach (5 samples) | 4 | | | |
| | DDE | 4 | 0.014-0.072 | 0.5[(d)] |
| | Endosulfan | 1 | 1.4 | 2.0 |
| | Permethrin | 2 | 0.23-4 | 20.0 |
| Squash, Summer (12 samples) | 8 | | | |
| | Chlordane | 4 | 0.017-0.091 | 0.1[(d)] |
| | DDE | 1 | 0.038 | 0.1[(d)] |
| | Endosulfan | 4 | 0.11-0.45 | 2.0 |
| Squash, Winter (4 samples) | 1 | | | |
| | Endosulfan | 1 | 0.195 | 2.0 |
| Strawberries (20 samples) | 11 | | | |
| | Captan | 4 | 1.5-4.2 | 25 |
| | Carbaryl | 1 | 0.25 | 10 |
| | Endosulfan | 9 | 0.092-0.78 | 2.0 |
| | Fenhexamid | 3 | 0.44-1.2 | 3.0 |
| Tangelos (1 sample) | 1 | | | |
| | Imazalil | 1 | 0.7 | 10.0 |
| Tomatoes (18 samples) | 8 | | | |

| | | | |
|---|---|---|---|
| Chlorothalonil | 5 | 0.11-0.74 | 5 |
| DDE | 2 | 0.036-0.036 | 0.05[(d)] |
| Endosulfan | 4 | 0.025-0.152 | 2.0 |

Miscellaneous (1 each) 0
Chives, Grapefruit, Lemons, Limes, Lychees, Turnips, Watermelon

[(a)] One apple, two potato samples listed as organic, may violate National Organic Law.
[(b)] Violative sample, residue not allowed on this commodity.
[(c)] Violative sample, residue is over the EPA tolerance for this commodity.
[(d)] Action level as per FDA Compliance Policy Guidelines, DDE not allowed on broccoli rabe
[(e)] GRAS = Generally Recognized as Safe, these chemicals are exempt from tolerances.

Table 5. Summary of pesticides found in processed foods sold in Connecticut, 2003.

| Commodity | Pesticide | Samples Analyzed | Samples with residues | No. of times detected | Residue range (ppm) |
|---|---|---|---|---|---|
| **Juices** | | | | | |
| Apple Cider/Juice | | 25 | 0 | | |
| Grape Juice | | 1 | 0 | | |
| **Baby Food** | | | | | |
| Miscellaneous Fruits | | 7 | 1 | | |
| | Endosulfan | | | 1 | 0.17[(a)] |
| Miscellaneous Vegetables | | 12 | 0 | | |
| **Fruits & Vegetables*** | | | | | |
| Broccoli Slaw | | 1 | 0 | | |
| Carrots | | 3 | 0 | | |
| Green Beans | | 1 | 0 | | |
| Peaches | | 1 | 1 | | |
| | Ortho-Phenylphenol | | | 1 | 0.024 |
| Pears | | 1 | 1 | | |
| | Diphenylamine | | | 1 | 0.032[(b)] |
| | Ortho-Phenylphenol | | | 1 | 0.024 |
| Peas | | 3 | 0 | | |
| Pineapple | | 1 | 0 | | |
| Potatoes | | 1 | 1 | | |
| | CIPC | | | 1 | 0.018 |
| Spinach | | 3 | 2 | | |
| | Permethrin | | | 2 | 0.82-7.6 |
| Squash, winter | | 1 | 0 | | |
| Strawberries | | 1 | 1 | | |
| | Endosulfan | | | 1 | 0.11 |
| Tomatoes | | 1 | 0 | | |

*One sample of carrots, the green beans, peaches, pears, peas, pineapples, potatoes, strawberries and one of the spinach samples that contained a residue, were canned. The broccoli slaw, two samples of carrots, and the winter squash sample had been washed and/or chopped and packaged. Two spinach samples had been frozen and one of those contained a residue.

[(a)] Found on a sample of peaches. [(b)] Residue is NOT allowed on Pears.

Table 6. Summary of pesticides found in fresh fruits and vegetables sold in Connecticut, 2004.

| Commodity / Pesticide | Samples with Residues | No. of Times Detected | Residue Range (ppm) | EPA Tolerance (ppm) |
|---|---|---|---|---|
| Apples (25 samples) | 4 | | | |
| Captan | | 3 | 0.16-0.7 | 25 |
| Endosulfan | | 2 | 0.016-0.098 | 2.0 |
| Phosmet | | 2 | 0.27-0.29 | 5.0 |
| Asparagus (2 samples) | 0 | | | |
| Beans, Snap (10 samples) | 5 | | | |
| Captan | | 1 | 0.94 | 25 |
| Chlorothalonil | | 3 | 0.028-0.7 | 5 |
| Endosulfan | | 3 | 0.028-0.66 | 2.0 |
| Vinclozolin | | 1 | 0.026 | 2.0 |
| Blueberries (8 samples) | 4 | | | |
| Captan | | 4 | 0.02-0.53 | 25 |
| Phosmet | | 1 | 0.24 | 10 |
| Broccoli (2 samples) | 0 | | | |
| Cabbage (2 samples) | 0 | | | |
| Cauliflower (2 samples) | 0 | | | |
| Cherries (1 sample) | 1 | | | |
| Captan | | 1 | 0.52 | 100 |
| Fenhexamid | | 1 | 0.94 | 10.0 |
| Propiconazole | | 1 | 0.34 | 1.0 |
| Clementines (1 sample) | 1 | | | |
| Ortho-Phenylphenol | | 1 | 1.3 | 10 |
| Collards (3 samples) | 1 | | | |
| Captan | | 1 | 3 | 2[(d)] |
| Corn (3 samples) | 0 | | | |
| Cucumbers (8 samples) | 6 | | | |
| Chlordane | | 2 | 0.063-0.063 | 0.1[(a)] |
| Chlorothalonil | | 1 | 0.12 | 5 |
| Dieldrin | | 1 | 0.056 | 0.1[(a)] |
| Endosulfan | | 3 | 0.026-0.064 | 2.0 |
| Eggplant (4 samples) | 0 | | | |

| | | | | |
|---|---|---|---|---|
| Grapes (1 sample) | 1 | | | |
| | Sulfur | 1 | 9.6 | GRAS |
| Oranges (2 samples) | 1 | | | |
| | Imazalil | 1 | 1.4 | 10.0 |
| Peaches (12 samples) | 11 | | | |
| | Captan | 7 | 0.03 | 50 |
| | Chlorothalonil | 2 | 0.046-0.06 | 0.5 |
| | Diazinon | 1 | 0.04 | 0.7 |
| | Endosulfan | 3 | 0.059-1.1 | 2.0 |
| | Iprodione | 1 | 4.6 | 20.0 |
| | Phosmet | 5 | 0.054-0.6 | 10 |
| | Sulfur | 1 | 0.54 | GRAS[(b)] |
| Pears (6 samples) | 1 | | | |
| | Ortho-Phenylphenol | 1 | 0.22 | 20 |
| Peppers (4 samples) | 3 | | | |
| | Endosulfan | 1 | 0.034 | 2.0 |
| | Ortho-Phenylphenol | 1 | 0.014 | 10 |
| | Permethrin | 2 | 0.047-0.28 | 1.0 |
| Plantains (2 samples) | 0 | | | |
| Plums (1 sample) | 1 | | | |
| | Endosulfan | 1 | 0.02 | 2.0 |
| Potatoes (4 samples) | 0 | | | |
| Potatoes, Sweet (1 sample) | 1 | | | |
| | DCNA | | 0.43 | 10 |
| Squash, Summer (10 samples) | 8 | | | |
| | Chlorothalonil | 3 | 0.034-0.037 | 5 |
| | DCPA | 1 | 0.024 | 1 |
| | Dieldrin | 3 | 0.018-0.098 | 0.1[(a)] |
| | Endosulfan | 6 | 0.074-0.3 | 2.0 |
| Squash, winter (2 samples) | 0 | | | |
| Strawberries (24 samples) | 19 | | | |

| | | | | |
|---|---|---|---|---|
| | Bifenthrin | 3 | 0.056-0.19 | 3.00 |
| | Captan | 15 | 0.019-7.6 | 25 |
| | Chlorothalonil | 1 | 0.38 | 0[(c)] |
| | Endosulfan | 7 | 0.019-0.39 | 2.0 |
| | Fenhexamid | 6 | 0.017-0.9 | 3.0 |
| | Vinclozolin | 1 | 0.05 | 0[(c)] |
| Tomatoes (17 samples) | 2 | | | |
| | Chlorothalonil | 1 | 0.034 | 5 |
| | Endosulfan | 1 | 0.22 | 2.0 |
| Yams, True (1 sample) | 1 | | | |
| | Imazalil | 1 | 1.6 | 0[(c)] |
| Miscellaneous (1 each) | 0 | | | |

Bananas, Beets, Beet tops, Blackberries, Carrots, Dandelion greens, Lettuce, Parsnips, Peas, Pomegranates, Raspberries

[(a)] Action level as per FDA Compliance Policy Guidelines. [(b)] GRAS = Generally Recognized as Safe, these chemicals are exempt from tolerances. [(c)] Violative sample, residue is not allowed on this commodity. [(d)]Violative sample, Overtolerance.

Table 7. Summary of pesticides found in processed foods sold in Connecticut, 2004.

| Commodity | Pesticide | Samples Analyzed | Samples with residues | No. of times detected | Residue range (ppm) |
|---|---|---|---|---|---|
| **Juices** | | | | | |
| Apple Cider/Juice | | 22 | 3 | | |
| | Diphenylamine | | | 3 | 0.054-00.078 |
| **Vegetables*** | | | | | |
| Asparagus | | 2 | 0 | | |
| Broccoli Florets | | 1 | 0 | | |
| Salad Mix | | 1 | 0 | | |
| Spinach | | 2 | 1 | | |
| | Endosulfan | | | 1 | 1.2 |

*The asparagus was sold in jars; remaining samples labeled as washed, and/or chopped and packaged.

Table 8. 1990 - 2004 summary of all market-basket samples, including organic and processed food samples.

| Year | Total Samples Tested | Samples With No Residues | Samples With Residues Within EPA Tolerances | Samples With Residues Over EPA Tolerances | Samples With Residues With No EPA Tolerances |
|---|---|---|---|---|---|
| 1990 | 418 | 186 | 230 | 0 | 2 |
| 1991 | 285 | 190 | 94 | 0 | 1 |
| 1992 | 273 | 179 | 89 | 1 | 4 |
| 1993 | 441 | 305 | 128 | 3 | 5 |
| 1994 | 545 | 414 | 125 | 1 | 5 |
| 1995 | 444 | 307 | 129 | 0 | 8 |
| 1996 | 327 | 188 | 134 | 1[a] | 4 |
| 1997 | 412 | 266 | 144 | 0 | 2 |
| 1998 | 180 | 115 | 63 | 0 | 2 |
| 1999 | 195 | 115 | 72 | 0 | 8 |
| 2000 | 145 | 90 | 54 | 1 | 0 |
| 2001 | 315 | 201 | 112 | 0 | 2 |
| 2002 | 206 | 137 | 68[b] | 0 | 1 |
| 2003 | 298 | 195 | 95 | 1 | 7[c] |
| 2004 | 197 | 122 | 72 | 1 | 3 |
| Total | 4681 | 3010 | 1612 | 9 | 51 |

(a) Over FDA Action Level.
(b) Two samples listed as Organic, but below 5% of the EPA Tolerance.
(c) Includes two “action level” violations, DDE is not allowed in Broccoli Rabe.

NOTES

NOTES