DO YOU KNOW WHAT YOU'RE EATING?

AN ANALYSIS OF U.S. GOVERNMENT DATA ON PESTICIDE RESIDUES IN FOODS

February, 1999

Consumers Union of United States, Inc.
Public Service Projects Department
Technical Division

Edward Groth III, PhD, Project Director
Charles M. Benbrook, PhD, Consultant
Karen Lutz, MS, Consultant

This analysis was supported in part by the Pew Charitable Trusts, the Joyce Foundation and the W. Alton Jones Foundation.

TABLE OF CONTENTS

LIST OF TABLES

SUMMARY

We analyzed data collected by the U.S. Department of Agriculture's Pesticide Data Program (PDP) to compare the relative amounts and toxicity of pesticide residues in different foods. We obtained pesticide residue data on over 27,000 food samples tested by the PDP in 1994-97. We weighted the amounts of residues present to account for differences in the toxicity of individual pesticide chemicals, and computed a Toxicity Index (TI) for each food. Our TI integrates measures of the frequency of pesticide detection, the levels of residues present and the relative toxicity of the detected residues, yielding an index of the ***relative toxicity loading*** of each food.

Larger TI values represent greater toxicity loading—that is, foods with high TI scores have greater amounts of pesticide residues, residues that are more toxic, or both, compared to foods with low TI scores. TI values for the foods tested by the PDP in 1994-97 range from 0.01 to 5,376.

But the majority of foods have TI values between 10 and 300, and a few more have values between 300 and 600. That is, the relative toxicity loading of the widely consumed foods tested by the PDP spans a range of at least 60-fold. In our judgment, values greater than 100 on the TI scale show comparatively high pesticide contamination, and values less than 10 indicate that those foods are comparatively quite "clean." (Values in the range from 10 to 100 represent increasing degrees from "low" to "moderate" levels of pesticide contamination.)

Our Toxicity Index does not measure *risk*, per se; the degree of risk associated with pesticide residues in foods also depends on food intake and on personal factors like age, illness, exposure to other sources of pesticides, and so forth. There is no sharp line between "safe" and "unsafe" scores on our Toxicity Index. With some exceptions noted later, the residues detected by the PDP are within the established U.S. legal limits for those pesticides on those foods. However, legal limits do not define safety, and residues of some chemicals on some foods would frequently expose a young child to a dose greater than the U.S. government's official estimate of the "safe" daily intake of those pesticides.

Our TI values permit a variety comparisons among foods:

Which Foods Have the Lowest TI Values? Six foods had very low TI's (10 or less) each time they were tested: Frozen/canned corn, milk, U.S. orange juice, U.S. broccoli, bananas, and canned peaches. Not quite as low, but still relatively "clean," were frozen/canned sweet peas, U.S. and imported apple juice, frozen winter squash from Mexico, tomatoes from Canada, Brazilian orange juice, and U.S. wheat. See page 13 and **Table 4** for details.

Which Foods Have the Highest TI Values? Seven foods consistently had high or very high TI's each time tested: Fresh peaches (both domestic and imported); frozen and fresh winter squash grown in the U.S.; domestic and imported apples, grapes, spinach and pears; and U.S.-grown green beans. Among these, U.S. peaches and frozen winter squash had TI Values about 10-fold higher than even the other "high" scores. See page 14 and **Table 4** for details.

How Many Residues? Some foods have residues of many more pesticides than others. Up to 37 different pesticide chemicals were detected in apples by the PDP, for example, and more than 20 are found in peaches, pears and spinach, while only 10 were found in broccoli, and fewer than that in apple juice, orange juice, bananas and corn. Individual food samples often have multiple residues on them. An apple grown in the U.S. typically contains four pesticides, and some have as many as 10 different residues. Peaches, winter squash, spinach, carrots and grapes are more likely than not to have two or more residues in a sample. One sample of spinach had residues of 14 different pesticides on it.

Are Imported Foods More Contaminated Than U.S. Crops? No. Eleven of the 12 highest TI scores are for U.S.-grown foods. There are 39 cases with 10 or more samples of a food from a specific other country to compare with U.S. samples; in 26 cases (67 percent), U.S. samples had higher TI's. Some differences exist between importing countries, as well as between the U.S. and other countries. Cases where imports are worse include Chilean grapes, Canadian and Mexican carrots, Mexican broccoli and tomatoes, Argentine and Hungarian apple juice, and Brazilian orange juice. U.S. samples are worse than imports for fresh peaches, fresh and frozen winter squash, fresh green beans, apples, and pears. U.S. apple juice has a higher TI than apple juice from Germany or Mexico, and U.S. grapes have higher TI's than those from South Africa and Mexico. The size of the differences varies from food to food. In two cases with the highest TI's of any foods, U.S. peaches have 10 times the TI of Chilean imports, and U.S. frozen winter squash has a TI

143 times as high as Mexican winter squash has. Only two imported foods, Mexican broccoli and Brazilian orange juice, have TI's more than 10-fold larger than those of U.S. samples, but in each case the higher score is still comparatively low.

Do Processed Foods Have Less Pesticides Than Fresh Foods? Generally, yes. But there are exceptions. TI values for apple juice and orange juice are far lower than for the fresh fruits, and the TI for canned peaches is 1/1,000 that of fresh peaches. Canned spinach has a TI about half as high as that for fresh spinach. Canned/frozen corn and canned/frozen peas also have among the lowest TI values, but no data on the fresh crops are available. But frozen and canned green beans and frozen winter squash each had TI scores higher than those for the corresponding fresh crops.

Were Any of the Residues Illegal? Yes. About 1 percent of the residues detected by the PDP in 1994, 4 percent in 1995 and 1996, and 5 percent in 1997 violated U.S. tolerances. Most violations are not excessive residues of legally registered pesticides, but rather, low levels of chemicals that are not registered for use on that food. Some violations are attributed to persistent residues in soils or to wind dispersal of pesticides applied legally to nearby fields, but we believe the PDP data show widespread illegal use of several insecticides on both U.S. and Mexican spinach.

Our analysis of the data also enables us to explain ***why*** different foods have the Toxicity Indices they do. We can break the TI for a food down into the components contributed by each pesticide chemical detected in that food. Doing that shows that a comparatively small number of uses of a few highly toxic insecticides accounts for most of the toxicity loading in the crops with high TI values.

For example, 22 different pesticides were detected in U.S. peaches in 1996, but one chemical—methyl parathion—accounts for more than 90 percent of the total toxicity load. Methyl parathion accounts for a large part of the TI values for apples, pears, green beans and peas, as well as peaches. The high TI's for winter squash (fresh and frozen) from the U.S. are almost entirely due to residues of dieldrin, a very toxic, carcinogenic insecticide that was banned 25 years ago, but persists in some agricultural soils. A handful of other widely used insecticides and a few fungicides consistently accounts for the greatest fraction of toxicity loading in most crops. We call pesticide uses that dominate the TI's for specific crops "risk drivers."

The fact that a few very toxic pesticides account for most of the toxicity loading in PDP-tested crops has important policy implications. The risks associated with pesticides in foods can be sharply reduced by focusing risk-management efforts on a few high-risk pesticide uses. Safer alternatives exist to manage most pests against which these high-risk chemicals are used (see Worst First, Consumers Union, 1998).

In 1996 Congress passed a law, the Food Quality Protection Act, that requires pesticide tolerances to protect children. This law could require the U.S. EPA to ban or severely restrict many of the high-risk insecticide uses responsible for the greatest part of the toxicity loading revealed by the PDP data. Unfortunately, the EPA is making only slow progress in implementing the new law, and is faced with fierce resistance from agricultural interests and pesticide manufacturers.

While consumers await stricter government limits, there are steps they can take to minimize pesticide risks in foods they eat or feed their children. We ***do not*** recommend eating less fruits and vegetables; the health benefits of these foods outweigh risks from the pesticides they contain. However, consumers can:

- Wash or peel fresh fruits and vegetables. Peeling apples, peaches and pears, in particular, can drastically reduce pesticide exposure from these foods, which have some of the highest Toxicity Indices.

- Try to buy organically grown peaches, apples, grapes, pears, green beans, winter squash and spinach, if they are available where you live.

- Choose a variety of foods; don’t overdo it with any one fresh fruit or vegetable.

- Choose foods that have relatively low scores on CU’s Toxicity Index. This includes considering the country of origin for foods where domestic and imported samples have very different scores (peaches, apples, grapes, tomatoes, winter squash), and choosing processed fruits and vegetables that have TI scores substantially lower than fresh equivalents, such as canned peaches.

INTRODUCTION

The USDA Pesticide Data Program

Since 1991, the United States Department of Agriculture (USDA) has carried out an extensive program testing foods sold in the U.S. for pesticide residues. This Pesticide Data Program (PDP) is designed to provide data on actual pesticide residues in widely-consumed foods, including foods known to be eaten often by children, to support more accurate risk assessments by government agencies that regulate pesticide use.

The PDP uses standard, multi-residue analytical methods (MRM's) that screen foods for a wide range of pesticides, and carries out additional, specific tests for some widely used pesticides not picked up by the MRMs. The analyses can detect more than 200 different pesticides and breakdown products.

The USDA's test protocols require testing foods "as eaten." Thus, if a consumer would ordinarily wash, peel or cook a food before consuming it, the PDP does that before analyzing the food. The results therefore provide a reasonably accurate picture of residues that consumers are likely to eat.

Each PDP sample is a composite of about five pounds of produce; a sample of might consist of 10 to 20 apples or oranges, or several hundred grapes. Composite samples provide reasonable estimates of the average residues consumers are exposed to over time, but tend to average out the variation in residue levels that occurs from one piece of fruit to the next. The PDP data therefore are likely to understate the maximum residue levels that may be present, for instance, on an individual apple, peach or carrot. This limitation is more significant for assessing acute exposure than for assessing chronic exposure, since long-term averages matter most in the latter case, while occasional "peak" exposures can be crucial in the former.

The PDP tests about 10 or 12 different foods a year, typically testing about 500 to 700 samples of each food. The foods selected rotate from one year to the next. The PDP has tried to test many different foods, which has tended to limit the program's ability to track changes over time in pesticide residue patterns in the same foods. Only a few foods have been tested for as many as three consecutive years.

In gathering the foods tested each year, USDA tries to sample both from major production regions within the U.S. and imports from countries that are significant suppliers to the U.S. market.

For many of the tested U.S. crops and some foods produced in other countries, the PDP data effectively document the pesticide content of foods that are traded internationally. Our analysis is therefore probably of interest to consumers and consumer organizations outside the U.S.A.

METHODOLOGY

A. Consumers Union's Analysis of the PDP Data

We obtained the results of the PDP pesticide residue analyses for the years 1994 through 1997. (The 1997 data are the most recent available, just released in January 1999.) The data are available to the public, and reports are published on the USDA web site, but most citizens are not familiar with the program or the data it has produced.

In the four years we examined, the PDP tested over 27,000 samples in 27 different food categories. **Table 1** lists the foods and numbers of samples of each food tested each year. Sixteen of the tested foods were fresh fruits and vegetables; 8 were processed fruits and vegetables; milk, soybeans and wheat were also included.

For 15 foods, at least 10 imported samples came from at least one foreign country, which was our "threshold" for examining imported samples as a separate category. For the other foods, all or nearly all of the samples came from the U.S. **Table 1** shows foods and countries they came from, where there were adequate samples. In nine cases (apple juice/Argentina, bananas/Central America, orange juice/Brazil, grapes, peaches and pears from Chile, green beans, tomatoes and winter squash from Mexico), the PDP tested at least 60 imported samples in one or more years. This large sample size provides an accurate picture of that food from that origin. For some of the other imported foods, though, sample numbers are probably too small to support precise estimates of their relative pesticide toxicity loading.

Our consultants, Karen Lutz and Chuck Benbrook, designed and built a large database program that we then used to analyze the USDA data. This database enabled us to examine the residue results in many ways—by year, food item, pesticide chemical, residue level, frequency of detection, country of origin, and by any combination of those parameters.

To the same database, we added information on the toxicity of every pesticide chemical detected in the PDP in the years we examined. The U.S. Environmental Protection Agency (EPA) has compiled toxicity data on all registered pesticides; we used EPA's most recent data.

The combination of USDA PDP residue data and EPA toxicity data enabled us to estimate the *relative toxicity loading* of pesticide residues in different foods. This integration of residue and toxicity data is an innovation by Consumers Union; we first applied this method last year in our report on Organically Grown Foods. We believe this method offers the scientific and regulatory communities, as well as consumers, a sound and useful way to compare the *relative size of pesticide risks* posed by different chemicals and combinations of chemicals in different foods.

B. CU's Toxicity Index

To compare the amounts of pesticide residues in different foods in a meaningful way, CU has developed a "Toxicity Index," or TI for short. The TI provides an integrated measure of the *frequency of detection* of residues in a food, the *average levels of residues* present, and the *relative toxicity* of the specific pesticides present.

This index is not a true measure of *risk*. Risk depends on how much a person eats of different foods and on characteristics of individual consumers like age, health status and other (non-food) exposures to pesticides. But the TI depicts the ***relative amount of pesticide toxicity*** in different foods, and as such it provides a more robust index of relative risk than simple measures of residue frequencies or levels, unweighted for toxicity, can do.

To create our TI's, we first needed to calculate a TI for each pesticide chemical found in the foods the PDP tested. Then, using the chemicals' TI's and the PDP data, we computed TI's for the pesticide residues in each food.

(1) Toxicity of Different Pesticides

Pesticide toxicity has two components: Acute Toxicity, the propensity to cause immediately observable adverse effects at relatively high levels of exposure; and Chronic Toxicity, the propensity to cause long-term, delayed effects, following repeated lower-level exposure. Different pesticide active ingredients differ widely in both acute and chronic toxicity.

The standard toxicological measure of *Acute Toxicity* is the LD_{50}, which is defined as the dose of a chemical that kills half of the exposed group of test animals. The smaller the LD_{50}, the more toxic the chemical. **Table 2** shows the LD_{50}'s of pesticide chemicals detected in foods in the PDP. The range from least toxic to most toxic of the listed pesticides by this measure of acute toxicity is over 5,000-fold.

To translate LD_{50}'s into an Acute Toxicity Index, (ATI), we took the inverse of the LD_{50} for each chemical (i.e., $1/LD_{50}$); this gives us an index in which larger numbers indicate greater toxicity. We multiplied the results by 100, to make the results whole numbers, instead of decimal fractions, while leaving the relative magnitude of the ATI's unchanged. **Table 2** also shows the ATI for each pesticide chemical.

In summary: $ATI = (1/LD_{50}) \times 100$

The most widely used toxicological measure of *Chronic Toxicity* is the Reference Dose, or RfD. The RfD is derived by taking the highest dose level that had no observed adverse effect in test animals and dividing it by a "safety factor," typically 100. The result in theory represents a dose thought to be without appreciable risk to humans, although the uncertainties inherent in extrapolating from animals to humans and from high doses to lower doses must be acknowledged. As with the LD_{50}, the more toxic a chemical is, the smaller its RfD. The EPA has published chronic RFD's for most registered pesticides. **Table 3** displays the RFD's of pesticides detected in the PDP. Here too, there is a wide range (8,000-fold) from most to least toxic.

CU has developed a Chronic Toxicity Index (CTI), which is based on the RfD, and also takes into account certain additional data on a chemical's toxicity. As with the Acute Toxicity Index, we used the inverse of the RfD, so that more toxic pesticides would have larger CTIs. RfD's typically are very small numbers, and the expression (1/RfD) yields results that range from about 6 to over 50,000. To express the results on a more manageable scale, we multiplied them by 0.1. We then added factors, where applicable, for endocrine disruption and carcinogenicity:

Endocrine disrupters: For pesticides listed as suspected endocrine disrupters by Colborn et al. (1996), the CTI was multiplied by a factor of 3. (I.e., CTI = (1/RfD) x 0.1 x 3.) Endocrine disruption is responsible for some of the most devastating documented effects of pesticides on wildlife, and as more research emerges, may well prove to be a very critical aspect of pesticides' impacts on human health. In our judgment, potential endocrine disruption is a more important aspect of a chemical's toxicity than even potential carcinogenicity, and our scoring scheme therefore gives it great weight.

Carcinogens: We incorporated a factor based on the U.S. EPA's classification of carcinogens and estimate of carcinogenic potency, or Q*. For those pesticides that have a Q* in EPA's database, we multiplied the Q* by 10 for pesticides classified by EPA as "known" or "probable" human carcinogens, and by 5 for those classified as "possible" human carcinogens. To put the results on a scale where they would comprise about one-third of the total when combined with the RfD-based index, we multiplied them by 50. This product was then added to the CTI. The effect of this additional factor is minor for pesticides that are very toxic in other ways (in which case, the RfD component of the CTI is dominant). For pesticides that have relatively low general toxicity but are carcinogenic, the carcinogen component of the CTI tends to dominate.

Table 3 also displays CU's Chronic Toxicity Index for pesticides detected in the PDP, and the factors used to calculate the CTIs.

(2) Calculating Toxicity Indices for Specific Foods

Using our ATI and CTI for each chemical, and the PDP data, we can compute a Toxicity Index (TI) for each category of food tested, based on the amounts of residues of different pesticides found in that food.

For example: The PDP tested 502 samples of U.S.-grown apples in 1996. The analysis detected residues of 37 different pesticide chemicals in those apple samples. The PDP data show us which chemicals were detected, how often (i.e., in how many of the 502 samples) each was detected, and at what levels they were detected in each sample. The PDP data provide this information on all the pesticide residues found in all 27 of the foods and in samples from each country of origin, in each year we examined. Overall, there are about 1,300 unique combinations of specific pesticides in specific foods from specific countries in specific years.

For each of those 1,300 combinations, we calculated *frequency of detection* (percent positive for the specific chemical) and the *mean residue* (the average residue level in the positive samples.) We then used those values, and the ATI and CTI for each individual pesticide, to compute an ATI and a CTI for each of the 1,300 combinations.

For example, for each of the 37 pesticides found in U.S. apples in 1996, we calculated an Acute Toxicity Index by multiplying the **percent positive** for a particular chemical in those apple samples, times the **mean residue,** times the **chemical's ATI**. We repeated the same process, using each **chemical's CTI**, to get the Chronic Toxicity Index for each pesticide found on the apples.

We repeated these steps for all 1,300 combinations of chemicals on foods from a given country in a given year. When this step was completed, we had 1,300 ATI scores and 1,300 CTI scores.

Before we could combine the ATI and CTI scores into a single TI for each individual chemical/food/country of origin/year combination, we had to convert them to the same scale. We *standardized* the two sets of numbers by converting them to a percent scale. Through this step, all but a few "outlier" values in the ATI and CTI data sets were expressed as numbers between 0 and 100.[1]

After standardizing the ATI and CTI indices to the 100-point scale, we combined the indices for each individual food/country-of-origin/chemical/year combination into a single Toxicity Index using the formula TI = ATI + 2CTI. That is, we gave chronic toxicity twice as much weight as the acute

[1] The initial strategy in our standardization step was to make 100 the highest score on both the ATI and CTI scales, expressing all other values as a percent of the maximum. However, there are a few extreme values in each set. If we had simply used the highest score in each set as our divisor (i.e., fixed the top of the scale at 100), the rest of the values would have been compressed into a narrow range, e.g., about 0-6 on the 100-point scale for the CTI values. We addressed this problem by choosing a representative very high score as the divisor, and allowing a few outliers to have scores greater than 100. Less than 1 percent of the raw ATI and CTI scores exceeded 100.

toxicity component. We believe this weighting is appropriate for assessing dietary exposure to pesticides.

To get a TI value for a given food/country-of-origin/year, we then added the TI values for all the pesticides detected in that specific category. For example, the TI for U.S. apples tested in 1996 is the sum of the TI's for the 37 individual pesticide chemicals found on those apples that year.

TI scores for all the food/country-of-origin/year combinations covered in our analysis are summarized in **Table 4**.

(3) Examining "Risk Drivers" For Specific Foods

The overall TI for a particular food from a particular country in a particular year indicates the aggregate amount of pesticide toxicity that the food carries. The component TI's for the individual chemicals detected in that food indicate how much each pesticide contributes to the food's overall toxicity loading.

In most cases, a small number of pesticide chemicals accounts for most of the toxicity loading. For example, U.S. apples tested in 1996 had a TI of 550, and 37 different pesticides contributed to that overall score. But just three—the insecticides methyl parathion and azinphos-methyl, and the fungicide diphenylamine—have a combined TI of 407, or 74 percent of the total TI.   For U.S. fresh peaches, methyl parathion alone accounts for over 90 percent of the total TI in each of the three years tested.

We call pesticide residues that account individually for large fractions of a food's total toxicity loading ***risk drivers***. **Table 5** shows the component TI's of all the individual chemicals detected in each of the tested foods. This table shows which chemicals are risk drivers and which are minor factors in the overall TI's of different foods from different countries.

C. Some Data-Analysis Issues

The overall TI for any particular food category is the sum of a group of TI's for individual chemicals found in that food, and each chemical's TI, in turn, depends in part on the mean residue level of the chemical in samples of the food. Residue levels for individual chemicals can vary widely from sample to sample of a food, and an average residue may result from a wide range of different values. If the number of samples is small (as it is for some of the imported PDP food categories), one or two samples with an extremely high residue level or with a very toxic pesticide could skew the resulting TI score. When TI scores are determined by rare or somewhat random events, apparent differences might be due to chance, and not likely to represent what would be seen if one looked repeatedly at the same comparisons.

For example, U.S.-grown potatoes were analyzed in two years of the PDP. The TI in 1994 was 191; in 1995 it was 59. Did pest management on potato farms improve markedly? Probably not. **Table 5** shows 688 samples of potatoes were tested in 1994, but only 36 of those samples were tested for dieldrin. Four of the 36 were positive for this very toxic insecticide, which was banned in the 1970s, but persists in some soils. The TI value for dieldrin alone accounts for 73 percent of the total TI for potatoes in 1994. Dieldrin was not detected in any of 702 1995 samples. Two possibilities exist: The 1994 sampling may have overstated the presence of dieldrin in potatoes, or the 1995 sampling may have understated it. But it seems quite likely that, despite the large number of samples, the two years' data do not comparably represent the occurrence of dieldrin in potatoes, and that the large decline in TI's from one year to the next is a spurious difference, not a real change.

In conducting our analysis, we sought to determine whether any differences and trends in TI's shown in **Table 4** might be due to chance, or to the random occurrence of certain rare, highly toxic residues. To reduce the likelihood of such skewing effects, we applied a "rule of 10" to the data. We excluded data for a food from a specific country in a given year if the PDP tested fewer than 10 samples of that food/country/year combination. And, within larger data sets, we excluded from our TI calculations residue data for which less than 10 samples of a food/country/year were tested.

We also used a variety of other information at hand, such as USDA pesticide use data, to assess whether the patterns we saw in the residue data made sense. Our bottom line: We believe the differences shown in **Table 4** are real. However, where sample size (see **Table 1**) is small, comparatively small differences (of 10-20 points or less on the TI scale) between scores for different foods are not very meaningful, statistically. Large differences, and scores based on large sample sizes, are not subject to this caveat.

RESULTS AND DISCUSSION

A. Comparative Toxicity Loading of Different Foods

The TI values for different foods shown in **Table 4** range from 0.01 to 5,376—a range of more than 500,000-fold. However, the majority of values fall between 10 and 300 on the TI scale. The scale is relative, and there is no firm dividing line between "acceptable" and "excessive" degrees of pesticide toxicity loading. Nevertheless, in our judgment, values of less than 10 can be considered very low toxicity loading, i.e., the food is very "clean." Values above 100 indicate "high" toxicity loading, increasingly serious as scores get larger. TI values between 10 and 100 fall on a continuum rising from "low" through "moderate" toxicity loading.

Foods with the lowest TI scores include:

Canned/Frozen Sweet Corn (U.S., 1995)	0.01
Canned/Frozen Sweet Corn, (U.S., 1994)	0.02
Milk (U.S., 1996)	1
Milk (U.S., 1997)	1
Broccoli (U.S., 1994)	2
Orange Juice (U.S., 1997)	2
Bananas (Imports, 9 countries, 1994)	3
Bananas (Imports, 7 countries, 1995)	4
Canned Peaches (U.S., 1997)	5
Canned/Frozen Peas (U.S., 1994)	6
Grapes (Mexico, 1994)	10
Apple Juice (U.S., 1996)	11
Apple Juice (Mexico, 1997)	12
Apple Juice (Germany, 1997)	13
Apple Juice (Argentina, 1996)	18
Apple Juice (U.S., 1997)	20

Corn, bananas and peas all have an inedible exterior husk, which tends to keep pesticide residues away from the edible portions of the foods. Processing typically further reduces residues. Only three of 1,015 samples of corn tested in two years had any detectable residues. The very low score for U.S. broccoli reflects the rarity of residues in that food; the two most frequently detected insecticides were each found on less than 2 percent of

659 samples. Apple juice (imported and domestic) typically has only low residues of a few pesticides. The score for canned peaches, which is 1/1,000 that for fresh peaches, reflects effects of processing, a longer time between harvest and consumption, and differences in pest management on peaches grown for processing as opposed to those grown for the fresh market (see Section F, below).

A few other foods had scores nearly as low as those listed above: Frozen/canned peas tested in 1995-96 (TI's of 22 and 21); frozen winter squash from Mexico (1997, 21); orange juice from Brazil (1997, 23); fresh winter squash from Honduras (1997, 23); U.S. sweet potatoes (1997, 25); Canadian tomatoes (1997, 26); and wheat (1995-97, 18, 29 and 32).

The highest Toxicity Indices (those over 100 on our TI scale), listed in descending order, were for the following foods/origins/years:

Fresh Peaches (U.S., 1995)	5,376
Fresh Peaches (U.S., 1996)	4,848
Fresh Peaches (U.S., 1994)	4,390
Frozen Winter Squash (U.S., 1997)	3,012
Fresh Winter Squash (U.S., 1997)	1,706
Grapes (U.S., 1994)	1,552
Fresh Spinach (Mexico, 1996)	623
Apples (U.S., 1994)	567
Fresh Spinach (U.S., 1995)	554
Apples (U.S., 1996)	550
Frozen/Canned Green Beans (U.S., 1997)	529
Apples (U.S., 1995)	521
Fresh Spinach (U.S., 1996)	495
Fresh Peaches (Chile, 1996)	471
Pears (U.S., 1997)	435
Pears (Chile, 1997)	415
Fresh Peaches (Chile, 1994)	381
Fresh Peaches (Chile, 1995)	366
Fresh Spinach (U.S., 1997)	349
Grapes (Chile, 1996)	339
Grapes (U.S., 1995)	329
Apples (New Zealand, 1994)	298
Fresh Green Beans (U.S., 1994)	294
Apples (New Zealand, 1996)	284

Apples (New Zealand, 1995)	260
Fresh Spinach (Mexico, 1997)	256
Celery (U.S., 1994)	255
Grapes (Chile, 1995)	241
Grapes (U.S., 1996)	228
Fresh Green Beans (U.S., 1995)	222
Frozen/Canned Green Beans (U.S., 1996)	222
Canned Spinach (U.S., 1997)	204
Pears (South Africa, 1997)	201
Potatoes (U.S., 1994)	191
Grapes (Chile, 1994)	181
Grapes (South Africa, 1996)	169
Tomatoes (Mexico, 1997)	159
Pears (Argentina, 1997)	157
Oranges (U.S., 1994)	138
Carrots (Mexico, 1995)	136
Tomatoes (Mexico, 1996)	123
Lettuce (U.S., 1994)	122
Fresh Spinach (Mexico, 1995)	103

Seven crops (peaches, apples, pears, grapes, winter squash, spinach and green beans) appear among the highest TI scores repeatedly, with scores above 200 essentially every time they were tested. For all but green beans and winter squash, imports and U.S. samples both have high (though often not equally high) TI scores. In most cases, the consistently high scores are attributable to the insect problems typically associated with growing these crops, and to the insecticides (mostly organophosphates) used on them. (See Section H, below, for further details.)

B. Illegal Residues

Only 1 percent of the residues detected by the PDP in 1994 violated the legal limits, or tolerances, established by the U.S. EPA for the specific pesticides on the specific foods in which they were detected. In 1995 and 1996, the violation rate was about 4 percent, and in 1997 it was 5 percent. Spinach was tested in the latter three years, and in 1995 and 1996, more than half of the violative residues were on spinach (a situation that improved in 1997). There were no noteworthy differences in violation rates between U.S. and imported samples.

Most violations (95 percent or so of the illegal residues each year) do not involve residue levels that exceed a legally permitted maximum level. Instead, most illegal residues are pesticides detected on foods on which they are not registered for use with the EPA. Such violations can occur because of residues left in soils from past uses on other crops, and from “drift,” wind-blown contamination of a field by pesticides applied legally to a different crop on adjacent fields.

However, some residues show up consistently in a significant fraction of samples of a crop on which they are not registered for use, at levels quite similar to those found in crops on which the chemical is legally registered for use. This strongly suggests that some growers used the pesticide, even though it is not legally registered for use on that crop. We found this kind of pattern of significant illegal use of several insecticides on spinach. At least one illegal residue was present in about 25 percent of spinach samples in 1995 and 1996, and many samples had residues of more than one illegally-used pesticide. In 1997, the violation rate was about half as high as in the two previous years, but still far greater than for other foods.

Some residues of pesticides banned years ago still show up in foods. Chlorinated hydrocarbon insecticides, such as DDT, dieldrin and chlordane, all banned from food uses in the 1970s, are very persistent in soil, and some agricultural land is still contaminated with them. For example, DDT and its breakdown product DDE are found in carrots, sweet potatoes and potatoes, and dieldrin was detected in 74 percent of tested samples of frozen, and 37 percent of fresh, winter squash. Such persistent banned pesticides have no tolerances, but the Food and Drug Administration has set “action levels,” or limits above which the FDA considers these residues too high to allow the foods on the market. None of the dieldrin, DDT or other residues of banned organochlorine insecticides violated action levels. But these “legal” residues can contribute substantially to the toxicity loading of the foods in which they occur.

C. Health Implications of Differences in Pesticide Toxicity Loading

What is the health significance of a high TI score? The only solid scientific answer to that question is, we are not sure. Pesticides, of course, are poisons; they are designed to kill living organisms. It is certain that all pesticides can have adverse health effects on people at a high enough level of exposure. The critical question is whether exposure associated with the residues found in foods is low enough to ensure an adequate safety margin between actual exposures and levels that can cause health damage.

Exposures Above Official "Safe" Levels. The Reference Dose (or RfD, defined on page 8), is generally regarded as a science-based estimate of a presumably "safe" daily intake for an individual pesticide. While there is room to debate that view—not all RfD's may adequately account for the higher vulnerability of children, for instance—let's stipulate for now that an RfD is a definition of "safe" pesticide exposure. In that case, the PDP data provide some striking evidence that safety margins are <u>not</u> adequate.

For example, the average methyl parathion residue on U.S. peaches tested in 1994-96 was 0.055 parts per million. At that concentration, a 100-gram peach would contain 5.5 micrograms of methyl parathion. The current EPA RfD for methyl parathion is 0.00002 mg/kg/day (or 0.02 ug/kg/day, since 1 mg = 1,000 ug). That means a 20-kg (44-pound) child should not consume more than 0.4 micrograms per day of this insecticide. Eating just one medium-sized peach with an average methyl parathion residue, though, would give that 20-kg child a dose of this intensely neurotoxic insecticide almost 14 times higher than the RfD.

In fact, even the *lowest* methyl-parathion residue found on peaches in 1996, the most recent year tested, 0.004 ppm, would still deliver a Reference Dose of the insecticide to a 20-kilogram child who ate a 100-gram peach. Methyl parathion was found on 41 percent of U.S. peaches in 1996. This means roughly two of every five children who eat a U.S. peach will exceed the RfD for methyl parathion by eating that single food item. The maximum methyl parathion level the PDP found on peaches in 1996, 0.5 ppm, would deliver 125 times the RfD, and the highest 10 percent of residues all exceed 35 times the RfD.[2]

---

[2] The PDP did not test fresh peaches in 1997, so 1996 data are the most recent available. However, data on pesticide applications (from another branch of USDA) suggest that total pounds of methyl parathion used on peaches declined 44 percent from 1995 to 1997. The Food and Drug Administration's pesticide residue testing program tested fresh peaches in 1996 and 1997. FDA data show a 34 percent decrease in frequency of detection of methyl parathion in peaches (from 28 percent in 1996 to 18 percent in 1997.) However, the same data show that the mean residue of methyl parathion on peaches increased five-fold, from 0.04 ppm in 1996 to 0.21 ppm in 1997. This suggests that methyl parathion use patterns on peaches may have shifted to fewer applications, but closer to harvest time. The FDA's sample size is smaller (only 35 samples positive for methyl parathion), and we consider the 1996 PDP data the best indicator of the current status of methyl parathion residues in peaches. A new PDP look at peaches would be valuable.

Methyl parathion on peaches is perhaps an extreme example, but is far from the only case in which a young child can ingest more than a safe dose (i.e., more than the RfD) of a specific pesticide by eating a single serving of a specific food. **Table 6** highlights some pesticide/crop combinations and shows how often they can deliver an unsafe dose. For instance, dieldrin was found in 37 percent of fresh winter squash and 74 percent of frozen winter squash samples tested for it in 1997. The majority of positive samples had residues high enough to give a 20-kg child more than the RfD of dieldrin in a 100-gram serving of squash. The odds of this occurring are 28 percent for fresh squash, and 48 percent for frozen squash. Grapes from Chile tested in 1996 contained residues of the organophosphate insecticides chlorpyrifos, dimethoate and omethoate, each at levels sometimes high enough to exceed the respective RfD's. The combined odds (i.e., the chance that a 20-kg child eating 100 grams of Chilean grapes would exceed the RfD for at least one of the three) are about 10 percent. Similarly, if that child were to eat 100 grams of fresh spinach, the odds are about 1 in 12 that he or she would exceed the RfD for dimethoate, omethoate or methomyl.

While odds like 1 in 12 or 10 percent may not seem very large, there are 20 million children under the age of six years in the United States. The likelihood that one of every 10 children who eats Chilean grapes, four of ten who eat U.S. peaches or half of those who eat frozen U.S. winter squash will get more than the theoretically “safe” dose of a very toxic insecticide, is not a trivial concern. And these simple calculations ignore the fact that children (and most everyone else) eat many different foods in a day, several of which may expose them to residues that could have additive effects.

In theory, RfD’s have safety factors built into them, and eating a food that exceeds the RfD for a pesticide does not automatically mean a child will suffer adverse effects. But the public needs to be confident that the levels of pesticides in foods are “safe enough,” i.e., that there is in fact a wide margin of safety between actual exposure and harmful levels, even for children and other vulnerable sub-populations. Clearly, such confidence in the “safety margin” of current residue levels is not warranted. In fact, if “safe use” is defined as practices that seldom leave residues that can exceed the RfD, it appears that methyl parathion cannot be used safely on foods that children eat, and that winter squash can’t be grown safely on dieldrin-contaminated croplands.

What about exposures that don't exceed the RfD? While many people assert that the levels of pesticides in foods are generally too small to have any adverse effects, there is no scientifically credible way to rule out the risk of subtle harmful effects in at least some fraction of the exposed population. Not all forms of health damage are readily measurable. It is also very difficult to assess possible interactive effects of multiple residues found in the variety of foods consumed in a typical day.

Young children, and fetuses, are more sensitive to toxic effects of chemicals than adults are, because the young are growing and developing rapidly, processes that are vulnerable to disruption by toxic agents. Since young people's bodies are smaller than adults' bodies, children get greater doses of residues by consuming a given food than an adult would. Children also eat fewer foods, and eat more of certain foods that tend to be relatively heavily contaminated with pesticides, than adults do. Most insecticides are nerve poisons, and a central concern is potential damage to the developing nervous system. Current scientific knowledge is generally inadequate to define exposure levels that are free of risk of adverse developmental effects on the nervous system. RfD's are typically based on tests on adult animals; most pesticides have not been fully tested for effects on immature animals. These gaps in scientific knowledge suggest that a cautious attitude toward dietary pesticide exposure, even at relatively "low" levels, is quite sensible.

While we cannot draw a clear line between "safe" and "unsafe" on our Toxicity Index, risk associated with dietary exposure to pesticide residues is relative. Higher toxicity loading scores clearly represent greater risks than lower scores, and in our judgment, differences of the magnitude shown here are meaningful. Excluding the extremely low scores for canned corn, the range of TI values for foods tested by the PDP over this four-year span is more than 5,000-fold. Consumers are justified in wanting to minimize their exposure to pesticides through food choices. Our TI values can help guide them to sound choices that can measurably reduce the risk of harm.

D. Multiple Residues

One of the reasons pesticide risk assessment is so difficult is that the average person's daily diet consists of many different foods, and many of those foods contain pesticide residues. People are not exposed to a single pesticide chemical at a constant dose level, the way laboratory animals are in toxicity tests; instead, they consume a constantly changing mixture of many different pesticides at variable levels.

The PDP data make this multi-chemical exposure picture very clear. PDP analyses show that as many as five or six different pesticides typically are detected in 10 percent or more of most crops, and for many foods, it is “normal” for individual samples to have multiple residues. **Table 7** shows the frequency of detection of multiple residues in the individual samples of different foods tested by the PDP in 1996. The median number of residues (that is, the number for which half the samples had fewer and half had more residues) on tomatoes and oranges was one, while the median apple sample had four residues, and the median peach sample had three residues. Three percent of apples had eight or more different residues. And one sample of spinach had a whopping 14 different pesticides on it.

The data in **Table 7** suggest that a person whose meals in a given day included apple juice, a salad with carrots, spinach and tomato, some green beans and a peach, would be exposed to 10 different pesticide residues, if those foods had typical (median) contamination patterns.

E. Differences Between Imported and Domestic Foods

One interesting question is whether imported foods have higher TI scores, indicating greater loading of pesticide toxicity, than domestically grown samples of the same crops. U.S. agricultural interests have argued that stricter U.S. regulations on pesticides in foods (which may be required as the U.S. EPA implements the Food Quality Protection Act of 1996) will hurt U.S. growers in the world market. Growers in other countries, facing fewer restrictions on pesticide use, the argument goes, can produce foods more cheaply. An implication of this argument is that imported foods may be more heavily contaminated with pesticide residues.

While U.S. government and agribusiness spokespeople are fond of boasting that “The U.S. has the safest food supply in the world,” the USDA has also stated that there are no meaningful differences in pesticide residue problems between domestically-grown and imported foods. Our analysis of the PDP data tells a different story.

One way to compare U.S. and imported foods is to see which group has consistently higher Toxicity Indices. The list of foods with highest TI scores, on page 14 above, shows 12 food/country/year cases that have TI's greater than 500. Eleven of those 12 cases are U.S.-grown foods. The one imported food among the top dozen (Mexican spinach in 1996) had much lower scores the other two years it was tested. Foods that might fairly be characterized as "loaded" with pesticide residues, based on our Toxicity Index, are almost all "Made in the USA."

Table 1 shows 39 cases in which more than 10 samples of a specific food imported from a specific country were tested; we used a sample size of 10 as our cut-off for comparing imports and larger numbers of U.S. samples. Of those 39 U.S./import comparisons, **Table 4** shows that U.S. samples had higher Toxicity Indices in 26 cases (67 percent). Again, the available data fail to support the hypothesis that imported foods in general are more likely to be contaminated with pesticides.

However, as **Table 4** also shows, there are notable differences from crop to crop. In a few cases, imports have consistently higher TI values; in more cases, U.S. samples have consistently higher values; and occasionally, there is no consistent pattern (U.S. TI's are higher one year, and imported TI's higher the next). The size of the difference between U.S. samples and imports also varies from food to food. Let's look at some specific cases:

<u>Cases in which U.S. samples have higher TI scores</u>:

Peaches. The U.S. TI values over three years of testing exceed the TI values for imports from Chile by more than 10-fold.

Winter Squash. For fresh samples of this vegetable, U.S. samples had a TI 42 times as high as that of Mexican samples. For frozen products, the U.S. score was 143-fold higher than that of Mexican samples.

Apples. The TI values for U.S. apples over a three-year testing span are consistently about twice as high as those for apples from New Zealand, the leading source of imports. The number of imported samples is small, but the consistency of the scores from year to year and the consistent pattern of residues (i.e., the same three insecticides account for most of the score in all three years for both sets) suggest that this is a real difference.

Pears from four countries were tested in 1997. The U.S. had the highest TI. Pears from Chile had a marginally lower TI, and those from South Africa and Argentina had TI's less than half that of U.S. samples.

Fresh Green Beans. In both years sampled, TI's for U.S. samples were substantially higher than those for Mexican samples, by ratios of about 3-fold and 6-fold in 1994 and 1995, respectively.

Oranges. Imports from Australia in 1995 had a TI 3/4 as large as that of U.S. oranges tested that year.

Apple Juice. Scores for apple juice from all countries are quite low. In 1997, imports from Germany and Mexico had TI's lower than that of U.S. apple juice. (Imports from two other countries had TI's higher than that of U.S. juice, though; see below.)

Grapes. Imports from Mexico had consistently much lower TI's than U.S. grapes had, in three years of tests. South African grapes, tested in 1996 only, also had a modestly lower TI than U.S. grapes did that year. (TI's for grapes from Chile, the leading source of imports, present a more complex picture; see discussion below.)

Tomatoes. Canadian tomatoes tested in 1997 had a TI half as large as that for U.S. tomatoes that year. (However, Mexican tomatoes had a much higher TI than either U.S. or Canadian samples did; see below.)

<u>Cases in which imported samples had higher TI values</u>:

Carrots. Canadian imports had consistently higher TI scores over the three years tested. In two of those years, the Canadian TI's were about twice as high as the US TI's. In 1994, the difference was very small. Carrots from Mexico, tested in 1995 only, had a TI substantially higher than Canadian and U.S. samples.

Tomatoes. Mexican tomatoes tested in 1996 had about twice the TI of U.S. tomatoes. In 1997, the gap widened to about three-fold.

Broccoli. Mexican samples, tested only in 1994, had a TI more than 20 times higher than U.S. samples (but the U.S. score was a very low 2).

Apple Juice: Imports from Hungary and Argentina in 1997 had TI's higher than the U.S. TI that year. Juice from Argentina also had a higher TI in 1996. Since all of these TI values are relatively low, the differences are not very meaningful.

Orange Juice. U.S. samples tested in 1997 had a very low TI of 2, while Brazilian samples had a 23; but, again, 23 is still a comparatively low score.

<u>Cases where the U.S. samples had higher scores in some years and imported samples had higher scores in other years</u>:

Fresh Spinach. U.S. samples had high scores of 554 in 1995, 495 in 1996 and 349 in 1997. Mexican samples had a moderately high TI of 103 in 1995, a very high 623 in 1996, and a 256 in 1997. Small sample size for the imports limits the precision of the Mexican TI's. If all three years' data are combined, the average U.S. TI is 460, and the Mexican average is 327.

Grapes. The comparison of U.S. grapes with imports from Chile is very interesting. In 1994, the TI for U.S. samples was almost 9 times that of Chilean grapes' TI, but by 1996 Chilean grapes had a significantly higher TI than domestic grapes. (This is most likely a valid long-term trend reflecting reduced pesticide use in U.S. grape production; see Section G, below.)

F. Differences Between Fresh and Processed Foods

The PDP data we examined include 16 fresh fruits and vegetables, and 8 processed fruits and vegetables (plus milk, wheat and soybeans).

The processed foods include apple juice, orange juice, and frozen or canned varieties of corn, sweet peas, green beans, winter squash, spinach, and peaches. Fresh samples of six of these foods were also tested, making comparisons between fresh and processed versions possible.

In general, processed foods have lower levels of pesticide residues than comparable fresh foods. Growers who have contracts with processors often don't need to ensure that their foods are cosmetically perfect, and this allows them to omit some pesticide treatments, including some late-season insecticide applications. Many processors, responding to consumer demand for foods with minimal pesticide residues, have contracts with growers that specifically limit pesticide applications. Processing itself also often involves washing, peeling and cooking the food, steps that all tend to reduce pesticide residues.

Two of the processed foods tested in the PDP years we examined do not have unprocessed varieties for comparison, but both (**corn**, and s**weet peas**) have quite low TI scores. (However, the score for peas increased by 250 percent from 1994 to 1995-96; see "Trends," below.) The other cases show some very interesting differences among the specific foods.

Peaches. The TI for canned peaches in 1997, was 5, an astonishing 1,000-fold lower than scores for fresh peaches grown in the U.S., and 100-fold lower than the TI's for imported peaches from Chile. This difference reflects different pest management needs and practices between peaches grown for canning and those grown for the fresh market. Orchardists who produce cling peaches for canning grow a different variety than those grown for the fresh market, one that has somewhat less severe pest problems. The fruit doesn't need to be cosmetically perfect, and many canners forbid the use of certain pesticides, including methyl parathion (which was not found in any of the 745 samples of canned peaches the PDP tested in 1997). The processing itself involves a vigorous wash that scours off the peaches' skin and removes most residues, and the long span of time between harvest and consumption allows further breakdown of any residues that remain.

Differences for other processed foods were less dramatic than that for peaches, but still noteworthy:

Apple Juice. TI scores for 1997 U.S. samples are more than 25-fold lower than those for U.S. fresh apples (in 1996, 50-fold lower). Imported apple juice from Argentina, Hungary, Germany and Mexico had TI scores ranging from about one-twentieth to about one-eighth that of fresh apples from New Zealand.

Orange Juice. The TI for U.S. orange juice, first tested in 1997, is an extremely low 2, roughly 25-fold lower than the TI for U.S. fresh oranges tested in 1996 and 70-fold lower than that of 1994 oranges. Orange juice from Brazil had a score half as high as that of U.S. fresh oranges (Brazilian fresh oranges were not tested).

Canned Spinach from the U.S., first tested in 1997, had a high TI of 204, but that is less than half of the average TI for fresh U.S. spinach tested in 1995 through 1997.

The remaining two cases are exceptions to the general rule that processed foods tend to have lower pesticide residues:

Frozen/Canned Green Beans grown in the U.S., tested in 1996 and 1997, had TI's of 222 and 529. Fresh U.S.-grown green beans scored 294 in 1994, and 222 in 1995. (Unfortunately, no fresh green beans were tested in 1996 or 1997.)

The scores for the processed beans are much higher than expected for a processed food, given the scores for the fresh commodity. **Table 5** shows that the high scores are explained primarily by residues of methyl parathion in the frozen/canned green beans. No methyl parathion was detected in any fresh green beans in 1994 or 1995. In 1996, this insecticide was found in 3.4 percent of the frozen/canned samples, and accounted for 49 percent of the TI score. In 1997, it was found in 4.6 percent of samples, the average residue level three was times as high as in 1996, and it contributed 82 percent of the score. These increases in residues are consistent with USDA's pesticide use data, which show increasing applications of methyl parathion on U.S. green bean acreage (See Section I, below, and **Table 8**.)

The increased score for methyl parathion accounts for all of the jump in scores between 1996 and 1997. Without methyl parathion, the TI's for frozen/canned green beans in 1996 and 1997 would have been 113 and 96, respectively. It appears, therefore, that expected lower scores for processed green beans were "cancelled out" by increasing use of a very toxic pesticide on this crop.

Winter Squash was tested in 1997 for the first time, and both frozen and fresh varieties were sampled. Both types had extremely high scores, and the score for frozen product was much higher—3,012, versus 1,706 for fresh winter squash. The insecticide dieldrin accounts for 86 to 90 percent of the total score in each case. Dieldrin, a chlorinated organic pesticide banned in the U.S. in the 1970s, is very persistent in soil, and is taken up through the roots by some crops—including winter squash varieties. Producers of some part of the U.S. winter squash crop seem to be farming lands with a history of dieldrin (or aldrin, which breaks down to dieldrin) applications. Frozen squash has a higher score because dieldrin was detected in 74 percent of the samples, versus in 37 percent of the fresh samples (mean residue levels were roughly comparable).

G. Trends

One very interesting question that the public might look to the PDP data to answer is whether the overall problem of pesticide residues in foods is getting better, or getting worse. Unfortunately, the PDP was not designed to answer that question. The foods tested change from year to year, and that makes it difficult to track trends, even for individual crops. If one adds up the TI values for all crops tested year to year, the total has declined slightly over the four years we examined. But the total is the sum of the TI's for different crops in different years, and TI values among crops vary widely. Any "trend" may therefore result more from the crops chosen for testing than from improvements in the overall pesticide residue picture.

No foods were tested in all four years that we examined. Seven foods were tested in three consecutive years (apples, carrots, grapes, oranges, peas and peaches, all tested 1994-96, and fresh spinach, tested 1995-97). If one compares the total TI for the six U.S.-grown crops tested from 1994 through 1996, there is an apparent downward trend, from 6,717 in 1994 to 6,326 in 1995 and 5,749 in 1996, a decrease of 14 percent over the three years. But that "trend" is almost entirely attributable to the change in TI scores for U.S. grapes, which dropped from 1,552 in 1994 to 329 in 1995 and 228 in 1996. If grapes are excluded, the total score for the other five U.S. crops *increased* by 7 percent over this three-year period.

It is more instructive to examine the specific crops on which there are three years of data:

Apples. There is no notable overall trend. Total TI values held relatively steady over the three-year test period, for both U.S. samples and imports. In both cases, a small cluster of individual pesticides is responsible for the bulk of the total TI in all three years (see **Table 5**).

Carrots. There was a slight downward trend (-17 percent) for U.S. samples, and a slight increase (15 percent) for Canadian samples, although the number of imported samples is too small to be sure that this apparent trend is real.

Grapes. There is a steep decline in the TI's for U.S.-grown grapes, from 1,552 in 1994 to 228 in 1996. We believe this reflects actual changes in pest-management practices among U.S. grape producers. In recent years grape growers have made great strides in adopting less chemical-intensive integrated pest management strategies. Comparing the TI factors for the individual pesticides found on grapes (**Table 5**), the percent positive and mean residue levels for the insecticides methyl parathion, azinphos-methyl and dimethoate all declined substantially in U.S. grapes from 1994 to 1996. These trends account for most of the decline in the TI scores, and they are consistent with trends in pesticide use data on the crop. We believe the PDP data do show a major reduction in the toxicity loading of U.S. grapes over recent years.

Individual components of the overall TI (**Table 5**) also explain the upward trend in TI values for Chilean grapes (from 181 in 1994 to 339 in 1996). Three insecticides (dimethoate, omethoate and chlorpyrifos) and the fungicide iprodione all increased substantially in frequency of detection in Chilean grapes over the three-year span. Overall, the pattern is consistent and suggests that the trend is real, at least for these three years.

Oranges. The TI's for U.S. samples declined from 138 in 1994 to 38 in 1995, then rose to 49 in 1996. The insecticide formetanate hydrochloride was detected in 10.6 percent of 663 samples tested for it in 1994, and its TI value was 107, or 77 percent of the total for the food. In 1995, the same chemical was found in only 3.5 percent of samples and the average residue was only one-fifth as high as the year before, and in 1996 no formetanate hydrochloride was detected in any of the 511 samples tested. This change in the residue pattern for one pesticide accounts for most of the decline in TI values for oranges. (A higher mean residue level for the fungicide imazalil accounts for the rise from 1995 to 1996.) While short-term trends in pest problems may account for the decline in use of formetanate hydrochloride, this pesticide is very toxic and ecologically disruptive, and orange growers have been working hard at finding safer alternatives to its use. The trend in residue data shown here is a hopeful sign that their efforts are succeeding.

Peaches. No real trend is apparent in the very high TI values for the U.S. peaches tested from 1994 through 1996. The scores rose from 4,390 in 1994 to 5,376 in 1995 and dropped back to 4,848 in 1996. One pesticide, the insecticide methyl parathion, accounts for more than 90 percent of the total TI for this food in all three years. While the frequency of detection was consistent from year to year, the average residue level rose in 1995 and then dropped somewhat in 1996, driving the changes in the overall TI score.

On the basis of USDA pesticide use data, it appears that applications of methyl parathion on U.S. peaches declined sharply between 1995 and 1997. But residue data from the Food and Drug Administration's (FDA) testing program show a five-fold rise in the mean methyl parathion residue on peaches from 1996 to 1997. This suggests, perhaps, that while fewer pounds were applied, applications were made closer to harvest, resulting in higher resides. The FDA tests far fewer samples than the PDP does. Given these complex and limited data, it is not possible to project a trend in methyl parathion residues in U.S. peaches beyond 1996. It would be valuable for the PDP to sample this crop again in the near future.

The TI values for imported peaches from Chile tested from 1994 to 1996 show a slight drop in 1995, then a big increase in 1996. TI values for the individual pesticides found on Chilean peaches show that the same two chemicals, iprodione and azinphos-methyl, account for over 70 percent of the total TI each year. The decline from 1994 to 1995 is attributable mainly to a drop in the average residue level for azinphos-methyl (which remained lower in 1996, although the percent of samples positive for this insecticide rose 50 percent over the three years.) The increase in 1996 is attributable primarily to a 34 percent increase in the average residue level for iprodione. Our conclusion: These year-to-year changes probably represent responses to differing pest problems in the three years, rather than an underlying trend.

Green Beans. Fresh green beans grown in the U.S. were tested in two years, 1994-95; frozen/canned green beans from the U.S. were tested in the next two years. While these two foods differ and their TI values are not strictly comparable, they are the same crop, and one very interesting trend in residue patterns emerges. No methyl parathion was detected in any samples of fresh green beans in 1994 or 1995. But this very toxic insecticide showed up in frozen/canned green beans in 1996, and both its frequency of detection and mean residues increased from 1996 to 1997. Methyl parathion residues alone account for the rise in the TI from 222 in 1996 to 529 in 1997. Since these changes correlate strongly with USDA pesticide applications data for methyl parathion on green beans, we believe this trend is real.

Peas. The TI value for frozen/canned peas was a very low 6 in 1994, but increased to 22 and 21 in the next two years. As in the case of green beans, the explanation is use of methyl parathion on this crop. No samples had methyl parathion residues in 1994, and it was detected in only 1 percent of the samples in 1995 and 1996. But this insecticide still accounts for half the total TI for peas in both of the latter years, small as those totals are. Here too, residue patterns match use data trends for methyl parathion on peas.

Spinach. U.S. fresh spinach tested in 1995 through 1997 had high but decreasing TI values, 554, 495 and 349. Imported samples from Mexico had a moderately high 103 in 1995, a very high 623 in 1996, and a 256 in 1997. Since sample size is very small for the Mexican imports (14, 21 and 12), we can't make anything of the year-to-year fluctuations there. But the trend in U.S. values is driven by declining scores for permethrin and dimethoate, two of the top four TI components in each of the three years. The frequency of detection for each has held fairly steady, but mean residue levels declined 39 percent for permethrin and 71 percent for dimethoate. U.S. spinach growers appear to be making progress toward reducing applications of at least some risk-driving insecticides on their crop.

Overall, then, we have a mixed bag: There are three cases where TI values are declining, most likely due to increased reliance on Integrated Pest Management by growers of the crops (grapes, oranges and spinach). There are three cases where residue patterns changed little over three years (apples, peaches and carrots). And there are two cases where Toxicity Indices have risen sharply because of increasing use of methyl parathion on the crop (peas and green beans). These few data points are interesting, but not sufficient to discern any overall trends in pesticide residues in the U.S. diet over the four-year period we examined.

H. Risk Drivers

Individual crops tested by the PDP contained as many as 37 different pesticide residues, and several crops consistently had more than 20 different pesticides detected on them. But in essentially every case, a small number of specific chemicals—from one to three or four—accounts for most of the TI score. We have coined the term “risk drivers” to describe any pesticide chemical that accounts for 10 percent or more of a food’s overall TI in any year. The higher the TI value for a food, the more important the role of its risk drivers in overall dietary exposure to pesticide residues.

As **Table 5** makes clear, the same pesticides tend to be risk drivers in more than one food, and year after year. For the 27 foods tested by the PDP in the four years we examined, roughly fifteen different pesticides show up repeatedly as major TI components of multiple foods. From the standpoint of policy, the fact that a few chemicals account for the most toxicity loading in many foods is important for setting priorities. Exposure and risk can be reduced substantially by focusing on comparatively few pesticide uses on a limited number of high-consumption foods.

In this section, we profile the risk-driving pesticides found in foods tested by the PDP in 1994 through 1997. They are discussed roughly in order of their overall contributions to toxicity loading on the tested foods.

Parathion-methyl. Also called methyl parathion, this highly toxic organophosphate insecticide is the leading factor in the TI’s for U.S. grown peaches (1994-96), U.S. apples (94-96), U.S. pears (97), U.S. grapes (94; second-ranked in 95), frozen/canned green beans (96-97) and frozen/canned sweet peas (95-96). It is also a notable factor in the TI for U.S. carrots (94) and U.S. wheat (96-97), and a minor factor in imported and U.S. tomatoes (96-97) and U.S. apple juice (97). Often, it accounts for more than half of the food’s TI, by itself; in peaches, methyl parathion alone contributes over 90 percent of the TI’s each year. Methyl parathion was rarely detected on imported produce sampled by the PDP.

In our scoring system, methyl parathion has the highest Chronic Toxicity Index of any pesticide detected by the PDP (see **Table 3**). It has the lowest EPA RfD (0.00002 mg/kg/day) among the organophosphate insecticides, and the second lowest RfD overall (only heptachlor epoxide’s RfD of 0.00001 is smaller). The very low RfD for methyl parathion is based on animal studies showing adverse effects on the developing nervous system at very low doses. Methyl parathion is also among the most potent organo-phosphates in terms of its acute toxicity.

In 1998, the EPA reviewed the RfD's for all members of the organo-phosphate and carbamate families of insecticides, as required by the Food Quality Protection Act (FQPA). The FQPA says that EPA must make sure that pesticide limits protect children's health, and requires that the agency add an extra 10-fold safety factor to limits for all pesticides, unless there is a sound scientific basis for using a different safety factor. Last August, the EPA issued a preliminary decision in which it applied an additional 10-fold safety factor to the RfD's for 11 insecticides. Methyl parathion is among the 11; so is chlorpyrifos, another of the top risk-drivers in the foods tested by the PDP. For another 10 insecticides, EPA applied an additional 3-fold safety factor. That group includes methamidophos, another risk-driver that we profile below. For another 27 insecticides, EPA has not decided to apply any additional safety factor yet, though that decision may not be final.

Methyl parathion is not a suspected carcinogen, but it is listed as an endocrine disrupter by Colborn et al. (1996). In our scoring scheme, that fact increases its Chronic Toxicity Index threefold. Five of the top 12 risk-drivers in our analysis are suspected endocrine disrupters.

Dieldrin. All food uses of this chlorinated organic insecticide were banned by the EPA in the 1970s, but it persists in soils in some locations. Some crops, notably winter squash, absorb dieldrin into the edible parts of the plant via the roots. Dieldrin accounts for 86 percent of the very high TI for fresh winter squash grown in the U.S., and 90 percent of the even higher TI for U.S. frozen winter squash, both tested only in 1997. (Winter squash from Mexico tested the same year had minimal dieldrin residues.) Dieldrin was the largest TI component for U.S. potatoes in 1994, and made smaller contributions to TI scores for U.S. carrots (94), U.S. spinach (95-97), sweet potatoes (96), tomatoes (97) and soybeans (97).

Dieldrin has a very high CTI in our scoring system (it ranks third, behind methyl parathion and heptachlor epoxide), because it has a very low chronic RfD (0.00005 mg/kg/day), and it is a potent carcinogen. In fact, the carcinogenicity component accounts for 80 percent of its Chronic Toxicity Index. It has not been listed as a suspected endocrine disrupter.

Iprodione, the only fungicide among the top risk-drivers, is a leading contributor to the TI's for Chilean grapes (94-96), a major factor in TI's for Chilean and U.S. peaches (94-96), and a somewhat lesser factor in the scores for U.S. grapes (95-96) and South African pears (97). It is also detected, at far lower levels, on green beans (U.S. and Mexican, 94-95) and U.S. carrots (95-96). Iprodione consistently ranks second to parathion-methyl in the TI for U.S. peaches. The TI contributions for iprodione on peaches range from 150 to 229—larger than the TI's for all residues in many foods.

Iprodione is quite low in acute and chronic toxicity, but it is classed by EPA as a "probable human carcinogen," which accounts for most of its Chronic Toxicity Index in our scoring system. In 1996, iprodione residues were found on two-thirds of Chilean grapes, 20 percent of U.S. grapes, and about 80 percent of peaches from both countries. Widespread use on these crops and fairly high average residues (0.8-0.9 ppm, on peaches) explain this chemical's large contribution to toxicity loading.

Azinphos-methyl. This organophosphate insecticide is the top risk driver on pears from the U.S., South Africa, Chile and Argentina (1997) and is among the top risk drivers for U.S.-grown and New Zealand apples (1994-96) and for apple juice (domestic and imported, 96). It is one of the biggest factors in the TI's for Chilean peaches in all three years, and a much smaller factor in the TI's for U.S. peaches. It was a risk-driver for U.S. grapes in 94, but not in later years. It is also used on green beans, spinach and tomatoes, but accounts for a much smaller part of the overall TI in those cases.

Azinphos-methyl, also called Guthion, is almost as acutely toxic as methyl parathion, but is only 1/75 as toxic on a chronic basis, comparing the current EPA RFD's for the two insecticides. It is neither a carcinogen nor an endocrine disrupter, based on current knowledge.

Heptachlor Epoxide is a breakdown product of a chlorinated hydrocarbon insecticide, heptachlor. As with dieldrin, DDT and other members of this chemical family, heptachlor use on food crops was banned in the U.S. during the 1970s. But residues of these very long-lived pesticides remain in soils, and some crops absorb them through their roots. Among the foods the PDP tested, only winter squash (fresh and frozen), tested in 1997, contained heptachlor epoxide residues, but the TI values (362 for the frozen, 142 for the fresh squash) are as high as or higher than TI's for all residues combined in many other foods.

Heptachlor expoxide has the lowest chronic RfD of any pesticide detected by the PDP in these four years, 0.00001 mg/kg/day. It is also a potent carcinogen, but not known to be an endocrine disrupter. These toxic attributes combine to give it the second highest CTI in our system, close behind methyl parathion (see **Table 3**).

Methomyl, a carbamate insecticide, is one of the top three TI factors for U.S. grapes (94-96), and the top TI factor for Mexican grapes in 1996. It is an important factor in the TI's for U.S. lettuce (1994), Mexican spinach (95-97), and U.S. spinach (95-97), and a less important factor in the scores for U.S. and Mexican green beans (94). It is also detected on peaches from Chile and the U.S. and on U.S. apples, but contributes only in a very minor way to the TI's for those foods.

Methomyl's RfD is 400 times larger than that for methyl parathion (i.e., it is 1/400 as toxic), but it is listed as an endocrine disrupter by Colborn et al., which boosts its Chronic Toxicity Index in our scoring scheme. In acute toxicity, it is on a par with methyl parathion and azinphos-methyl.

Permethrin. This synthetic pyrethroid insecticide is the predominant factor in the TI's for both Mexican and U.S. spinach in 95-97. It is a smaller factor in scores for celery and lettuce, tested only in 94.

Permethrin is quite low in acute toxicity and is only 1/2,500 as toxic as methyl parathion, in terms of chronic RfD; it's the least-toxic pesticide among the prominent risk drivers. But EPA classes permethrin as a possible human carcinogen, which accounts for most of its Chronic Toxicity Index in our scoring scheme. It dominates the TI for spinach because it was detected on 40 to 60 percent of the Mexican and U.S. samples, respectively, and was found at relatively high concentrations (averages of from 1.5 to 2.4 ppm in three years of U.S. samples).

Dimethoate, another organophosphate insecticide, is a top TI factor for Chilean grapes (94-96), Mexican and U.S. green beans (94), U.S. spinach (96-97), Mexican spinach (96), U.S. lettuce (94), U.S. sweet peas (94-96), U.S. and Argentine apple juice (96-97), and German and Hungarian apple juice (97).

Dimethoate, and its breakdown product omethoate (see next profile), are among the more toxic organophosphates, with RfD's only 25 and 15 times greater, respectively, than that for methyl parathion. Neither one is classed as a carcinogen or an endocrine disrupter, based on current data.

Omethoate. This organophosphate is sometimes used on its own as an insecticide, but is also a breakdown product of dimethoate, and use of the latter often explains its presence. It tends to be found on the same foods as dimethoate. It is the leading TI factor for both Chilean (94-96) and Mexican grapes (94-95), and is one of the top three TI factors for U.S. spinach (95-97) and U.S. processed peas (94-96). It is a major factor in the TI for apple juice from Argentina (97) and is also detected on apples, tomatoes, green beans and lettuce, but is a smaller factor in the total TI's for those foods. Its toxicity profile was discussed above.

Chlorpyrifos, another organophosphate insecticide, is a risk driver for imported (New Zealand) apples (94-96), and a smaller component of the TI for U.S. apples in those years. It is also detected in apple juice, and is a top factor in the score for imported (Argentine) juice in 1996. It is the top factor in the TI's for Mexican tomatoes (96-97) and U.S. soybeans (97). It is also an important component of scores for Chilean grapes (94-96) and U.S. wheat (95-96), and a minor factor in the scores for Chilean and U.S. peaches (94-96), Chilean pears (97) and U.S. sweet potatoes (97). It was found on from 2 to 8 percent of fresh spinach samples in 1995-97 (with the lowest rate in 97). It makes only a small contribution to the TI's for spinach, but its use on spinach is not legally permitted.

Chlorpyrifos is one of the more toxic organophosphates, with an RfD (including the FQPA-mandated extra 10-fold safety factor) only 15 times as large as that for methyl parathion. It is neither a carcinogen nor currently listed as an endocrine disrupter. Its high Chronic Toxicity Index reflects its potent neurotoxicity.

Dicofol, a chlorinated organic insecticide, is the leading risk driver on pears from Chile (97) and a major contributor to the TI's of U.S. grapes (94-96), U.S. apples (94, 96), Chilean peaches (95-96), and U.S. tomatoes (96).

On a chronic basis dicofol is moderately toxic, 1/60 as toxic as methyl parathion. It is also a suspected endocrine disrupter, which boosts its CTI. On crops where the PDP detected it, dicofol was present fairly infrequently (3 to 11 percent of samples), but at relatively high residue levels (0.3 to 0.5 ppm) on samples where it is present.

Carbaryl, a carbamate insecticide, is a leading factor in the TI for apples from New Zealand (94-96) and for both U.S. and imported apple juice (96-97). Carbaryl also contributes TI components of 29-41 points to the total for U.S. peaches in 1994-96; this factor is overwhelmed by methyl parathion on peaches, but it is larger than the total TI for several other entire foods. Carbaryl also accounts for about 85 percent of the very low TI for canned peaches. It is used on many other crops as well, and makes a smaller contribution to the TI's for grapes (U.S. and Chile), green beans (U.S. and Mexico), pears from Argentina, oranges, sweet peas and sweet potatoes (all from the U.S.).

Carbaryl is comparatively low in chronic toxicity (1/700 as toxic as methyl parathion), but it is listed as a suspected endocrine disrupter.

Endosulfan is a chlorinated hydrocarbon insecticide. It is a top risk driver for U.S. and Mexican green beans in 94-95, and Mexican spinach (95-97), and a lesser factor in TI's for U.S. spinach in (95-97), and Mexican and U.S. tomatoes (96-97). It is the largest factor in small scores for imported winter squash from Mexico and Honduras in 1997.

Endosulfan is comparatively low in chronic toxicity, with an RfD 300 times greater than methyl parathion's. It is listed as an endocrine disrupter.

Acephate, another organophosphate insecticide, is a risk driver for U.S. celery (94), U.S. fresh green beans (94-95), and U.S. processed green beans (96-97). On green beans, it is the largest single component of the TI in 94 and 95. It is used on many other crops but typically contributes only minimally to overall TI's.

Acephate is relatively toxic among the organophosphates, about 1/60 as toxic as methyl parathion. It is neither a carcinogen nor an endocrine disrupter.

Methamidophos, another organophosphate, is used on its own as an insecticide; it is also a breakdown product of acephate, and residues of the two pesticides tend to occur on the same crops. It is the leading TI factor for U.S. tomatoes (96-97) and the second-ranked factor for Mexican tomatoes

(96-97). Methamidophos is one of the top TI factors for U.S. fresh green beans (94-95), Mexican fresh green beans in 1995, and U.S. processed green beans (96-97). Its toxicity profile is very similar to acephate's.

I. Pesticide Use Data

The National Agricultural Statistical Service (NASS), part of the U.S. Department of Agriculture, publishes surveys of pesticide applications on major U.S. crops. Data for fruits and vegetables are compiled in alternating years. We obtained NASS pesticide use data for fruits for 1993, 1995 and 1997, and for vegetables for 1994 and 1996, and added them to our database.

Crop-to-crop differences and trends in pesticide applications can help confirm inferences drawn from the PDP residue data. Use data for some risk-driving insecticides on key crops are shown in **Table 8**. While residue data are a better index of the potential for dietary exposure, and therefore of relative risk to consumers, the use data show some interesting patterns.

For example, azinphos-methyl, carbaryl and chlorpyrifos applications on apples held fairly steady from 1993 through 1997, but dimethoate use on apples decreased by 75 percent and methyl parathion applications more than doubled in the same period. This suggests that methyl parathion is replacing some uses of dimethoate on apples, and is consistent with the dominant role methyl parathion plays in the TI's for apples from 1994 through 1996. Over the same three years, the TI's for dimethoate on apples declined from 15 to 2.5, and the percent of samples with residues of this insecticide shrank from 12 percent to 3 percent—almost perfectly in synch with use data.

Methyl parathion use has also increased steeply on pears and green beans, and decreased on peaches. The effects of this use trend showed up in the TI's for processed green beans, and methyl parathion is the top-ranked factor in the TI for U.S. pears in the one year they were tested. Insufficient recent data are available to assess whether the contribution of this chemical to the extremely high TI's for U.S. peaches may be shrinking.

The use on potatoes of two very toxic insecticides, methamidophos and aldicarb, increased dramatically from 1995 to 1997. The PDP carried out a special test of potatoes in 1997, testing only for aldicarb. They tested 342 samples, and found one or more aldicarb breakdown products in 20 samples, a detection frequency of 6 percent. (No aldicarb was detected in U.S. potatoes tested in 1994 and 1995.) They also tested individual servings (i.e., single potatoes) and found that residues in individual samples varied from 0.1 to 7 times the mean level for composite samples. This variability means some children eating a potato have a risk of getting a very high dose of aldicarb, which has implications in terms of potential acute toxicity. This situation clearly requires ongoing surveillance.

Progress toward less reliance on high-risk insecticides is evident in the decreasing use of azinphos-methyl on grapes, peaches and pears; the declining use of dimethoate on apples, grapes, green beans and peas; and decreases in methamidophos and chlorpyrifos use on tomatoes.

Comparable data are not available for pesticide applications in other countries, but the NASS data provide some additional insights into changing pest-management practices in the U.S., and can help explain some of the residue patterns that show up in the PDP data.

RECOMMENDATIONS

A. Advice to Consumers

It is sensible for consumers to try to minimize their own and their children's exposure to pesticide residues in foods. One way to do that is to choose foods that have relatively low toxicity loading on our Toxicity Index. In particular, consumers can:

- Choose foods frequently that have low TI values, such as milk, bananas, broccoli, orange juice, apple juice, and frozen or canned peas and corn;

- Choose foods with the highest TI values, such as peaches, winter squash, apples, pears, grapes, frozen/canned green beans, and fresh spinach, less often. Eating these foods occasionally is unlikely to do much harm, but eating multiple servings in a short time probably should be avoided.

- Look for organically grown apples, peaches, pears, grapes, winter squash, spinach and green beans. In tests published in January 1998, Consumers Union confirmed that organically grown foods have substantially lower pesticide toxicity loading than their conventionally grown counterparts.

- Ask your grocer or supermarket produce buyer to seek out suppliers of fruits and vegetables produced without using high-risk pesticides. Many grower organizations have pledged to reduce their use of chemicals like methyl parathion, and some have set up certification programs to "green-label" their produce. Clearly expressed consumer demand can help these forward-looking producers gain a foothold in the market.

- Before feeding peaches, pears and apples to children, remove the peel. Many pesticide residues are on the outside of a fruit. Removing the peel can dramatically lower pesticide exposure associated with these foods.

- For foods where PDP data show significant differences between U.S.-grown samples and imports, choose from a source with a lower Toxicity Index. For example, Chilean peaches over U.S. peaches, Mexican winter squash (fresh or frozen) and green beans over U.S.- grown varieties, New Zealand apples over U.S. apples, U.S. tomatoes over Mexican tomatoes, U.S. grapes over Chilean grapes, and U.S. orange juice over Brazilian orange juice.

- Choose processed foods more often, especially those for which Toxicity Indices are substantially lower than for fresh varieties of the same foods, such as canned peaches.

Consumers can also reduce pesticide contamination on any fruits and vegetables they buy by washing the foods. A gentle washing with detergent (such as any dishwashing liquid) will remove a sizeable fraction of surface residues.

It's important that parents ***not*** reduce their children's consumption of fruits and vegetables, out of fear of pesticide risks. The benefits of eating these healthful foods outweigh the risks. However, parents armed with facts about documented differences in pesticide contamination of different foods can provide those health benefits and minimize pesticide exposure through sensible food choices.

B. Policy Recommendations

In its efforts to implement the Food Quality Protection Act (FQPA), the EPA needs to set priorities, and address the pesticide uses that pose the largest risks first.

The information we have assembled here can help set priorities. We suggest beginning with foods that have Toxicity Indices greater than 100, and focusing on individual pesticides found on those foods whose residues account for 10 percent or more of the overall TI's. **Table 5** shows about a dozen crops, and about 20 pesticides used one or more of those crops, that meet these criteria.

We believe the EPA should, with very little further ado, determine that use of methyl parathion on foods like apples, grapes, peaches, pears and green beans cannot survive the children's health protection requirements of the FQPA. EPA must promptly address the dominant role this insecticide plays in the toxicity loading of several foods consumed in large quantities by children. Taking action on methyl parathion alone can dramatically reduce the TI's for several of the foods with the highest toxicity loadings in this analysis.

But EPA should not stop with methyl parathion. The most prominent risk drivers in **Table 5** involve only about 20 chemicals in all, and for many of the chemicals, only selected uses are risk drivers. Many essential uses of even some very toxic pesticides probably can be preserved; selective bans of high-risk uses, not outright bans of chemicals, can very likely reduce overall toxicity loading to acceptably safe levels. In some cases, tighter regulation of how a pesticide is used—reducing the permissible application rates, or requiring longer intervals between application and harvest, to give residues more time to break down—can undoubtedly bring risks within acceptable limits, without requiring growers to do completely without certain valuable pest-control chemicals.

The Food and Drug Administration, EPA and USDA need to address the problems that can result from dieldrin residues in soils. Residues of this pesticide—banned a quarter-century ago—gave U.S. winter squash Toxicity Indices far greater than those of many other foods with residues of currently legal, high-risk organophosphates. It seems clear that the "action levels" in effect for such persistent environmental contaminants need re-examination; many would not pass the child-health protection test of the FQPA.

Producers of crops which, like winter squash, have a propensity for taking up residues like dieldrin and heptachlor epoxide from the soil, should plant only on lands that are known to be free of these pollutants.

As far as the PDP is concerned, we believe USDA should expand its surveillance of foods children eat a lot of, to provide data that can measure progress as the FQPA is implemented. As it is now structured, the PDP rotates among different foods. While breadth of coverage is valuable, it is also essential to revisit certain foods that play a large role in overall dietary pesticide exposure often, to track trends in residue patterns. We think apples, peaches, pears, grapes, potatoes, spinach, green beans and winter squash all should probably be tested at least every other year.

Whenever pesticide-use data indicate a steep increase in applications of a risk-driving pesticide (as, for example, recent increases in aldicarb use on Western potatoes, or methyl parathion use on green beans), such trends in use data should trigger expanded testing of that crop by the PDP.

In tests Consumers Union did in 1997 for a report published in January 1998, we found that green peppers had frequent, high residues of acephate and methamidophos. We think green peppers should be tested by the PDP, too. Perhaps another six to 10 crops that each are significant in (i.e., make up more than 1 percent of) the diets of young children, have not yet been tested by the PDP, and should be among those tested soon.

We would like to see the PDP include more samples of organically-grown and “green labeled” foods in its annual test surveys. These food categories are becoming increasingly important in the U.S. marketplace, driven in part by consumer demand for foods produced with less pesticide use. In 1997, the PDP made an initial effort to include identified samples of such categories for several tested foods. We hope the program can expand its testing of these market sectors, to provide objective data on whether and how these alternatives can help reduce dietary pesticide exposure.

Our comparisons between U.S. and imported samples of various foods were sometimes stymied by the PDP’s inclusion of too few samples of foods from certain importing countries. USDA should carry out an analysis of the number of samples needed to provide statistically meaningful residue data, and should ensure that the PDP tests sufficient numbers of samples from key importing countries for foods it examines each year.

REFERENCES

Benbrook, Charles M., et al. (1996) ***Pest Management at the Crossroads***. Yonkers, NY: Consumers Union of U.S., Inc,

Colborn, Theo, Diane Dumanoski and John Peterson Myers (1996) ***Our Stolen Future***. New York: Dutton.

Colborn, Theo, Frederick S. vom Saal and Ana M. Soto (1993) Developmental Effects of Endocrine-Disrupting Chemicals in Wildlife and Humans, *Environmental Health Perspectives*, Vol. 101:5, pp.378-384.

Consumers Union (1998) Greener Greens? The Truth About Organic Food. *Consumer Reports*, January 1998, pp. 12-18.

Environmental Working Group (1998) ***Overexposed: Organophosphate Insecticides in Children's Foods***. Washington, DC: EWG.

Kenney, Jeannine M., Charles M. Benbrook, and Edward Groth III (1998) ***Worst First: High Risk Insecticide Uses, Children's Foods, and Safer Alternatives***. Washington, D.C.: Consumers Union of U.S., Inc.

National Research Council (1993) ***Pesticides in the Diets of Infants and Children***. Washington, DC: National Academy Press.

FOR MORE INFORMATION

USDA PDP reports and databases: http://www.ams.usda.gov/science/pdp/

For the EPA's toxicity data on pesticides, contact The Office of Pesticide Programs, OPPTS/OPP/HED, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460 (Attn: Mr. Rick Whiting):

For Consumers Union's papers and analyses related to pesticide policy and the Food Quality Protection Act: http://www.ecologic-ipm.com.

For an interactive database on pesticides encountered in foods you eat or feed to your children: http://www.foodnews.org.

Table 1. Foods Tested by the USDA Pesticide Data Program, 1994-1997					
Food*	**Country of Origin**	**Number of Samples**			
		1994	**1995**	**1996**	**1997**
Apple Juice	Argentina			11	59
	Germany				18
	Hungary				25
	Mexico				12
	U.S.			162	515
Apples	New Zealand	13	13	15	
	U.S.	656	659	502	
Bananas	All Imports	636	486		
Broccoli	Mexico	14			
	U.S.	659			
Carrots	Canada	23	35	10	
	Mexico		19		
	U.S.	655	646	481	
Celery	U.S.	172			
Grapes	Chile	255	256	279	
	Mexico	32	46	24	
	South Africa			10	
	U.S.	377	379	211	
Green Beans, Fresh	Mexico	83	80		
	U.S.	484	483		
Green Beans, Frozen/ Canned	U.S.			525	691
Lettuce	U.S.	688			
Milk	U.S.			570	727
Orange Juice	Brazil				66
	U.S.				487
Oranges	Australia		14		
	U.S.	676	680	511	
Peaches, Fresh	Chile	123	115	126	
	U.S.	271	249	198	
Peaches, Canned	U.S.				745

Food*	Country of Origin	Number of Samples			
		1994	1995	1996	1997
Pears	Argentina				34
	Chile				66
	South Africa				13
	U.S.				588
Potatoes	U.S.	688	702		
Soybeans	U.S.				159
Spinach, Fresh	Mexico		14	21	12
	U.S.		593	491	497
Spinach, Canned	U.S.				168
Sweet Corn, Canned/Frozen	U.S.	364	651		
Sweet Peas, Canned/Frozen	U.S.	346	660	346	
Sweet Potatoes	U.S.			507	691
Tomatoes	Canada				21
	Mexico			31	192
	U.S.			134	497
Wheat	U.S.		600	340	623
Winter Squash, Fresh	Honduras				10
	Mexico				161
	U.S.				258
Winter Squash, Frozen	Mexico				20
	U.S.				199

* Food-country combinations with 9 or fewer samples are not included in this table.

Table 2. Acute Toxicity of Pesticides Detected by the USDA Pesticide Data Program, 1994-1997

Pesticide	LD_{50} (mg/kg)	$1/LD_{50}$	Acute Toxicity Index ($100 \times 1/LD_{50}$)
2,4-D	375.00	0.0027	0.27
4-hydroxydiphenylamine (DPA)	300.00	0.0033	0.33
acephate	945.00	0.0011	0.11
aldicarb	0.93	1.0753	107.5
aldicarb sulfoxide	0.93	1.0753	107.5
aldoxycarb	27.00	0.0370	3.70
atrazine	2,000.00	0.0005	0.05
azinphos-methyl	16.00	0.0625	6.25
benomyl	5,000.00	0.0002	0.02
bifenthrin	55.00	0.0182	1.82
captan	5,000.00	0.0002	0.02
carbaryl	300.00	0.0033	0.33
carbofuran	8.00	0.1250	12.50
carbofuran-3 OH	8.00	0.1250	12.50
chlordane	460.00	0.0022	0.22
chlorothalonil	5,000.00	0.0002	0.02
chlorpropham	3,800.00	0.0003	0.026
chlorpyrifos	135.00	0.0074	0.74
chlorpyrifos-methyl	3,000.00	0.0003	0.03
cypermethrin	86.00	0.0116	1.16
DCPA	5,000.00	0.0002	0.02
DDD (TDE)	113.00	0.0088	0.88
DDE	113.00	0.0088	0.88
DDT	113.00	0.0088	0.88
demeton-S-sulfone	30.00	0.0333	3.33
diazinon	300.00	0.0033	0.33
dichlorvos (DDVP)	56.00	0.0179	1.79
diclofop methyl	565.00	0.0018	0.18
dicloran	4,000.00	0.0003	0.03
dicofol PP	690.00	0.0014	0.14
dieldrin	37.00	0.0270	2.70
dimethoate	150.00	0.0067	0.67
diphenylamine (DPA)	300.00	0.0033	0.33
disulfoton sulfone	2.60	0.3846	38.46
endosulfan I	80.00	0.0125	1.25
endosulfan II	80.00	0.0125	1.25
endosulfan sulfate	80.00	0.0125	1.25
esfenvalerate	67.00	0.0149	1.49
ethion	208.00	0.0048	0.48
fenamiphos	15.00	0.0667	6.67
fenamiphos sulfoxide	15.00	0.0667	6.67
fenbutatin oxide	2,630.00	0.0004	0.04
fenpropathrin	66.00	0.0152	1.52
fenvalerate	450.00	0.0022	0.22

Pesticide	LD_{50} (mg/kg)	$1/LD_{50}$	Acute Toxicity Index ($100 \times 1/LD_{50}$)
formetanate HCL	21.00	0.0476	4.76
heptachlor epoxide	NA*	NA*	NA*
hexachlorobenzene	5,000.00	0.0002	0.02
imazalil	320.00	0.0031	0.31
iprodione	3,500.00	0.0003	0.03
lamba-cyhalothrin	56.00	0.0179	1.79
lindane	88.00	0.0114	1.14
linuron	4,000.00	0.0003	0.03
malathion	2,100.00	0.0005	0.05
metalaxyl	670.00	0.0015	0.15
methamidophos	30.00	0.0333	3.33
methidathion	25.00	0.0400	4.00
methomyl	17.00	0.0588	5.88
methoxychlor	5,000.00	0.0002	0.02
methoxychlor PP	5,000.00	0.0002	0.02
mevinphos	4.00	0.2500	25.00
myclobutanil	1,600.00	0.0006	0.06
o-phenylphenol	2,700.00	0.0004	.04
omethoate	50.00	0.0200	2.00
oxamyl	6.00	0.1667	16.67
parathion-ethyl	14.00	0.0714	7.14
parathion-methyl	14.00	0.0714	7.14
pentachloroaniline (PCA)	2,420.00	0.0004	0.04
permethrin	500.00	0.0020	0.20
phorate sulfone	2.00	0.5000	50.00
phosalone	120.00	0.0083	0.83
phosmet	230.00	0.0043	0.43
phosphamidon	7.00	0.1429	14.29
piperonyl butoxide	5,000.00	0.0002	0.02
propargite	2,200.00	0.0005	0.05
quintozene (PCNB)	1,700.00	0.0006	0.06
simazine	5,000.00	0.0002	0.02
tecnazine	5,000.00	0.0002	0.02
thiabendazole	3,330.00	0.0003	0.03
triadimefon	602.00	0.0017	0.17
trifluralin	5,000.00	0.0002	0.02
vinclozolin	5,000.00	0.0002	0.02

Table 3. Chronic Toxicity of Pesticides Detected by the USDA Pesticide Data Program, 1994-1997											
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
	Reference Dose Component					Carcinogenicity Component					
Pesticide	EPA Reference Dose (RfD) (mg/kg/day)	1/RfD	Scaled Inverse RfD (0.1 x Col. B)	Endocrine Disruptor Component	(C) x (D)	EPA Class-ification	EPA Class Value	EPA Cancer Potency Factor (Q*)	Carcino-genicity Component (G x H)	Scaled Carcino-genicity Component (50 x I)	Chronic Toxicity Index (E + J)
2,4-D	0.01	100	10	3	30						30
4-hydroxydiphenylamine (DPA)	0.025	40	4	1	4						4
acephate	0.0012	833	83	1	83						83
aldicarb	0.001	1,000	100	3	300						300
aldicarb sulfoxide	0.001	1,000	100	3	300						300
aldoxycarb	0.001	1,000	100	1	100						100
atrazine	0.035	29	2.9	3	9	C	5	0.222	1.11	55.5	64
azinphos-methyl	0.0015	667	67	1	67						67
benomyl	0.05	20	2	3	6	C	5	0.0042	0.021	1.1	7
bifenthrin	0.015	67	7	1	7						7
captan	0.13	8	0.8	1	1	B2	10	0.00121	0.0121	0.6	1
carbaryl	0.014	71	7	3	21	C	5	0.0227	0.1135	6	27
carbofuran	0.005	200	20	1	20						20
carbofuran-3 OH	0.005	200	20	1	20						20
chlordane	0.00006	16,667	1,667	1	1,667	B2	10	1.3	13	650	2,317
chlorothalonil	0.02	50	5	1	5	B2	10	0.0077	0.077	3.9	9
chlorpropham	0.05	20	2	1	2						2
chlorpyrifos	0.0003	3,333	333	1	333						333
chlorpyrifos-methyl	0.01	100	10	1	10						10
cypermethrin	0.01	100	10	3	30						30
DCPA	0.01	100	10	1	10	C	5	0.00149	0.00745	0.4	10
DDD (TDE)	0.0005	2,000	200	1	200	B2	10	0.34	3.4	170	370
DDE	0.0005	2,000	200	1	200	B2	10	0.34	3.4	170	370
DDT	0.0005	2,000	200	1	200	B2	10	0.34	3.4	170	370
demeton-S-sulfone	0.00004	25,000	2,500	1	2,500						2,500
diazinon	0.0007	1,429	143	1	143						143
dichlorvos (DDVP)	0.00017	5,882	588	1	588	C	5	0.122	0.61	30.5	619
diclofop methyl	0.002	500	50	1	50						108
dicloran	0.025	40	4	1	4						4
dicofol PP	0.0012	833	83	3	250						250
dieldrin	0.00005	20,000	2,000	1	2,000	B2	10	16	160	8,000	10,000
dimethoate	0.0005	2,000	200	1	200						200
diphenylamine (DPA)	0.025	40	4	1	4						4
disulfoton sulfone	0.0003	3,333	333	1	333						333
endosulfan I	0.006	167	17	3	50						50
endosulfan II	0.006	167	17	3	50						50

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
	Reference Dose Component					Carcinogenicity Component					
Pesticide	EPA Reference Dose (RfD) (mg/kg/day)	1/RfD	Scaled Inverse RfD (0.1 x Col. B)	Endocrine Disruptor Component	(C) x (D)	EPA Class-ification	EPA Class Value	EPA Cancer Potency Factor (Q*)	Carcino-genicity Component (G x H)	Scaled Carcino-genicity Component (50 x I)	Chronic Toxicity Index (E + J)
endosulfan sulfate	0.006	167	17	3	50						50
esfenvalerate	0.02	50	5	1	5						5
ethion	0.0005	2,000	200	1	200						200
fenamiphos	0.0001	10,000	1,000	1	1,000						1,000
fenamiphos sulfoxide	0.0001	10,000	1,000	1	1,000						1,000
fenbutatin oxide	0.05	20	2	1	2						2
fenpropathrin	0.025	40	4	1	4						4
fenvalerate	0.025	40	4	1	4						4
formetanate HCL	0.002	500	50	1	50						50
heptachlor epoxide	0.00001	100,000	10,000	1	10,000	B2	10	9.1	91	4,550	14,550
hexachlorobenzene	0.0008	1,250	125	1	125	B2	10	1.6	16	800	925
imazalil	0.025	40	4	1	4	C	5	0.062	0.31	15.5	20
iprodione	0.06	17	1.7	1	2	B2	10	0.0439	0.439	21.95	24
lamba-cyhalothrin	0.001	1,000	100	1	100						100
lindane	0.0047	213	21	3	64						64
linuron	0.008	125	13	1	13						13
malathion	0.04	25	3	1	3						3
metalaxyl	0.074	14	1.4	1	1						1
methamidophos	0.001	1,000	100	1	100						100
methidathion	0.0015	667	67	1	67						67
methomyl	0.008	125	13	3	38						38
methoxychlor	0.005	200	20	3	60						60
methoxychlor PP	0.005	200	20	3	60						60
mevinphos	0.00025	4,000	400	1	400						400
myclobutanil	0.025	40	4	1	4						4
o-phenylphenol	0.02	50	5	1	5						5
omethoate	0.0003	3,333	333	1	333						333
oxamyl	0.0002	5,000	500	1	500						500
parathion-ethyl	0.00033	3,030	303	3	909						909
parathion-methyl	0.00002	50,000	5,000	3	15,000						15,000
pentachloroaniline	0.16	6	0.6	1	1						1
permethrin	0.05	20	2	3	6	C	5	0.0184	0.092	4.6	11
phorate sulfone	0.0005	2,000	200	1	200						200
phosalone	0.0025	400	40	1	40						40
phosmet	0.003	333	33	1	33						33
phosphamidon	0.0002	5,000	500	1	500						500
piperonyl butoxide	0.0175	57	6	1	6						6

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
	Reference Dose Component					Carcinogenicity Component					
Pesticide	EPA Reference Dose (RfD) (mg/kg/day)	1/RfD	Scaled Inverse RfD (0.1 x Col. B)	Endocrine Disruptor Component	(C) x (D)	EPA Class-ification	EPA Class Value	EPA Cancer Potency Factor (Q*)	Carcino-genicity Component (G x H)	Scaled Carcino-genicity Component (50 x I)	Chronic Toxicity Index (E + J)
propargite	0.04	25	3	1	3	B2	10	0.0171	0.171	8.6	11
quintozene (PCNB)	0.003	333	33	1	33						33
simazine	0.005	200	20	1	20	C	5	0.12	0.6	30	50
tecnazine	0.01	100	10	1	10						10
thiabendazole	0.1	10	1	1	1						1
THPI (tetrahydro- phthalimide)	N.A.*	N.A.*	N.A.*	N.A.*	N.A.*	N.A.*	N.A.*	N.A.*	N.A.*	N.A.*	N.A.*
triadimefon	0.04	25	3	1	3						3
trifluralin	0.024	42	4	3	13	C	5	0.0077	0.0385	1.9	14
vinclozolin	0.012	83	8	3	25						25

N.A. = Toxicity data not available on this post-harvest fungicide.

Table 4. Toxicity Indices for Foods Tested in the USDA Pesticide Data Program, 1994-1997

		Toxicity Index Value			
Food*	**Country of Origin**	**1994**	**1995**	**1996**	**1997**
Apple Juice	Argentina			18	32
	Germany				13
	Hungary				30
	Mexico				12
	U.S.			11	20
Apples	New Zealand	298	260	284	
	U.S.	567	521	550	
Bananas	All Imports	3	4		
Broccoli	Mexico	45			
	U.S.	2			
Carrots	Canada	73	80	84	
	Mexico		136		
	U.S.	64	40	53	
Celery	U.S.	255			
Grapes	Chile	181	241	339	
	Mexico	10	79	71	
	South Africa			169	
	U.S.	1,552	329	228	
Green Beans, Fresh	Mexico	97	39		
	U.S.	294	222		
Green Beans, Frozen/Canned	U.S.			222	529
Lettuce	U.S.	122			
Milk	U.S.			1	1
Orange Juice	Brazil				23
	U.S.				2
Oranges	Australia		30		
	U.S.	138	38	49	
Peaches, Fresh	Chile	381	366	471	
	U.S.	4,390	5,376	4,848	
Peaches, Canned	U.S.				5

		Toxicity Index Value			
Food*	**Country of Origin**	**1994**	**1995**	**1996**	**1997**
Pears	Argentina				157
	Chile				415
	South Africa				201
	U.S.				435
Potatoes	U.S.	191	59		
Soybeans	U.S.				66
Spinach, Fresh	Mexico		103	623	256
	U.S.		554	495	349
Spinach, Canned	U.S.				204
Sweet Corn, Canned/Frozen	U.S.	0.02	0.01		
Sweet Peas, Canned/Frozen	U.S.	6	22	21	
Sweet Potatoes	U.S.			56	25
Tomatoes	Canada				26
	Mexico			123	159
	U.S.			63	55
Wheat	U.S.		18	29	32
Winter Squash, Fresh	Honduras				23
	Mexico				41
	U.S.				1,706
Winter Squash, Frozen	Mexico				21
	U.S.				3,012

* Food-country combinations with 9 or fewer samples are not inlcuded in this table.

Table 5. Shares of Total Toxicity Index Values Contributed by Individual Pesticides Detected on Each Food by Origin and Year, Pesticide Data Program 1994-1997									
Food	**Origin**	**Year**	**Pesticide**	**Type**	**Number of Samples**	**Percent Positive**	**Mean Residue**	**Toxicity Index**	**Share of Toxicity by Pesticide**
apple juice	Argentina	1997	dimethoate	I	59	50.8%	0.011	15.10	47.8%
apple juice	Argentina	1997	omethoate	I	59	18.6%	0.012	10.58	33.5%
apple juice	Argentina	1997	carbaryl	I	59	44.1%	0.015	2.95	9.3%
apple juice	Argentina	1997	azinphos-methyl	I	59	5.1%	0.011	1.50	4.7%
apple juice	Argentina	1997	methamidophos	I	59	6.8%	0.005	0.76	2.4%
apple juice	Argentina	1997	thiabendazole	F	58	8.6%	0.143	0.27	0.8%
apple juice	Argentina	1997	acephate	I	59	3.4%	0.007	0.26	0.8%
apple juice	Argentina	1997	diphenylamine (DPA)	F	59	1.7%	0.048	0.12	0.4%
apple juice	Argentina	1997	captan	F	58	1.7%	0.046	0.02	0.1%
Totals								**31.56**	**100.0%**
apple juice	Argentina	1996	dimethoate	I	11	27.3%	0.011	8.50	48.1%
apple juice	Argentina	1996	carbaryl	I	11	45.5%	0.020	4.10	23.2%
apple juice	Argentina	1996	azinphos-methyl	I	11	9.1%	0.010	2.44	13.8%
apple juice	Argentina	1996	methamidophos	I	11	9.1%	0.006	1.23	7.0%
apple juice	Argentina	1996	benomyl	F	11	9.1%	0.083	0.72	4.1%
apple juice	Argentina	1996	thiabendazole	F	11	18.2%	0.151	0.59	3.4%
apple juice	Argentina	1996	malathion	I	11	9.1%	0.017	0.07	0.4%
Totals								**17.65**	**100.0%**
apple juice	Germany	1997	omethoate	I	18	16.7%	0.008	6.45	51.2%
apple juice	Germany	1997	dimethoate	I	18	22.2%	0.005	3.06	24.3%
apple juice	Germany	1997	carbaryl	I	18	16.7%	0.024	1.77	14.1%
apple juice	Germany	1997	methamidophos	I	18	5.6%	0.005	0.63	5.0%
apple juice	Germany	1997	thiabendazole	F	18	16.7%	0.077	0.28	2.2%
apple juice	Germany	1997	diphenylamine (DPA)	F	16	6.3%	0.025	0.23	1.8%
apple juice	Germany	1997	acephate	I	18	5.6%	0.003	0.18	1.5%
Totals								**12.60**	**100.0%**
apple juice	Hungary	1997	dimethoate	I	25	72.0%	0.009	18.15	60.4%
apple juice	Hungary	1997	omethoate	I	25	12.0%	0.010	6.00	20.0%
apple juice	Hungary	1997	carbaryl	I	25	12.0%	0.043	2.30	7.7%
apple juice	Hungary	1997	benomyl	F	24	4.2%	0.270	1.08	3.6%
apple juice	Hungary	1997	azinphos-methyl	I	25	4.0%	0.010	1.07	3.6%
apple juice	Hungary	1997	thiabendazole	F	25	16.0%	0.151	0.52	1.7%
apple juice	Hungary	1997	methamidophos	I	25	4.0%	0.005	0.45	1.5%
apple juice	Hungary	1997	permethrin	I	25	4.0%	0.048	0.37	1.2%
apple juice	Hungary	1997	diphenylamine (DPA)	F	25	4.0%	0.013	0.08	0.3%
Totals								**30.02**	**100.0%**
apple juice	Mexico	1997	dimethoate	I	12	33.3%	0.012	11.00	88.3%
apple juice	Mexico	1997	thiabendazole	F	12	8.3%	0.440	0.79	6.3%
apple juice	Mexico	1997	carbaryl	I	12	8.3%	0.013	0.48	3.8%
apple juice	Mexico	1997	diphenylamine (DPA)	F	12	8.3%	0.013	0.16	1.3%
apple juice	Mexico	1997	o-phenylphenol	F	12	8.3%	0.005	0.03	0.3%
Totals								**12.46**	**100.0%**
apple juice	US	1997	dimethoate	I	515	21.4%	0.008	4.97	24.7%
apple juice	US	1997	azinphos-methyl	I	515	7.4%	0.023	4.59	22.8%
apple juice	US	1997	omethoate	I	515	5.8%	0.011	3.11	15.5%
apple juice	US	1997	parathion-methyl	I	515	0.4%	0.003	2.26	11.2%
apple juice	US	1997	carbaryl	I	515	23.5%	0.020	2.11	10.5%
apple juice	US	1997	thiabendazole	F	513	38.4%	0.209	1.73	8.6%
apple juice	US	1997	diphenylamine (DPA)	F	502	10.4%	0.035	0.53	2.6%
apple juice	US	1997	oxamyl	I	515	0.2%	0.017	0.37	1.8%
apple juice	US	1997	benomyl	F	513	1.2%	0.109	0.12	0.6%
apple juice	US	1997	methamidophos	I	515	1.6%	0.003	0.10	0.5%
apple juice	US	1997	esfenvalerate	I	413	0.5%	0.038	0.09	0.5%
apple juice	US	1997	acephate	I	515	1.2%	0.006	0.07	0.4%
apple juice	US	1997	o-phenylphenol	F	435	6.2%	0.010	0.05	0.2%
apple juice	US	1997	fenvalerate	I	515	0.4%	0.050	0.02	0.1%
Totals								**20.12**	**100.0%**
apple juice	US	1996	carbaryl	I	162	32.1%	0.027	3.88	34.5%
apple juice	US	1996	thiabendazole	F	162	39.5%	0.205	1.74	15.5%
apple juice	US	1996	azinphos-methyl	I	162	4.9%	0.011	1.47	13.1%
apple juice	US	1996	dimethoate	I	162	7.4%	0.007	1.43	12.7%
apple juice	US	1996	omethoate	I	143	2.1%	0.014	1.42	12.6%
apple juice	US	1996	diphenylamine	F	156	10.9%	0.042	0.68	6.1%
apple juice	US	1996	benomyl	F	162	3.1%	0.102	0.30	2.7%
apple juice	US	1996	phosmet	I	137	2.9%	0.010	0.16	1.4%
apple juice	US	1996	methamidophos	I	162	0.6%	0.006	0.08	0.7%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
apple juice	US	1996	captan	F	133	4.5%	0.027	0.03	0.3%
apple juice	US	1996	acephate	I	162	0.6%	0.004	0.03	0.2%
apple juice	US	1996	o-phenylphenol	F	156	5.1%	0.007	0.03	0.2%
Totals								**11.26**	**100.0%**
apples	New Zealand	1996	chlorpyrifos	I	15	80.0%	0.031	110.92	39.1%
apples	New Zealand	1996	azinphos-methyl	I	15	93.3%	0.044	108.93	38.4%
apples	New Zealand	1996	carbaryl	I	15	33.3%	0.328	48.44	17.1%
apples	New Zealand	1996	propargite	I	15	26.7%	0.218	9.05	3.2%
apples	New Zealand	1996	diphenylamine	F	15	20.0%	0.208	6.15	2.2%
apples	New Zealand	1996	captan	F	15	33.3%	0.019	0.15	0.1%
Totals								**283.65**	**100.0%**
apples	New Zealand	1995	azinphos-methyl	I	13	84.6%	0.054	123.43	47.4%
apples	New Zealand	1995	chlorpyrifos	I	13	69.2%	0.028	85.67	32.9%
apples	New Zealand	1995	carbaryl	I	13	38.5%	0.266	45.37	17.4%
apples	New Zealand	1995	diazinon	I	13	15.4%	0.013	3.70	1.4%
apples	New Zealand	1995	propargite	I	13	7.7%	0.150	1.78	0.7%
apples	New Zealand	1995	diphenylamine	F	13	15.4%	0.014	0.32	0.1%
apples	New Zealand	1995	captan	F	13	23.1%	0.022	0.12	0.04%
Totals								**260.38**	**100.0%**
apples	New Zealand	1994	carbaryl	I	13	53.8%	0.651	155.22	52.1%
apples	New Zealand	1994	azinphos-methyl	I	13	61.5%	0.037	60.79	20.4%
apples	New Zealand	1994	chlorpyrifos	I	13	76.9%	0.017	59.52	20.0%
apples	New Zealand	1994	propargite	I	13	30.8%	0.270	12.94	4.3%
apples	New Zealand	1994	dicofol	I	13	7.7%	0.029	7.21	2.4%
apples	New Zealand	1994	diphenylamine (DPA)	F	12	33.3%	0.032	1.56	0.5%
apples	New Zealand	1994	captan	F	13	46.2%	0.034	0.36	0.1%
apples	New Zealand	1994	thiabendazole	F	13	7.7%	0.013	0.02	0.01%
Totals								**297.62**	**100.0%**
apples	US	1996	parathion-methyl	I	502	6.0%	0.019	217.15	39.5%
apples	US	1996	diphenylamine	F	496	88.3%	0.841	109.55	19.9%
apples	US	1996	azinphos-methyl	I	502	53.2%	0.057	80.75	14.7%
apples	US	1996	chlorpyrifos	I	502	24.5%	0.027	29.99	5.4%
apples	US	1996	methoxychlor	I	502	18.7%	0.180	25.96	4.7%
apples	US	1996	dicofol	I	502	2.8%	0.221	19.91	3.6%
apples	US	1996	propargite	I	502	24.7%	0.402	15.45	2.8%
apples	US	1996	thiabendazole	F	502	74.1%	0.835	13.32	2.4%
apples	US	1996	oxamyl	I	502	3.6%	0.026	10.45	1.9%
apples	US	1996	carbaryl	I	502	12.0%	0.129	6.84	1.2%
apples	US	1996	parathion-ethyl	I	421	0.7%	0.058	5.66	1.0%
apples	US	1996	dimethoate	I	502	3.0%	0.031	2.51	0.5%
apples	US	1996	ethion	I	502	0.6%	0.136	2.18	0.4%
apples	US	1996	omethoate	I	427	2.3%	0.019	2.10	0.4%
apples	US	1996	mevinphos	I	502	1.0%	0.013	1.61	0.3%
apples	US	1996	methomyl	I	502	2.2%	0.030	1.44	0.3%
apples	US	1996	phosphamidon	I	502	1.0%	0.012	1.30	0.2%
apples	US	1996	phosmet	I	422	3.6%	0.047	0.92	0.2%
apples	US	1996	captan	F	502	14.9%	0.155	0.54	0.1%
apples	US	1996	o-phenylphenol	F	461	10.0%	0.071	0.53	0.1%
apples	US	1996	endosulfan sulfate	I	502	4.2%	0.012	0.51	0.1%
apples	US	1996	esfenvalerate	I	403	2.2%	0.036	0.40	0.1%
apples	US	1996	DDT	I	303	0.7%	0.010	0.33	0.1%
apples	US	1996	endosulfan II	I	502	2.8%	0.011	0.31	0.1%
apples	US	1996	endosulfan I	I	502	2.8%	0.008	0.22	0.04%
apples	US	1996	lindane	I	502	0.8%	0.013	0.12	0.02%
apples	US	1996	diazinon	I	502	0.2%	0.022	0.08	0.02%
apples	US	1996	imazalil	F	502	0.2%	0.092	0.06	0.01%
apples	US	1996	fenbutatin oxide	I	322	1.2%	0.109	0.05	0.01%
apples	US	1996	iprodione	F	502	0.4%	0.025	0.03	0.01%
apples	US	1996	chlorothalonil	F	502	0.8%	0.030	0.03	0.01%
apples	US	1996	DDE	I	502	0.2%	0.005	0.02	0.004%
apples	US	1996	myclobutanil	F	502	2.0%	0.016	0.02	0.004%
apples	US	1996	fenvalerate	I	502	0.6%	0.031	0.02	0.004%
apples	US	1996	dicloran	F	502	0.2%	0.019	0.00	0.0004%
apples	US	1996	metalaxyl	F	162	0.6%	0.005	0.00	0.0003%
Totals								**550.38**	**100.0%**
apples	US	1995	parathion-methyl	I	659	5.0%	0.023	220.06	42.2%
apples	US	1995	diphenylamine	F	657	72.1%	0.806	86.39	16.6%
apples	US	1995	azinphos-methyl	I	657	45.8%	0.069	84.94	16.3%
apples	US	1995	chlorpyrifos	I	658	21.4%	0.026	24.78	4.8%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
apples	US	1995	oxamyl	I	659	4.4%	0.037	18.43	3.5%
apples	US	1995	methoxychlor	I	659	16.7%	0.132	17.06	3.3%
apples	US	1995	propargite	I	626	27.8%	0.396	17.00	3.3%
apples	US	1995	thiabendazole	F	632	54.9%	0.878	10.39	2.0%
apples	US	1995	dicofol	I	658	1.1%	0.215	7.40	1.4%
apples	US	1995	dimethoate	I	659	3.9%	0.067	7.30	1.4%
apples	US	1995	carbaryl	I	659	10.6%	0.140	6.62	1.3%
apples	US	1995	phosphamidon	I	659	2.3%	0.018	4.28	0.8%
apples	US	1995	omethoate	I	437	4.1%	0.020	4.02	0.8%
apples	US	1995	methomyl	I	659	3.6%	0.035	2.80	0.5%
apples	US	1995	disulfoton	I	659	0.2%	0.110	2.59	0.5%
apples	US	1995	formetanate HCL	I	311	1.3%	0.085	2.22	0.4%
apples	US	1995	endosulfans	I	659	6.4%	0.022	1.42	0.3%
apples	US	1995	phosmet	I	558	4.1%	0.061	1.40	0.3%
apples	US	1995	o-phenylphenol	F	483	8.9%	0.125	0.83	0.2%
apples	US	1995	phosalone	I	398	0.3%	0.220	0.42	0.1%
apples	US	1995	captan	F	657	13.9%	0.116	0.37	0.1%
apples	US	1995	fenbutatin oxide	I	336	3.9%	0.160	0.23	0.04%
apples	US	1995	diazinon	I	659	0.5%	0.010	0.09	0.02%
apples	US	1995	esfenvalerate	I	526	0.4%	0.036	0.07	0.01%
apples	US	1995	iprodione	F	659	0.8%	0.023	0.05	0.01%
apples	US	1995	myclobutanil	F	646	1.2%	0.021	0.02	0.003%
apples	US	1995	permethrin	I	659	0.2%	0.016	0.00	0.001%
apples	US	1995	dicloran	F	659	0.3%	0.005	0.00	0.0002%
Totals								**521.20**	**100.0%**
apples	US	1994	parathion-methyl	I	656	6.9%	0.015	202.18	35.6%
apples	US	1994	diphenylamine (DPA)	F	600	70.0%	0.773	79.80	14.1%
apples	US	1994	azinphos-methyl	I	656	41.9%	0.064	72.34	12.8%
apples	US	1994	dicofol	I	656	3.8%	0.329	40.51	7.1%
apples	US	1994	methoxychlor	I	656	18.4%	0.172	24.50	4.3%
apples	US	1994	chlorpyrifos	I	656	18.3%	0.026	21.67	3.8%
apples	US	1994	propargite	I	656	32.8%	0.401	20.48	3.6%
apples	US	1994	oxamyl	I	656	3.5%	0.048	18.78	3.3%
apples	US	1994	dimethoate	I	656	12.0%	0.046	15.08	2.7%
apples	US	1994	omethoate	I	553	11.0%	0.028	14.86	2.6%
apples	US	1994	carbaryl	I	655	20.8%	0.121	11.15	2.0%
apples	US	1994	thiabendazole	F	655	58.6%	0.804	10.16	1.8%
apples	US	1994	phosphamidon	I	457	4.6%	0.019	9.11	1.6%
apples	US	1994	ethion	I	656	0.9%	0.275	6.78	1.2%
apples	US	1994	formetanate HCL	I	671	2.8%	0.103	5.92	1.0%
apples	US	1994	methomyl	I	656	4.0%	0.043	3.76	0.7%
apples	US	1994	endosulfan	I	656	14.0%	0.027	3.76	0.7%
apples	US	1994	phosmet	I	656	7.6%	0.061	2.58	0.5%
apples	US	1994	o-phenylphenol	F	337	18.7%	0.096	1.35	0.2%
apples	US	1994	benomyl	F	670	10.4%	0.104	1.04	0.2%
apples	US	1994	diazinon	I	656	0.9%	0.026	0.45	0.1%
apples	US	1994	captan	F	646	15.3%	0.107	0.38	0.1%
apples	US	1994	iprodione	F	656	0.6%	0.154	0.29	0.1%
apples	US	1994	parathion-ethyl	I	632	0.3%	0.005	0.22	0.04%
apples	US	1994	phosalone	I	408	0.2%	0.010	0.02	0.003%
apples	US	1994	myclobutanil	F	656	0.5%	0.048	0.02	0.003%
apples	US	1994	permethrin	I	656	0.2%	0.038	0.01	0.002%
Totals								**567.17**	**100.0%**
bananas	Colombia	1995	thiabendazole	F	54	66.7%	0.115	1.65	76%
bananas	Colombia	1995	imazalil	F	54	3.7%	0.041	0.52	24%
Totals								**2.17**	**100.0%**
bananas	Colombia	1994	thiabendazole	F	108	70.4%	0.123	1.87	70%
bananas	Colombia	1994	imazalil	F	108	4.6%	0.051	0.80	30%
Totals								**2.66**	**100.0%**
bananas	Costa Rica	1995	thiabendazole	F	125	55.2%	0.064	0.76	74%
bananas	Costa Rica	1995	imazalil	F	125	2.4%	0.033	0.27	26%
Totals								**1.03**	**100.0%**
bananas	Costa Rica	1994	thiabendazole	F	137	70.1%	0.059	0.89	74%
bananas	Costa Rica	1994	imazalil	F	137	4.4%	0.021	0.31	26%
Totals								**1.20**	**100.0%**
bananas	Ecuador	1995	imazalil	F	153	37.3%	0.062	7.92	92%
bananas	Ecuador	1995	thiabendazole	F	153	41.2%	0.078	0.70	8%
Totals								**8.62**	**100.0%**
bananas	Ecuador	1994	imazalil	F	136	23.5%	0.066	5.31	86%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
bananas	Ecuador	1994	thiabendazole	F	136	47.8%	0.082	0.84	14%
Totals								**6.15**	**100.0%**
bananas	Guatamala	1995	thiabendazole	F	46	67.4%	0.098	1.42	49%
bananas	Guatamala	1995	imazalil	F	46	4.3%	0.065	0.96	34%
bananas	Guatamala	1995	diphenylamine	F	46	2.2%	0.150	0.48	17%
Totals								**2.86**	**100.0%**
bananas	Guatemala	1994	thiabendazole	F	89	30.3%	0.068	0.45	100%
Totals								**0.45**	**100.0%**
bananas	Honduras	1995	thiabendazole	F	47	42.6%	0.085	0.78	63%
bananas	Honduras	1995	imazalil	F	47	4.3%	0.032	0.46	37%
Totals								**1.24**	**100.0%**
bananas	Honduras	1994	imazalil	F	67	11.9%	0.060	2.44	86.3%
bananas	Honduras	1994	thiabendazole	F	67	11.9%	0.151	0.39	13.7%
Totals								**2.83**	**100.0%**
bananas	Mexico	1995	thiabendazole	F	16	12.5%	0.093	0.25	100.0%
Totals								**0.25**	**100.0%**
bananas	Mexico	1994	imazalil	F	38	10.5%	0.048	1.70	81.8%
bananas	Mexico	1994	thiabendazole	F	38	23.7%	0.074	0.38	18.2%
Totals								**2.08**	**100.0%**
bananas	Panama	1995	imazalil	F	21	19.0%	0.050	3.24	56.0%
bananas	Panama	1995	thiabendazole	F	21	90.5%	0.131	2.54	44.0%
Totals								**5.79**	**100.0%**
bananas	Panama	1994	imazalil	F	46	39.1%	0.053	7.01	66.5%
bananas	Panama	1994	thiabendazole	F	46	95.7%	0.172	3.54	33.5%
Totals								**10.55**	**100.0%**
broccoli	Mexico	1994	mevinphos	I	14	7.1%	0.033	29.27	64.6%
broccoli	Mexico	1994	methomyl	I	14	7.1%	0.070	10.99	24.2%
broccoli	Mexico	1994	permethrin	I	14	14.3%	0.183	5.07	11.2%
Totals								**45.33**	**100.0%**
broccoli	US	1994	chlorpyrifos	I	659	1.7%	0.010	0.73	30.6%
broccoli	US	1994	methamidophos	I	611	0.5%	0.032	0.35	14.8%
broccoli	US	1994	dimethoate	I	653	1.7%	0.007	0.32	13.6%
broccoli	US	1994	methomyl	I	659	0.6%	0.023	0.30	12.5%
broccoli	US	1994	omethoate	I	542	0.6%	0.010	0.27	11.2%
broccoli	US	1994	DDE	I	659	0.5%	0.021	0.23	9.7%
broccoli	US	1994	endosulfan	I	659	0.8%	0.016	0.12	5.1%
broccoli	US	1994	permethrin	I	659	0.2%	0.115	0.03	1.4%
broccoli	US	1994	chlorothalonil	F	612	0.3%	0.054	0.02	0.9%
broccoli	US	1994	carbaryl	I	659	0.2%	0.007	0.00	0.2%
Totals								**2.39**	**100.0%**
carrots	Canada	1996	DDT	I	8	75.0%	0.012	44.84	53.3%
carrots	Canada	1996	parathion-ethyl	I	9	33.3%	0.004	19.78	23.5%
carrots	Canada	1996	chlorpyrifos	I	10	40.0%	0.005	8.95	10.6%
carrots	Canada	1996	DDE	I	10	50.0%	0.005	6.31	7.5%
carrots	Canada	1996	diazinon	I	10	30.0%	0.007	4.23	5.0%
Totals								**84.10**	**100.0%**
carrots	Canada	1995	parathion-ethyl	I	31	35.5%	0.008	41.09	51.5%
carrots	Canada	1995	DDT	I	26	34.6%	0.012	20.32	25.5%
carrots	Canada	1995	chlorpyrifos	I	35	14.3%	0.009	6.01	7.5%
carrots	Canada	1995	DDE	I	35	37.1%	0.007	5.97	7.5%
carrots	Canada	1995	diazinon	I	35	14.3%	0.012	3.29	4.1%
carrots	Canada	1995	phosmet	I	31	9.7%	0.016	0.87	1.1%
carrots	Canada	1995	benomyl	F	35	8.6%	0.084	0.69	0.9%
carrots	Canada	1995	esfenvalerate	I	31	6.5%	0.020	0.65	0.8%
carrots	Canada	1995	iprodione	F	35	5.7%	0.025	0.44	0.6%
carrots	Canada	1995	endosulfans	I	35	2.9%	0.011	0.32	0.4%
carrots	Canada	1995	fenvalerate	I	35	2.9%	0.020	0.07	0.1%
carrots	Canada	1995	dicloran	F	35	2.9%	0.010	0.02	0.02%
Totals								**79.73**	**100.0%**
carrots	Canada	1994	parathion-ethyl	I	22	31.8%	0.011	47.31	64.8%
carrots	Canada	1994	DDT	I	21	33.3%	0.010	16.61	22.8%
carrots	Canada	1994	DDE	I	23	47.8%	0.005	5.81	8.0%
carrots	Canada	1994	DDD (TDE)	I	20	20.0%	0.004	1.43	2.0%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
carrots	Canada	1994	chlorpyrifos	I	23	4.3%	0.005	0.97	1.3%
carrots	Canada	1994	diazinon	I	23	4.3%	0.010	0.84	1.1%
Totals								**72.96**	**100.0%**
carrots	Mexico	1995	parathion-methyl	I	19	5.3%	0.010	101.91	74.8%
carrots	Mexico	1995	DDE	I	19	15.8%	0.043	16.62	12.2%
carrots	Mexico	1995	hexachlorobenzene	F	19	10.5%	0.013	16.17	11.9%
carrots	Mexico	1995	endosulfans	I	19	5.3%	0.024	1.27	0.9%
carrots	Mexico	1995	quintozene	F	19	5.3%	0.007	0.16	0.1%
carrots	Mexico	1995	pentachlorobenzene	F	19	10.5%	0.003	0.14	0.1%
carrots	Mexico	1995	captan	F	19	10.5%	0.020	0.05	0.04%
Totals								**136.32**	**100.0%**
carrots	US	1996	DDE	I	481	43.5%	0.038	39.90	75.7%
carrots	US	1996	iprodione	F	481	38.5%	0.043	5.15	9.8%
carrots	US	1996	phosphamidon	I	481	0.2%	0.160	3.51	6.7%
carrots	US	1996	DDT	I	187	6.4%	0.010	3.20	6.1%
carrots	US	1996	chlorpyrifos	I	481	0.4%	0.015	0.28	0.5%
carrots	US	1996	endosulfan sulfate	I	481	2.1%	0.008	0.18	0.3%
carrots	US	1996	ethion	I	481	0.8%	0.007	0.16	0.3%
carrots	US	1996	diazinon	I	481	1.0%	0.007	0.13	0.3%
carrots	US	1996	metalaxyl	F	63	23.8%	0.008	0.12	0.2%
carrots	US	1996	acephate	I	481	0.4%	0.007	0.03	0.1%
carrots	US	1996	endosulfan I	I	481	0.2%	0.010	0.02	0.04%
carrots	US	1996	dicloran	F	481	0.2%	0.040	0.00	0.01%
Totals								**52.68**	**100.0%**
carrots	US	1995	DDE	I	644	38.2%	0.031	29.09	73.1%
carrots	US	1995	iprodione	F	646	26.5%	0.041	3.35	8.4%
carrots	US	1995	DDT	I	238	5.0%	0.011	2.70	6.8%
carrots	US	1995	diazinon	I	645	3.3%	0.025	1.56	3.9%
carrots	US	1995	parathion-methyl	I	646	0.2%	0.005	1.50	3.8%
carrots	US	1995	terbufos sulfone	I	292	0.3%	0.004	0.55	1.4%
carrots	US	1995	metalaxyl	F	11	63.6%	0.010	0.40	1.0%
carrots	US	1995	endosulfans	I	646	3.6%	0.010	0.35	0.9%
carrots	US	1995	DDD	I	239	1.3%	0.004	0.10	0.2%
carrots	US	1995	acephate	I	646	0.5%	0.012	0.06	0.2%
carrots	US	1995	dicloran	F	646	0.3%	0.230	0.04	0.1%
carrots	US	1995	chlorpyrifos	I	646	0.2%	0.005	0.03	0.1%
carrots	US	1995	quintozene	F	646	0.6%	0.007	0.02	0.05%
carrots	US	1995	methamidophos	I	646	0.2%	0.004	0.01	0.04%
carrots	US	1995	o-phenylphenol	F	513	0.8%	0.017	0.01	0.02%
carrots	US	1995	lindane	I	646	0.2%	0.005	0.01	0.02%
carrots	US	1995	pentachlorobenzene	F	646	0.3%	0.005	0.01	0.02%
carrots	US	1995	myclobutanil	F	646	0.2%	0.014	0.00	0.004%
carrots	US	1995	malathion	I	623	0.2%	0.017	0.00	0.003%
carrots	US	1995	thiabendazole	F	1283	0.1%	0.050	0.00	0.002%
carrots	US	1995	captan	F	504	0.2%	0.010	0.00	0.001%
Totals								**39.80**	**100.0%**
carrots	US	1994	DDE	I	640	37.3%	0.023	21.01	33.0%
carrots	US	1994	parathion-methyl	I	655	0.9%	0.008	14.78	23.2%
carrots	US	1994	dieldrin	I	63	1.6%	0.005	10.20	16.0%
carrots	US	1994	disulfoton sulfone	I	85	1.2%	0.037	6.75	10.6%
carrots	US	1994	iprodione	F	641	25.9%	0.054	4.32	6.8%
carrots	US	1994	DDT	I	393	3.3%	0.018	3.00	4.7%
carrots	US	1994	diazinon	I	655	4.7%	0.018	1.66	2.6%
carrots	US	1994	disulfoton	I	655	0.2%	0.035	0.83	1.3%
carrots	US	1994	parathion-ethyl	I	617	0.3%	0.007	0.29	0.5%
carrots	US	1994	endosulfan	I	641	2.5%	0.011	0.29	0.5%
carrots	US	1994	DDD (TDE)	I	380	1.3%	0.011	0.25	0.4%
carrots	US	1994	dicloran	F	655	1.1%	0.203	0.13	0.2%
carrots	US	1994	hexachlorobenzene	F	655	0.2%	0.005	0.09	0.1%
carrots	US	1994	chlorpyrifos	I	655	0.2%	0.005	0.03	0.1%
carrots	US	1994	pentachloroaniline (PCA)	F	50	6.0%	0.008	0.01	0.02%
carrots	US	1994	quintozene (PCNB)	F	655	0.3%	0.007	0.01	0.01%
carrots	US	1994	captan	F	521	1.3%	0.020	0.01	0.01%
carrots	US	1994	o-phenylphenol	F	286	0.3%	0.014	0.00	0.01%
carrots	US	1994	thiabendazole	F	646	0.3%	0.025	0.00	0.003%
Totals								**63.65**	**100.0%**
celery	US	1994	oxamyl	I	172	16.9%	0.088	166.13	65.1%
celery	US	1994	acephate	I	172	41.3%	0.106	47.91	18.8%
celery	US	1994	dicloran	F	172	52.9%	0.242	7.66	3.0%
celery	US	1994	chlorothalonil	F	172	67.4%	0.091	7.26	2.8%
celery	US	1994	methamidophos	I	172	25.6%	0.011	6.58	2.6%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
celery	US	1994	parathion-methyl	I	172	0.6%	0.005	5.63	2.2%
celery	US	1994	permethrin	I	172	29.7%	0.079	4.54	1.8%
celery	US	1994	methomyl	I	172	3.5%	0.037	2.82	1.1%
celery	US	1994	mevinphos	I	172	2.3%	0.009	2.60	1.0%
celery	US	1994	chlorpyrifos	I	172	2.3%	0.015	1.56	0.6%
celery	US	1994	DDE	I	172	8.1%	0.007	1.43	0.6%
celery	US	1994	diazinon	I	172	4.7%	0.010	0.85	0.3%
celery	US	1994	iprodione	F	172	0.6%	0.030	0.05	0.02%
celery	US	1994	endosulfan	I	172	0.6%	0.005	0.03	0.01%
Totals								**255.05**	**100.0%**
grapes	Chile	1996	omethoate	I	234	33.8%	0.047	76.07	22.4%
grapes	Chile	1996	iprodione	F	279	66.7%	0.295	60.98	18.0%
grapes	Chile	1996	dimethoate	I	279	28.3%	0.075	58.23	17.2%
grapes	Chile	1996	hexachlorobenzene	F	279	0.4%	1.300	55.06	16.2%
grapes	Chile	1996	chlorpyrifos	I	279	20.1%	0.049	43.83	12.9%
grapes	Chile	1996	methomyl	I	279	3.9%	0.165	14.34	4.2%
grapes	Chile	1996	carbaryl	I	279	7.9%	0.201	7.00	2.1%
grapes	Chile	1996	parathion-ethyl	I	234	3.0%	0.016	6.56	1.9%
grapes	Chile	1996	vinclozolin	F	278	6.8%	0.206	4.58	1.4%
grapes	Chile	1996	carbofuran-3 OH	I	279	0.4%	0.300	4.20	1.2%
grapes	Chile	1996	azinphos-methyl	I	279	5.0%	0.028	3.70	1.1%
grapes	Chile	1996	captan	F	279	73.1%	0.155	2.64	0.8%
grapes	Chile	1996	diazinon	I	279	2.9%	0.022	1.20	0.4%
grapes	Chile	1996	fenbutatin oxide	I	239	7.1%	0.109	0.29	0.1%
grapes	Chile	1996	myclobutanil	F	279	7.5%	0.040	0.20	0.1%
grapes	Chile	1996	phosmet	I	234	1.3%	0.015	0.10	0.03%
grapes	Chile	1996	DDE	I	279	0.4%	0.004	0.03	0.01%
grapes	Chile	1996	endosulfan I	I	279	0.4%	0.003	0.01	0.003%
grapes	Chile	1996	chlorothalonil	F	227	0.4%	0.012	0.01	0.002%
Totals								**339.03**	**100.0%**
grapes	Chile	1995	omethoate	I	184	28.3%	0.053	72.75	30.1%
grapes	Chile	1995	iprodione	F	255	57.6%	0.279	49.80	20.6%
grapes	Chile	1995	dimethoate	I	255	23.5%	0.068	44.15	18.3%
grapes	Chile	1995	chlorpyrifos	I	256	14.1%	0.033	21.05	8.7%
grapes	Chile	1995	vinclozolin	F	256	39.1%	0.162	20.62	8.5%
grapes	Chile	1995	carbofuran-3 OH	I	256	1.2%	0.254	11.62	4.8%
grapes	Chile	1995	methomyl	I	256	0.8%	0.385	6.61	2.7%
grapes	Chile	1995	carbaryl	I	256	5.1%	0.141	3.18	1.3%
grapes	Chile	1995	captan	F	255	85.1%	0.160	3.18	1.3%
grapes	Chile	1995	mevinphos	I	256	1.6%	0.016	3.06	1.3%
grapes	Chile	1995	azinphos-methyl	I	256	1.2%	0.067	2.09	0.9%
grapes	Chile	1995	parathion-ethyl	I	256	2.0%	0.006	1.71	0.7%
grapes	Chile	1995	carbofuran	I	256	0.8%	0.023	0.69	0.3%
grapes	Chile	1995	diazinon	I	256	2.0%	0.013	0.49	0.2%
grapes	Chile	1995	dicofol	I	256	0.4%	0.008	0.10	0.0%
grapes	Chile	1995	myclobutanil	F	256	5.5%	0.027	0.10	0.0%
grapes	Chile	1995	phosmet	I	256	1.2%	0.010	0.06	0.0%
grapes	Chile	1995	fenvalerate	I	256	0.4%	0.070	0.03	0.0%
Totals								**241.30**	**100.0%**
grapes	Chile	1994	omethoate	I	226	19.0%	0.049	45.03	24.9%
grapes	Chile	1994	dimethoate	I	255	21.2%	0.063	36.40	20.1%
grapes	Chile	1994	iprodione	F	255	51.8%	0.215	34.58	19.1%
grapes	Chile	1994	mevinphos	I	255	1.2%	0.091	13.24	7.3%
grapes	Chile	1994	chlorpyrifos	I	255	11.8%	0.023	12.14	6.7%
grapes	Chile	1994	vinclozolin	F	255	29.0%	0.116	10.91	6.0%
grapes	Chile	1994	carbofuran-3 OH	I	168	0.6%	0.340	7.91	4.4%
grapes	Chile	1994	azinphos-methyl	I	255	3.9%	0.060	6.33	3.5%
grapes	Chile	1994	captan	F	255	76.1%	0.217	3.85	2.1%
grapes	Chile	1994	parathion-methyl	I	255	0.4%	0.005	3.80	2.1%
grapes	Chile	1994	parathion-ethyl	I	235	1.7%	0.010	2.33	1.3%
grapes	Chile	1994	diazinon	I	255	3.5%	0.027	1.85	1.0%
grapes	Chile	1994	methomyl	I	255	0.8%	0.047	0.80	0.4%
grapes	Chile	1994	carbaryl	I	255	2.0%	0.074	0.64	0.4%
grapes	Chile	1994	benomyl	F	251	5.2%	0.123	0.61	0.3%
grapes	Chile	1994	phosmet	I	255	1.2%	0.070	0.45	0.2%
grapes	Chile	1994	thiabendazole	F	255	0.8%	0.300	0.05	0.03%
grapes	Chile	1994	myclobutanil	F	255	2.0%	0.033	0.04	0.02%
grapes	Chile	1994	diphenylamine (DPA)	F	230	0.4%	0.017	0.01	0.01%
grapes	Chile	1994	dicloran	F	255	0.8%	0.010	0.00	0.003%
Totals								**180.99**	**100.0%**
grapes	Mexico	1996	methomyl	I	24	20.8%	0.073	33.61	47.1%
grapes	Mexico	1996	carbofuran-3 OH	I	24	12.5%	0.063	30.63	42.9%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
grapes	Mexico	1996	myclobutanil	F	24	50.0%	0.122	4.19	5.9%
grapes	Mexico	1996	dimethoate	I	24	4.2%	0.015	1.72	2.4%
grapes	Mexico	1996	omethoate	I	20	5.0%	0.005	1.21	1.7%
grapes	Mexico	1996	fenbutatin oxide	I	22	4.5%	0.011	0.02	0.03%
Totals								**71.38**	**100.0%**
grapes	Mexico	1995	omethoate	I	38	23.7%	0.027	30.57	38.7%
grapes	Mexico	1995	carbofuran-3 OH	I	46	4.3%	0.141	23.89	30.2%
grapes	Mexico	1995	methomyl	I	46	15.2%	0.020	6.79	8.6%
grapes	Mexico	1995	iprodione	F	46	6.5%	0.248	5.01	6.3%
grapes	Mexico	1995	carbofuran	I	46	2.2%	0.052	4.42	5.6%
grapes	Mexico	1995	dimethoate	I	46	13.0%	0.010	3.59	4.5%
grapes	Mexico	1995	diazinon	I	46	2.2%	0.037	1.55	2.0%
grapes	Mexico	1995	myclobutanil	F	46	45.7%	0.040	1.27	1.6%
grapes	Mexico	1995	mevinphos	I	46	2.2%	0.004	1.08	1.4%
grapes	Mexico	1995	endosulfans	I	46	6.5%	0.009	0.57	0.7%
grapes	Mexico	1995	fenbutatin oxide	I	11	9.1%	0.038	0.13	0.2%
grapes	Mexico	1995	carbaryl	I	46	2.2%	0.011	0.11	0.1%
grapes	Mexico	1995	captan	F	46	19.6%	0.020	0.09	0.1%
Totals								**79.04**	**100.0%**
grapes	Mexico	1994	omethoate	I	21	9.5%	0.012	5.30	51.4%
grapes	Mexico	1994	benomyl	F	32	6.3%	0.380	2.28	22.1%
grapes	Mexico	1994	myclobutanil	F	32	28.1%	0.101	1.95	18.9%
grapes	Mexico	1994	dimethoate	I	32	6.3%	0.005	0.77	7.5%
grapes	Mexico	1994	captan	F	32	3.1%	0.020	0.01	0.1%
grapes	Mexico	1994	dicloran	F	32	3.1%	0.005	0.01	0.1%
Totals								**10.32**	**100.0%**
grapes	South Africa	1996	iprodione	F	10	100.0%	0.371	115.21	68.4%
grapes	South Africa	1996	omethoate	I	7	28.6%	0.026	35.27	20.9%
grapes	South Africa	1996	dimethoate	I	10	40.0%	0.014	14.85	8.8%
grapes	South Africa	1996	dichlorvos	I	10	10.0%	0.003	2.53	1.5%
grapes	South Africa	1996	captan	F	10	10.0%	0.280	0.65	0.4%
Totals								**168.51**	**100.0%**
grapes	US	1996	dicofol	I	211	8.1%	0.447	116.42	51.1%
grapes	US	1996	methomyl	I	211	10.9%	0.299	71.59	31.4%
grapes	US	1996	iprodione	F	211	19.9%	0.139	8.57	3.8%
grapes	US	1996	phosmet	I	177	5.1%	0.274	7.67	3.4%
grapes	US	1996	endosulfan II	I	211	4.3%	0.087	3.71	1.6%
grapes	US	1996	chlorpyrifos	I	211	7.6%	0.011	3.67	1.6%
grapes	US	1996	myclobutanil	F	211	46.4%	0.104	3.32	1.5%
grapes	US	1996	carbaryl	I	211	5.7%	0.129	3.25	1.4%
grapes	US	1996	fenamiphos sulfoxide	I	115	1.7%	0.008	2.05	0.9%
grapes	US	1996	omethoate	I	183	2.2%	0.017	1.80	0.8%
grapes	US	1996	propargite	I	211	4.3%	0.211	1.40	0.6%
grapes	US	1996	endosulfan I	I	211	2.8%	0.039	1.11	0.5%
grapes	US	1996	endosulfan sulfate	I	211	3.8%	0.020	0.76	0.3%
grapes	US	1996	fenbutatin oxide	I	51	2.0%	0.820	0.60	0.3%
grapes	US	1996	dicloran	F	211	5.7%	0.148	0.50	0.2%
grapes	US	1996	diazinon	I	211	0.9%	0.023	0.41	0.2%
grapes	US	1996	DDE	I	211	2.8%	0.006	0.38	0.2%
grapes	US	1996	azinphos-methyl	I	211	0.9%	0.013	0.33	0.1%
grapes	US	1996	dimethoate	I	211	1.4%	0.005	0.18	0.1%
grapes	US	1996	captan	F	210	6.2%	0.033	0.05	0.02%
Totals								**227.78**	**100.0%**
grapes	US	1995	dicofol	I	377	11.1%	0.464	167.21	50.9%
grapes	US	1995	parathion-methyl	I	379	0.5%	0.072	73.05	22.2%
grapes	US	1995	methomyl	I	378	10.3%	0.130	29.54	9.0%
grapes	US	1995	omethoate	I	301	10.3%	0.035	17.68	5.4%
grapes	US	1995	dimethoate	I	379	6.9%	0.079	14.82	4.5%
grapes	US	1995	iprodione	F	379	30.1%	0.157	14.64	4.5%
grapes	US	1995	propargite	I	378	8.7%	0.222	2.99	0.9%
grapes	US	1995	endosulfans	I	379	6.6%	0.029	1.94	0.6%
grapes	US	1995	myclobutanil	F	378	35.2%	0.075	1.83	0.6%
grapes	US	1995	chlorpyrifos	I	379	5.3%	0.007	1.76	0.5%
grapes	US	1995	fenbutatin oxide	I	300	13.7%	0.163	0.82	0.2%
grapes	US	1995	dicloran	F	379	4.7%	0.187	0.52	0.2%
grapes	US	1995	carbaryl	I	379	1.3%	0.086	0.50	0.2%
grapes	US	1995	benomyl	F	379	2.4%	0.174	0.40	0.1%
grapes	US	1995	DDE	I	379	2.9%	0.005	0.38	0.1%
grapes	US	1995	DDT	I	183	0.5%	0.010	0.27	0.1%
grapes	US	1995	vinclozolin	F	379	0.5%	0.105	0.18	0.1%
grapes	US	1995	captan	F	379	7.4%	0.042	0.07	0.02%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
grapes	US	1995	phosmet	I	351	0.6%	0.018	0.06	0.02%
grapes	US	1995	diazinon	I	379	0.3%	0.006	0.03	0.01%
grapes	US	1995	methamidophos	I	379	0.3%	0.004	0.02	0.01%
grapes	US	1995	acephate	I	379	0.3%	0.006	0.02	0.01%
grapes	US	1995	diphenylamine	F	375	0.3%	0.014	0.01	0.002%
grapes	US	1995	thiabendazole	F	758	0.1%	0.050	0.00	0.0004%
Totals								**328.73**	**100.0%**
grapes	US	1994	parathion-methyl	I	377	3.4%	0.208	1,387.19	89.4%
grapes	US	1994	dicofol	I	377	5.8%	0.317	59.86	3.9%
grapes	US	1994	methomyl	I	377	14.9%	0.168	55.00	3.5%
grapes	US	1994	iprodione	F	377	29.7%	0.191	17.57	1.1%
grapes	US	1994	azinphos-methyl	I	377	1.9%	0.203	10.08	0.6%
grapes	US	1994	omethoate	I	324	5.6%	0.021	5.53	0.4%
grapes	US	1994	endosulfan	I	377	14.6%	0.027	3.94	0.3%
grapes	US	1994	propargite	I	377	9.3%	0.199	2.88	0.2%
grapes	US	1994	dimethoate	I	377	5.3%	0.017	2.50	0.2%
grapes	US	1994	chlorpyrifos	I	377	0.8%	0.054	1.93	0.1%
grapes	US	1994	carbaryl	I	377	1.9%	0.199	1.64	0.1%
grapes	US	1994	myclobutanil	F	377	31.8%	0.069	1.51	0.1%
grapes	US	1994	benomyl	F	388	4.6%	0.261	1.16	0.1%
grapes	US	1994	dicloran	F	377	6.4%	0.132	0.50	0.03%
grapes	US	1994	diazinon	I	377	0.8%	0.012	0.18	0.01%
grapes	US	1994	DDE	I	377	0.3%	0.004	0.03	0.002%
grapes	US	1994	methamidophos	I	377	0.3%	0.004	0.02	0.002%
grapes	US	1994	vinclozolin	F	376	0.3%	0.024	0.02	0.001%
grapes	US	1994	acephate	I	377	0.3%	0.006	0.02	0.001%
grapes	US	1994	captan	F	370	3.2%	0.021	0.02	0.001%
grapes	US	1994	lindane	I	377	0.3%	0.005	0.02	0.001%
grapes	US	1994	thiabendazole	F	377	0.3%	0.013	0.00	0.00005%
Totals								**1,551.58**	**100.0%**
green beans	Mexico	1995	endosulfans	I	80	41.3%	0.060	25.02	64.5%
green beans	Mexico	1995	carbaryl	I	80	5.0%	0.382	8.47	21.8%
green beans	Mexico	1995	acephate	I	80	3.8%	0.066	2.71	7.0%
green beans	Mexico	1995	methamidophos	I	80	6.3%	0.013	1.77	4.6%
green beans	Mexico	1995	iprodione	F	80	1.3%	0.140	0.54	1.4%
green beans	Mexico	1995	captan	F	69	15.9%	0.075	0.28	0.7%
Totals								**38.79**	**100.0%**
green beans	Mexico	1994	endosulfan	I	83	57.8%	0.085	49.29	50.8%
green beans	Mexico	1994	methomyl	I	83	1.2%	0.440	11.65	12.0%
green beans	Mexico	1994	dimethoate	I	83	8.4%	0.049	11.26	11.6%
green beans	Mexico	1994	benomyl	F	80	28.8%	0.391	10.78	11.1%
green beans	Mexico	1994	iprodione	F	83	6.0%	0.355	6.64	6.8%
green beans	Mexico	1994	carbaryl	I	83	1.2%	0.570	3.04	3.1%
green beans	Mexico	1994	methamidophos	I	83	6.0%	0.014	1.87	1.9%
green beans	Mexico	1994	chlorothalonil	F	83	1.2%	0.570	0.82	0.8%
green beans	Mexico	1994	azinphos-methyl	I	83	1.2%	0.020	0.65	0.7%
green beans	Mexico	1994	omethoate	I	61	1.6%	0.005	0.40	0.4%
green beans	Mexico	1994	acephate	I	83	1.2%	0.026	0.34	0.4%
green beans	Mexico	1994	permethrin	I	83	1.2%	0.103	0.24	0.2%
green beans	Mexico	1994	captan	F	78	2.6%	0.070	0.04	0.04%
Totals								**97.02**	**100.0%**
green beans	US	1995	acephate	I	483	23.2%	0.236	59.98	27.0%
green beans	US	1995	demeton-S-sulfone	I	72	5.6%	0.026	47.52	21.4%
green beans	US	1995	methamidophos	I	483	20.9%	0.099	46.68	21.0%
green beans	US	1995	endosulfans	I	483	21.1%	0.133	28.23	12.7%
green beans	US	1995	dimethoate	I	483	5.0%	0.088	12.02	5.4%
green beans	US	1995	methomyl	I	483	4.6%	0.072	7.26	3.3%
green beans	US	1995	omethoate	I	302	4.3%	0.025	5.19	2.3%
green beans	US	1995	diazinon	I	483	0.6%	0.385	4.60	2.1%
green beans	US	1995	carbaryl	I	482	2.7%	0.230	2.75	1.2%
green beans	US	1995	iprodione	F	483	1.7%	0.324	1.67	0.7%
green beans	US	1995	chlorothalonil	F	483	16.4%	0.074	1.44	0.6%
green beans	US	1995	esfenvalerate	I	389	5.9%	0.044	1.29	0.6%
green beans	US	1995	vinclozolin	F	387	3.6%	0.106	1.25	0.6%
green beans	US	1995	azinphos-methyl	I	483	0.8%	0.027	0.60	0.3%
green beans	US	1995	oxamyl	I	483	0.2%	0.025	0.58	0.3%
green beans	US	1995	DDE	I	483	1.7%	0.008	0.30	0.1%
green beans	US	1995	DDT	I	178	0.6%	0.010	0.28	0.1%
green beans	US	1995	permethrin	I	483	1.0%	0.113	0.23	0.1%
green beans	US	1995	dicloran	F	483	0.6%	0.467	0.17	0.1%

Table 5.

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
green beans	US	1995	methidathion	I	483	0.2%	0.040	0.17	0.1%
green beans	US	1995	metalaxyl	F	18	33.3%	0.005	0.10	0.05%
green beans	US	1995	quintozene	F	483	3.1%	0.006	0.09	0.04%
green beans	US	1995	dicofol	I	483	0.2%	0.008	0.05	0.02%
green beans	US	1995	lindane	I	483	0.2%	0.005	0.01	0.01%
green beans	US	1995	captan	F	349	0.3%	0.140	0.01	0.004%
green beans	US	1995	fenvalerate	I	483	0.2%	0.020	0.00	0.002%
Totals								**222.47**	**100.0%**
green beans	US	1994	acephate	I	484	25.6%	0.298	83.66	28.5%
green beans	US	1994	methamidophos	I	484	24.2%	0.114	62.27	21.2%
green beans	US	1994	dimethoate	I	484	7.9%	0.238	51.45	17.5%
green beans	US	1994	endosulfan	I	484	23.8%	0.188	44.84	15.3%
green beans	US	1994	omethoate	I	379	7.7%	0.052	19.22	6.5%
green beans	US	1994	methomyl	I	484	4.1%	0.132	11.98	4.1%
green beans	US	1994	carbaryl	I	484	5.2%	0.253	5.78	2.0%
green beans	US	1994	aldicarb sulfoxide	I	483	0.2%	0.076	5.55	1.9%
green beans	US	1994	benomyl	F	479	10.9%	0.265	2.76	0.9%
green beans	US	1994	chlorothalonil	F	482	19.3%	0.090	2.05	0.7%
green beans	US	1994	iprodione	F	484	1.4%	0.329	1.48	0.5%
green beans	US	1994	vinclozolin	F	385	3.6%	0.056	0.67	0.2%
green beans	US	1994	azinphos-methyl	I	483	0.6%	0.031	0.52	0.2%
green beans	US	1994	carbofuran	I	450	0.7%	0.017	0.43	0.1%
green beans	US	1994	esfenvalerate	I	243	1.6%	0.051	0.42	0.1%
green beans	US	1994	DDE	I	484	0.8%	0.012	0.24	0.1%
green beans	US	1994	dichlorvos (DDVP)	I	484	0.2%	0.012	0.21	0.1%
green beans	US	1994	quintozene (PCNB)	F	484	4.1%	0.008	0.14	0.05%
green beans	US	1994	dicloran	F	484	1.7%	0.103	0.10	0.03%
green beans	US	1994	permethrin	I	484	0.4%	0.124	0.10	0.03%
green beans	US	1994	aldoxycarb	I	395	0.3%	0.013	0.08	0.03%
green beans	US	1994	diazinon	I	484	0.4%	0.009	0.07	0.02%
green beans	US	1994	fenvalerate	I	372	0.5%	0.038	0.02	0.01%
Totals								**294.02**	**100.0%**
green beans, canned/frozen	US	1997	parathion-methyl	I	691	4.6%	0.048	432.63	81.8%
green beans, canned/frozen	US	1997	acephate	I	654	46.3%	0.074	37.72	7.1%
green beans, canned/frozen	US	1997	methamidophos	I	664	45.3%	0.027	27.68	5.2%
green beans, canned/frozen	US	1997	demeton-S-sulfone	I	107	9.3%	0.007	20.29	3.8%
green beans, canned/frozen	US	1997	carbaryl	I	683	10.7%	0.070	3.33	0.6%
green beans, canned/frozen	US	1997	dimethoate	I	690	1.9%	0.038	1.98	0.4%
green beans, canned/frozen	US	1997	vinclozolin	F	669	18.2%	0.030	1.78	0.3%
green beans, canned/frozen	US	1997	dicofol	I	691	0.6%	0.049	0.92	0.2%
green beans, canned/frozen	US	1997	methomyl	I	691	1.0%	0.033	0.74	0.1%
green beans, canned/frozen	US	1997	carbofuran	I	687	0.3%	0.043	0.48	0.1%
green beans, canned/frozen	US	1997	omethoate	I	691	0.7%	0.013	0.47	0.1%
green beans, canned/frozen	US	1997	esfenvalerate	I	557	1.4%	0.040	0.29	0.1%
green beans, canned/frozen	US	1997	diazinon	I	691	1.0%	0.008	0.15	0.03%
green beans, canned/frozen	US	1997	diphenylamine (DPA)	F	678	0.9%	0.071	0.09	0.02%
green beans, canned/frozen	US	1997	fenvalerate	I	691	1.2%	0.058	0.08	0.01%
green beans, canned/frozen	US	1997	DDE	I	691	0.3%	0.008	0.05	0.01%
green beans, canned/frozen	US	1997	endosulfan sulfate	I	691	0.6%	0.008	0.05	0.01%
green beans, canned/frozen	US	1997	iprodione	F	691	0.4%	0.030	0.04	0.01%
green beans, canned/frozen	US	1997	endosulfan II	I	691	0.4%	0.005	0.02	0.004%
green beans, canned/frozen	US	1997	endosulfan I	I	691	0.4%	0.003	0.01	0.002%
green beans, canned/frozen	US	1997	propargite	I	691	0.1%	0.037	0.01	0.002%
green beans, canned/frozen	US	1997	o-phenylphenol	F	599	0.8%	0.013	0.01	0.002%
green beans, canned/frozen	US	1997	quintozene	F	691	0.1%	0.005	0.00	0.001%
green beans, canned/frozen	US	1997	dicloran	F	691	0.3%	0.013	0.00	0.0004%
green beans, canned/frozen	US	1997	metalaxyl	F	194	0.5%	0.005	0.00	0.0003%
green beans, canned/frozen	US	1997	thiabendazole	F	691	0.1%	0.015	0.00	0.0001%
Totals								**528.84**	**100.0%**
green beans, canned/frozen	US	1996	parathion-methyl	I	525	3.4%	0.016	109.17	49.3%
green beans, canned/frozen	US	1996	demeton-S-sulfone	I	80	13.8%	0.009	39.06	17.6%
green beans, canned/frozen	US	1996	acephate	I	525	33.9%	0.099	36.97	16.7%
green beans, canned/frozen	US	1996	methamidophos	I	525	32.6%	0.034	24.99	11.3%
green beans, canned/frozen	US	1996	carbaryl	I	525	12.0%	0.059	3.12	1.4%
green beans, canned/frozen	US	1996	dimethoate	I	525	2.9%	0.030	2.34	1.1%
green beans, canned/frozen	US	1996	vinclozolin	F	410	20.2%	0.029	1.91	0.9%
green beans, canned/frozen	US	1996	omethoate	I	446	2.9%	0.013	1.87	0.8%
green beans, canned/frozen	US	1996	esfenvalerate	I	410	3.4%	0.033	0.56	0.3%
green beans, canned/frozen	US	1996	methomyl	I	525	1.0%	0.027	0.56	0.3%
green beans, canned/frozen	US	1996	DDT	I	197	0.5%	0.010	0.25	0.1%
green beans, canned/frozen	US	1996	dicofol	I	525	0.2%	0.030	0.18	0.1%
green beans, canned/frozen	US	1996	diazinon	I	525	0.8%	0.009	0.14	0.1%
green beans, canned/frozen	US	1996	DDE	I	525	0.8%	0.007	0.13	0.1%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
green beans, canned/frozen	US	1996	fenvalerate	I	525	1.7%	0.056	0.11	0.05%
green beans, canned/frozen	US	1996	endosulfan sulfate	I	525	0.8%	0.008	0.06	0.03%
green beans, canned/frozen	US	1996	iprodione	F	525	0.8%	0.022	0.05	0.02%
green beans, canned/frozen	US	1996	permethrin	I	525	0.4%	0.058	0.04	0.02%
green beans, canned/frozen	US	1996	o-phenylphenol	F	440	2.0%	0.025	0.04	0.02%
green beans, canned/frozen	US	1996	endosulfan I	I	525	0.6%	0.004	0.02	0.01%
green beans, canned/frozen	US	1996	metalaxyl	F	80	6.3%	0.005	0.02	0.01%
green beans, canned/frozen	US	1996	endosulfan II	I	525	0.2%	0.005	0.01	0.004%
green beans, canned/frozen	US	1996	quintozene	F	525	0.2%	0.005	0.00	0.002%
Totals								**221.62**	**100.0%**
lettuce	US	1994	mevinphos	I	688	11.0%	0.044	60.93	50.1%
lettuce	US	1994	methomyl	I	688	4.9%	0.164	17.86	14.7%
lettuce	US	1994	dimethoate	I	688	11.9%	0.040	13.04	10.7%
lettuce	US	1994	permethrin	I	690	14.1%	0.374	10.19	8.4%
lettuce	US	1994	endosulfan	I	688	21.1%	0.042	8.86	7.3%
lettuce	US	1994	acephate	I	688	12.8%	0.026	3.62	3.0%
lettuce	US	1994	omethoate	I	488	5.1%	0.012	2.89	2.4%
lettuce	US	1994	diazinon	I	688	3.9%	0.017	1.28	1.1%
lettuce	US	1994	methamidophos	I	688	5.8%	0.010	1.25	1.0%
lettuce	US	1994	cypermethrin	I	98	1.0%	0.100	0.74	0.6%
lettuce	US	1994	DDE	I	688	2.9%	0.010	0.71	0.6%
lettuce	US	1994	DDT	I	421	0.2%	0.013	0.15	0.1%
lettuce	US	1994	chlorpyrifos	I	688	0.1%	0.010	0.07	0.1%
lettuce	US	1994	dicloran	F	688	0.9%	0.042	0.02	0.02%
lettuce	US	1994	malathion	I	688	0.3%	0.033	0.00	0.004%
lettuce	US	1994	chlorothalonil	F	634	0.2%	0.005	0.00	0.001%
Totals								**121.60**	**100.0%**
milk	US	1997	DDE	I	727	14.2%	0.003	1.01	96.4%
milk	US	1997	o-phenylphenol	F	273	1.8%	0.011	0.02	1.5%
milk	US	1997	ivermectin	I	424	0.2%	0.002	0.02	1.5%
milk	US	1997	thiabendazole	F	543	0.4%	0.050	0.00	0.4%
milk	US	1997	diphenylamine (DPA)	F	665	0.2%	0.010	0.00	0.2%
Totals								**1.05**	**100.0%**
milk	US	1996	DDE	I	570	17.4%	0.002	1.05	94.9%
milk	US	1996	dichlorvos	I	570	0.2%	0.003	0.04	4.0%
milk	US	1996	o-phenylphenol	F	202	0.5%	0.010	0.00	0.3%
milk	US	1996	thiabendazole	F	536	0.7%	0.050	0.01	0.7%
Totals								**1.10**	**100.0%**
orange juice	Brazil	1997	aldicarb	I	66	1.5%	0.035	18.70	82.4%
orange juice	Brazil	1997	ethion	I	66	34.8%	0.002	1.92	8.5%
orange juice	Brazil	1997	methidathion	I	66	6.1%	0.005	0.61	2.7%
orange juice	Brazil	1997	dicofol	I	66	1.5%	0.010	0.49	2.2%
orange juice	Brazil	1997	imazalil	F	66	3.0%	0.046	0.47	2.1%
orange juice	Brazil	1997	carbaryl	I	66	9.1%	0.011	0.42	1.9%
orange juice	Brazil	1997	thiabendazole	F	66	6.1%	0.048	0.06	0.3%
orange juice	Brazil	1997	o-phenylphenol	F	65	1.5%	0.017	0.02	0.1%
Totals								**22.70**	**100.0%**
orange juice	US	1997	imazalil	F	480	4.0%	0.043	0.58	32.1%
orange juice	US	1997	ethion	I	487	9.2%	0.002	0.58	31.7%
orange juice	US	1997	carbaryl	I	487	3.7%	0.012	0.19	10.5%
orange juice	US	1997	thiabendazole	F	480	8.3%	0.079	0.14	7.8%
orange juice	US	1997	methidathion	I	487	1.2%	0.005	0.12	6.9%
orange juice	US	1997	dicofol	I	487	0.2%	0.010	0.07	3.7%
orange juice	US	1997	o-phenylphenol	F	398	3.8%	0.020	0.06	3.2%
orange juice	US	1997	chlorpyrifos	I	487	0.2%	0.005	0.05	2.5%
orange juice	US	1997	diphenylamine (DPA)	F	474	0.4%	0.050	0.03	1.7%
Totals								**1.82**	**100.0%**
oranges	Australia	1995	imazalil	F	7	71.4%	0.121	29.31	98.9%
oranges	Australia	1995	thiabendazole	F	14	7.1%	0.210	0.32	1.1%
Totals								**29.63**	**100.0%**
oranges	US	1996	imazalil	F	511	58.1%	0.174	34.42	69.6%
oranges	US	1996	chlorpyrifos	I	511	12.1%	0.007	3.62	7.3%
oranges	US	1996	o-phenylphenol	F	447	14.8%	0.227	2.53	5.1%
oranges	US	1996	aldicarb sulfoxide	I	511	0.4%	0.017	2.35	4.7%
oranges	US	1996	carbaryl	I	511	11.9%	0.042	2.20	4.5%
oranges	US	1996	thiabendazole	F	511	44.4%	0.199	1.90	3.8%
oranges	US	1996	methidathion	I	511	6.5%	0.009	1.13	2.3%
oranges	US	1996	dicofol	I	511	0.6%	0.023	0.44	0.9%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
oranges	US	1996	ethion	I	511	0.8%	0.018	0.37	0.7%
oranges	US	1996	omethoate	I	432	0.5%	0.008	0.17	0.3%
oranges	US	1996	azinphos-methyl	I	511	0.2%	0.020	0.10	0.2%
oranges	US	1996	propargite	I	511	2.2%	0.025	0.08	0.2%
oranges	US	1996	dimethoate	I	511	0.4%	0.007	0.07	0.1%
oranges	US	1996	endosulfan sulfate	I	511	1.0%	0.005	0.05	0.1%
oranges	US	1996	diphenylamine	F	447	0.2%	0.086	0.03	0.1%
oranges	US	1996	malathion	I	511	0.8%	0.011	0.00	0.01%
oranges	US	1996	fenbutatin oxide	I	340	0.9%	0.005	0.00	0.003%
Totals								**49.48**	**100.0%**
oranges	US	1995	imazalil	F	680	57.1%	0.115	22.32	59.2%
oranges	US	1995	formetanate HCL	I	512	3.5%	0.096	6.84	18.1%
oranges	US	1995	carbaryl	I	680	10.4%	0.047	2.19	5.8%
oranges	US	1995	chlorpyrifos	I	680	7.4%	0.005	1.79	4.7%
oranges	US	1995	thiabendazole	F	1186	34.7%	0.210	1.57	4.2%
oranges	US	1995	aldicarb sulfoxide	I	680	0.1%	0.015	0.78	2.1%
oranges	US	1995	methidathion	I	680	3.1%	0.008	0.53	1.4%
oranges	US	1995	o-phenylphenol	F	513	15.6%	0.042	0.49	1.3%
oranges	US	1995	omethoate	I	614	0.8%	0.010	0.40	1.1%
oranges	US	1995	azinphos-methyl	I	680	0.1%	0.073	0.29	0.8%
oranges	US	1995	propargite	I	655	0.3%	0.580	0.27	0.7%
oranges	US	1995	endosulfans	I	680	2.1%	0.005	0.10	0.3%
oranges	US	1995	dimethoate	I	680	0.4%	0.004	0.05	0.1%
oranges	US	1995	ethion	I	680	0.7%	0.002	0.04	0.1%
oranges	US	1995	dicofol	I	680	0.1%	0.008	0.04	0.1%
oranges	US	1995	fenbutatin oxide	I	338	0.9%	0.005	0.00	0.004%
oranges	US	1995	malathion	I	680	0.3%	0.009	0.00	0.003%
Totals								**37.70**	**100.0%**
oranges	US	1994	formetanate HCL	I	663	10.6%	0.499	106.91	77.4%
oranges	US	1994	imazalil	F	676	52.4%	0.110	19.62	14.2%
oranges	US	1994	thiabendazole	F	676	62.3%	0.198	2.65	1.9%
oranges	US	1994	chlorpyrifos	I	676	4.7%	0.009	1.82	1.3%
oranges	US	1994	carbaryl	I	676	7.7%	0.044	1.50	1.1%
oranges	US	1994	aldicarb sulfoxide	I	676	0.1%	0.025	1.30	0.9%
oranges	US	1994	ethion	I	676	3.6%	0.012	1.11	0.8%
oranges	US	1994	dicofol	I	676	1.5%	0.023	1.10	0.8%
oranges	US	1994	methidathion	I	676	4.7%	0.009	0.83	0.6%
oranges	US	1994	omethoate	I	583	0.9%	0.010	0.40	0.3%
oranges	US	1994	o-phenylphenol	F	346	18.5%	0.026	0.36	0.3%
oranges	US	1994	dimethoate	I	676	1.8%	0.005	0.26	0.2%
oranges	US	1994	carbofuran	I	551	0.2%	0.030	0.21	0.2%
oranges	US	1994	endosulfan	I	676	1.5%	0.005	0.07	0.1%
oranges	US	1994	benomyl	F	679	0.4%	0.073	0.03	0.02%
Totals								**138.18**	**100.0%**
peaches	Chile	1996	iprodione	F	126	80.2%	0.857	213.27	45.3%
peaches	Chile	1996	azinphos-methyl	I	126	72.2%	0.072	138.89	29.5%
peaches	Chile	1996	dicofol	I	126	4.0%	0.278	35.62	7.6%
peaches	Chile	1996	benomyl	F	130	56.9%	0.511	27.88	5.9%
peaches	Chile	1996	chlorpyrifos	I	126	34.9%	0.010	16.36	3.5%
peaches	Chile	1996	phosmet	I	105	21.0%	0.114	13.18	2.8%
peaches	Chile	1996	propargite	I	126	12.7%	0.422	8.35	1.8%
peaches	Chile	1996	carbaryl	I	127	15.7%	0.052	3.60	0.8%
peaches	Chile	1996	endosulfan II	I	126	9.5%	0.036	3.42	0.7%
peaches	Chile	1996	dicloran	F	126	4.8%	0.860	2.45	0.5%
peaches	Chile	1996	diazinon	I	126	7.9%	0.016	2.41	0.5%
peaches	Chile	1996	endosulfan sulfate	I	126	9.5%	0.019	1.81	0.4%
peaches	Chile	1996	methomyl	I	127	0.8%	0.093	1.61	0.3%
peaches	Chile	1996	endosulfan I	I	126	6.3%	0.017	1.05	0.2%
peaches	Chile	1996	captan	F	126	9.5%	0.269	0.60	0.1%
peaches	Chile	1996	diphenylamine	F	104	4.8%	0.081	0.57	0.1%
peaches	Chile	1996	methamidophos	I	126	0.8%	0.005	0.09	0.0%
peaches	Chile	1996	imazalil	F	126	0.8%	0.017	0.05	0.0%
peaches	Chile	1996	fenvalerate	I	126	1.6%	0.025	0.05	0.0%
peaches	Chile	1996	fenbutatin oxide	I	118	1.7%	0.040	0.02	0.0%
Totals								**471.27**	**100.0%**
peaches	Chile	1995	iprodione	F	115	75.7%	0.638	149.62	40.9%
peaches	Chile	1995	azinphos-methyl	I	115	59.1%	0.070	111.53	30.5%
peaches	Chile	1995	dicofol	I	115	3.5%	0.320	36.00	9.8%
peaches	Chile	1995	phosmet	I	103	27.2%	0.095	14.24	3.9%
peaches	Chile	1995	chlorpyrifos	I	115	30.4%	0.009	12.41	3.4%
peaches	Chile	1995	formetanate HCL	I	86	7.0%	0.085	12.04	3.3%
peaches	Chile	1995	dimethoate	I	115	1.7%	0.184	8.80	2.4%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
peaches	Chile	1995	propargite	I	115	8.7%	0.474	6.36	1.7%
peaches	Chile	1995	diazinon	I	115	17.4%	0.017	5.68	1.6%
peaches	Chile	1995	carbaryl	I	115	6.1%	0.187	5.04	1.4%
peaches	Chile	1995	omethoate	I	103	1.9%	0.029	2.68	0.7%
peaches	Chile	1995	benomyl	F	114	3.5%	0.234	0.79	0.2%
peaches	Chile	1995	endosulfans	I	115	4.3%	0.008	0.37	0.1%
peaches	Chile	1995	dicloran	F	115	1.7%	0.223	0.23	0.1%
peaches	Chile	1995	vinclozolin	F	115	2.6%	0.014	0.12	0.03%
peaches	Chile	1995	captan	F	115	10.4%	0.023	0.06	0.02%
peaches	Chile	1995	fenvalerate	I	115	0.9%	0.038	0.04	0.01%
peaches	Chile	1995	permethrin	I	115	0.9%	0.020	0.03	0.01%
peaches	Chile	1995	diphenylamine	F	90	1.1%	0.017	0.03	0.01%
Totals								**366.06**	**100.0%**
peaches	Chile	1994	iprodione	F	123	71.5%	0.682	151.43	39.7%
peaches	Chile	1994	azinphos-methyl	I	123	48.0%	0.114	146.59	38.5%
peaches	Chile	1994	benomyl	F	125	61.6%	0.428	25.25	6.6%
peaches	Chile	1994	phosmet	I	123	19.5%	0.135	14.54	3.8%
peaches	Chile	1994	dicofol	I	123	0.8%	0.380	9.99	2.6%
peaches	Chile	1994	vinclozolin	F	118	4.2%	0.721	9.93	2.6%
peaches	Chile	1994	carbaryl	I	123	13.8%	0.102	6.22	1.6%
peaches	Chile	1994	propargite	I	123	5.7%	0.518	4.59	1.2%
peaches	Chile	1994	diazinon	I	123	21.1%	0.010	3.87	1.0%
peaches	Chile	1994	endosulfan	I	123	5.7%	0.053	3.03	0.8%
peaches	Chile	1994	chlorpyrifos	I	123	5.7%	0.008	1.96	0.5%
peaches	Chile	1994	mevinphos	I	123	0.8%	0.010	1.01	0.3%
peaches	Chile	1994	dicloran	F	123	2.4%	0.540	0.79	0.2%
peaches	Chile	1994	fenvalerate	I	31	6.5%	0.080	0.60	0.2%
peaches	Chile	1994	parathion-ethyl	I	109	0.9%	0.003	0.38	0.1%
peaches	Chile	1994	captan	F	119	15.1%	0.086	0.30	0.1%
peaches	Chile	1994	o-phenylphenol	F	43	14.0%	0.017	0.18	0.05%
peaches	Chile	1994	dimethoate	I	123	0.8%	0.006	0.13	0.04%
peaches	Chile	1994	thiabendazole	F	123	4.9%	0.093	0.10	0.03%
peaches	Chile	1994	lindane	I	123	0.8%	0.010	0.09	0.02%
Totals								**380.97**	**100.0%**
peaches	US	1996	parathion-methyl	I	198	41.4%	0.056	4,507.05	93.0%
peaches	US	1996	iprodione	F	198	78.3%	0.923	224.16	4.6%
peaches	US	1996	phosmet	I	168	31.5%	0.217	37.76	0.8%
peaches	US	1996	carbaryl	I	198	16.2%	0.412	29.45	0.6%
peaches	US	1996	azinphos-methyl	I	198	8.6%	0.054	12.39	0.3%
peaches	US	1996	dicloran	F	198	51.5%	0.394	12.16	0.3%
peaches	US	1996	propargite	I	198	21.7%	0.324	10.97	0.2%
peaches	US	1996	methomyl	I	198	1.5%	0.183	6.11	0.1%
peaches	US	1996	chlorpyrifos	I	198	5.6%	0.008	2.01	0.04%
peaches	US	1996	dicofol	I	198	1.0%	0.047	1.53	0.03%
peaches	US	1996	fenbutatin oxide	I	155	22.6%	0.137	1.15	0.02%
peaches	US	1996	endosulfan sulfate	I	198	2.0%	0.045	0.90	0.02%
peaches	US	1996	endosulfan II	I	198	2.5%	0.020	0.50	0.01%
peaches	US	1996	permethrin	I	198	0.5%	0.480	0.47	0.01%
peaches	US	1996	myclobutanil	F	198	10.1%	0.055	0.38	0.01%
peaches	US	1996	endosulfan I	I	198	2.0%	0.011	0.21	0.004%
peaches	US	1996	imazalil	F	198	1.5%	0.017	0.09	0.002%
peaches	US	1996	captan	F	198	5.6%	0.064	0.08	0.002%
peaches	US	1996	benomyl	F	199	1.0%	0.083	0.08	0.002%
peaches	US	1996	diazinon	I	198	1.0%	0.004	0.08	0.002%
peaches	US	1996	thiabendazole	F	198	1.0%	0.042	0.01	0.0002%
peaches	US	1996	chlorothalonil	F	198	0.5%	0.012	0.01	0.0001%
Totals								**4,847.55**	**100.0%**
peaches	US	1995	parathion-methyl	I	249	41.8%	0.061	4,893.41	91.0%
peaches	US	1995	iprodione	F	249	66.7%	1.109	229.17	4.3%
peaches	US	1995	formetanate HCL	I	80	25.0%	0.214	108.77	2.0%
peaches	US	1995	carbaryl	I	249	18.5%	0.500	40.94	0.8%
peaches	US	1995	dicloran	F	249	61.8%	0.866	31.29	0.6%
peaches	US	1995	phosmet	I	215	14.4%	0.261	20.78	0.4%
peaches	US	1995	azinphos-methyl	I	249	13.3%	0.057	20.19	0.4%
peaches	US	1995	propargite	I	249	24.9%	0.423	16.25	0.3%
peaches	US	1995	chlorpyrifos	I	249	10.0%	0.007	3.05	0.1%
peaches	US	1995	endosulfans	I	249	9.6%	0.028	2.71	0.1%
peaches	US	1995	methoxychlor	I	249	0.8%	0.420	2.60	0.05%
peaches	US	1995	methomyl	I	249	1.2%	0.060	1.60	0.03%
peaches	US	1995	diazinon	I	249	1.2%	0.064	1.49	0.03%
peaches	US	1995	captan	F	249	19.3%	0.203	0.91	0.02%
peaches	US	1995	benomyl	F	255	0.8%	0.895	0.67	0.01%
peaches	US	1995	permethrin	I	249	3.2%	0.102	0.64	0.01%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
peaches	US	1995	esfenvalerate	I	136	2.9%	0.043	0.63	0.01%
peaches	US	1995	fenbutatin oxide	I	155	12.9%	0.050	0.24	0.004%
peaches	US	1995	vinclozolin	F	249	0.8%	0.051	0.13	0.002%
peaches	US	1995	dimethoate	I	249	0.8%	0.005	0.10	0.002%
peaches	US	1995	DDE	I	249	0.4%	0.005	0.05	0.001%
peaches	US	1995	o-phenylphenol	F	158	1.9%	0.031	0.04	0.001%
peaches	US	1995	myclobutanil	F	249	1.2%	0.053	0.04	0.001%
peaches	US	1995	chlorothalonil	F	235	0.4%	0.065	0.03	0.001%
peaches	US	1995	fenvalerate	I	244	0.4%	0.020	0.01	0.0002%
peaches	US	1995	thiabendazole	F	504	0.2%	0.050	0.00	0.00004%
peaches	US	1995	malathion	I	249	0.8%	0.005	0.00	0.00003%
Totals								**5,375.76**	**100.0%**
peaches	US	1994	parathion-methyl	I	271	42.8%	0.049	4,041.74	92.1%
peaches	US	1994	iprodione	F	271	66.4%	0.896	184.70	4.2%
peaches	US	1994	carbaryl	I	271	16.6%	0.509	37.44	0.9%
peaches	US	1994	formetanate HCL	I	273	6.2%	0.237	30.01	0.7%
peaches	US	1994	dicloran	F	271	53.5%	0.898	28.75	0.7%
peaches	US	1994	propargite	I	271	29.2%	0.473	21.46	0.5%
peaches	US	1994	azinphos-methyl	I	271	7.4%	0.095	18.83	0.4%
peaches	US	1994	phosmet	I	271	13.3%	0.148	10.84	0.2%
peaches	US	1994	methoxychlor	I	271	0.7%	0.815	4.64	0.1%
peaches	US	1994	lindane	I	271	0.4%	0.710	3.01	0.1%
peaches	US	1994	benomyl	F	272	11.0%	0.155	1.64	0.04%
peaches	US	1994	chlorpyrifos	I	271	3.0%	0.012	1.63	0.04%
peaches	US	1994	permethrin	I	271	5.2%	0.146	1.46	0.03%
peaches	US	1994	endosulfan	I	271	5.2%	0.026	1.37	0.03%
peaches	US	1994	vinclozolin	F	271	0.7%	0.352	0.84	0.02%
peaches	US	1994	captan	F	271	12.5%	0.129	0.38	0.01%
peaches	US	1994	methomyl	I	270	0.4%	0.033	0.27	0.01%
peaches	US	1994	diazinon	I	271	1.5%	0.009	0.26	0.01%
peaches	US	1994	o-phenylphenol	F	133	10.5%	0.018	0.15	0.003%
peaches	US	1994	DDE	I	271	0.4%	0.011	0.10	0.002%
peaches	US	1994	thiabendazole	F	271	0.7%	0.243	0.04	0.001%
peaches	US	1994	myclobutanil	F	271	0.4%	0.033	0.01	0.0002%
peaches	US	1994	chlorothalonil	F	244	0.4%	0.010	0.00	0.0001%
Totals								**4,389.57**	**100.0%**
peaches, canned	US	1997	carbaryl	I	728	11.0%	0.079	3.86	83.3%
peaches, canned	US	1997	iprodione	F	745	2.7%	0.030	0.25	5.3%
peaches, canned	US	1997	azinphos-methyl	I	743	0.1%	0.053	0.19	4.1%
peaches, canned	US	1997	piperonyl butoxide	I	112	0.9%	0.120	0.08	1.8%
peaches, canned	US	1997	methamidophos	I	745	0.3%	0.012	0.07	1.5%
peaches, canned	US	1997	o-phenylphenol	F	648	3.2%	0.024	0.06	1.3%
peaches, canned	US	1997	esfenvalerate	I	402	0.2%	0.042	0.05	1.1%
peaches, canned	US	1997	diphenylamine (DPA)	F	725	0.1%	0.140	0.03	0.6%
peaches, canned	US	1997	fenvalerate	I	745	0.3%	0.050	0.02	0.3%
peaches, canned	US	1997	benomyl	F	741	0.1%	0.083	0.01	0.2%
peaches, canned	US	1997	acephate	I	743	0.1%	0.007	0.01	0.2%
peaches, canned	US	1997	myclobutanil	F	745	0.3%	0.025	0.00	0.1%
peaches, canned	US	1997	thiabendazole	F	743	0.3%	0.042	0.00	0.1%
Totals								**4.64**	**100.0%**
pears	Argentina	1997	azinphos-methyl	I	34	73.5%	0.039	76.66	48.8%
pears	Argentina	1997	diphenylamine (DPA)	F	33	33.3%	0.634	31.20	19.9%
pears	Argentina	1997	phosmet	I	28	53.6%	0.074	21.74	13.8%
pears	Argentina	1997	dicofol	I	34	5.9%	0.051	9.70	6.2%
pears	Argentina	1997	carbaryl	I	34	38.2%	0.051	8.64	5.5%
pears	Argentina	1997	thiabendazole	F	32	50.0%	0.675	7.27	4.6%
pears	Argentina	1997	captan	F	32	50.0%	0.120	1.40	0.9%
pears	Argentina	1997	propargite	I	34	5.9%	0.033	0.30	0.2%
pears	Argentina	1997	iprodione	F	34	2.9%	0.025	0.23	0.1%
Totals								**157.14**	**100.0%**
pears	Chile	1997	dicofol	I	66	13.6%	0.410	180.66	43.5%
pears	Chile	1997	azinphos-methyl	I	66	63.6%	0.072	123.18	29.7%
pears	Chile	1997	phosmet	I	58	56.9%	0.160	50.20	12.1%
pears	Chile	1997	chlorpyrifos	I	66	15.2%	0.019	12.67	3.1%
pears	Chile	1997	thiabendazole	F	62	53.2%	0.976	11.19	2.7%
pears	Chile	1997	parathion-ethyl	I	58	1.7%	0.046	10.86	2.6%
pears	Chile	1997	diphenylamine (DPA)	F	64	45.3%	0.084	5.63	1.4%
pears	Chile	1997	diazinon	I	66	28.8%	0.008	4.34	1.0%
pears	Chile	1997	captan	F	65	50.8%	0.354	4.19	1.0%
pears	Chile	1997	omethoate	I	66	4.5%	0.014	3.08	0.7%
pears	Chile	1997	dimethoate	I	66	6.1%	0.018	2.92	0.7%
pears	Chile	1997	propargite	I	66	4.5%	0.234	1.66	0.4%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
pears	Chile	1997	iprodione	F	66	16.7%	0.024	1.25	0.3%
pears	Chile	1997	carbaryl	I	66	7.6%	0.029	0.98	0.2%
pears	Chile	1997	dichlorvos	I	66	1.5%	0.005	0.64	0.2%
pears	Chile	1997	endosulfan II	I	66	3.0%	0.018	0.55	0.1%
pears	Chile	1997	endosulfan I	I	66	3.0%	0.012	0.37	0.1%
pears	Chile	1997	endosulfan sulfate	I	66	3.0%	0.012	0.37	0.1%
pears	Chile	1997	methidathion	I	66	1.5%	0.005	0.15	0.04%
pears	Chile	1997	fenvalerate	I	66	1.5%	0.050	0.09	0.02%
pears	Chile	1997	o-phenylphenol	F	58	5.2%	0.013	0.05	0.01%
Totals								**415.02**	**100.0%**
pears	South Africa	1997	azinphos-methyl	I	13	92.3%	0.068	168.34	83.6%
pears	South Africa	1997	iprodione	F	13	61.5%	0.157	29.99	14.9%
pears	South Africa	1997	diphenylamine (DPA)	F	13	61.5%	0.033	2.99	1.5%
Totals								**201.32**	**100.0%**
pears	US	1997	parathion-methyl	I	588	6.0%	0.018	208.11	47.8%
pears	US	1997	azinphos-methyl	I	582	67.9%	0.089	161.15	37.0%
pears	US	1997	o-phenylphenol	F	510	29.6%	0.820	18.34	4.2%
pears	US	1997	dicofol	I	588	1.5%	0.328	16.23	3.7%
pears	US	1997	thiabendazole	F	581	71.8%	0.522	8.07	1.9%
pears	US	1997	oxamyl	I	588	1.0%	0.060	6.89	1.6%
pears	US	1997	phosmet	I	509	13.0%	0.074	5.32	1.2%
pears	US	1997	formetanate HCL	I	171	2.3%	0.105	4.97	1.1%
pears	US	1997	diphenylamine (DPA)	F	576	18.8%	0.068	1.87	0.4%
pears	US	1997	carbaryl	I	588	4.1%	0.073	1.32	0.3%
pears	US	1997	diazinon	I	588	0.9%	0.038	0.62	0.1%
pears	US	1997	parathion-ethyl	I	510	0.4%	0.008	0.43	0.1%
pears	US	1997	endosulfan II	I	588	2.6%	0.015	0.40	0.1%
pears	US	1997	dimethoate	I	588	0.2%	0.060	0.28	0.1%
pears	US	1997	omethoate	I	588	0.2%	0.026	0.21	0.0%
pears	US	1997	chlorpyrifos	I	588	0.3%	0.014	0.21	0.05%
pears	US	1997	endosulfan sulfate	I	573	2.3%	0.008	0.19	0.04%
pears	US	1997	methoxychlor	I	588	0.5%	0.044	0.17	0.04%
pears	US	1997	endosulfan I	I	588	1.0%	0.009	0.09	0.02%
pears	US	1997	captan	F	567	2.5%	0.092	0.05	0.01%
pears	US	1997	propargite	I	588	0.2%	0.160	0.04	0.01%
pears	US	1997	esfenvalerate	I	467	0.2%	0.033	0.04	0.01%
pears	US	1997	iprodione	F	573	0.2%	0.025	0.01	0.003%
pears	US	1997	fenvalerate	I	588	0.2%	0.050	0.01	0.002%
Totals								**435.05**	**100.0%**
potatoes	US	1995	phorate sulfoxide	I	310	1.6%	0.058	15.95	27.1%
potatoes	US	1995	demeton-S-sulfone	I	144	2.1%	0.022	15.08	25.6%
potatoes	US	1995	phorate sulfone	I	310	4.5%	0.011	8.36	14.2%
potatoes	US	1995	phorate oxygen analog	I	59	6.8%	0.005	5.82	9.9%
potatoes	US	1995	DDT	I	388	10.6%	0.010	5.34	9.1%
potatoes	US	1995	DDE	I	702	15.1%	0.008	2.83	4.8%
potatoes	US	1995	endosulfans	I	702	18.9%	0.013	2.49	4.2%
potatoes	US	1995	thiabendazole	F	702	18.2%	0.387	1.52	2.6%
potatoes	US	1995	o-phenylphenol	F	656	4.7%	0.168	0.59	1.0%
potatoes	US	1995	methamidophos	I	702	2.0%	0.010	0.44	0.7%
potatoes	US	1995	disulfoton	I	702	0.1%	0.005	0.11	0.2%
potatoes	US	1995	metalaxyl	F	40	15.0%	0.011	0.10	0.2%
potatoes	US	1995	tecnazene	F	101	2.0%	0.030	0.08	0.1%
potatoes	US	1995	quintozene	F	702	0.6%	0.019	0.05	0.1%
potatoes	US	1995	phosphamidon	I	702	0.1%	0.003	0.05	0.1%
potatoes	US	1995	pentachlorobenzene	F	702	0.7%	0.006	0.02	0.03%
potatoes	US	1995	diphenylamine	F	687	0.1%	0.057	0.01	0.02%
Totals								**58.84**	**100.0%**
potatoes	US	1994	dieldrin	I	36	11.1%	0.010	139.18	73.1%
potatoes	US	1994	phorate sulfoxide	I	197	2.0%	0.064	22.32	11.7%
potatoes	US	1994	phorate sulfone	I	260	2.3%	0.047	18.63	9.8%
potatoes	US	1994	thiabendazole	F	688	23.4%	0.455	2.29	1.2%
potatoes	US	1994	DDE	I	688	9.6%	0.010	2.27	1.2%
potatoes	US	1994	DDT	I	491	3.9%	0.010	2.01	1.1%
potatoes	US	1994	endosulfan	I	688	12.1%	0.016	1.97	1.0%
potatoes	US	1994	carbofuran	I	597	0.3%	0.049	0.64	0.3%
potatoes	US	1994	o-phenylphenol	F	357	3.9%	0.172	0.51	0.3%
potatoes	US	1994	carbofuran-3 OH	I	579	0.2%	0.035	0.24	0.1%
potatoes	US	1994	methamidophos	I	688	0.7%	0.010	0.16	0.1%
potatoes	US	1994	chlorpyrifos	I	688	0.1%	0.024	0.16	0.1%
potatoes	US	1994	quintozene (PCNB)	F	688	0.6%	0.021	0.05	0.03%
potatoes	US	1994	iprodione	F	688	0.1%	0.088	0.04	0.02%
potatoes	US	1994	dimethoate	I	688	0.1%	0.005	0.02	0.01%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
potatoes	US	1994	dicloran	F	688	0.6%	0.046	0.02	0.01%
potatoes	US	1994	acephate	I	688	0.1%	0.005	0.01	0.004%
potatoes	US	1994	captan	F	603	0.2%	0.020	0.00	0.0004%
Totals								**190.52**	**100.0%**
soybean, grain	US	1997	chlorpyrifos	I	157	80.3%	0.014	51.56	77.6%
soybean, grain	US	1997	dieldrin	I	159	3.8%	0.003	14.54	21.9%
soybean, grain	US	1997	malathion	I	159	33.3%	0.014	0.21	0.3%
soybean, grain	US	1997	DDD	I	159	0.6%	0.008	0.09	0.1%
soybean, grain	US	1997	thiabendazole	F	136	1.5%	0.012	0.00	0.0%
soybean, grain	US	1997	metolachlor	H	159	3.1%	0.003	0.00	0.0%
Totals								**66.41**	**100.0%**
spinach, fresh	Mexico	1997	methomyl	I	12	25.0%	0.347	190.50	74.4%
spinach, fresh	Mexico	1997	endosulfan sulfate	I	12	16.7%	0.176	29.36	11.5%
spinach, fresh	Mexico	1997	permethrin	I	12	16.7%	0.717	23.16	9.1%
spinach, fresh	Mexico	1997	DDE	I	12	41.7%	0.011	11.53	4.5%
spinach, fresh	Mexico	1997	endosulfan II	I	12	8.3%	0.010	0.84	0.3%
spinach, fresh	Mexico	1997	diazinon	I	12	8.3%	0.003	0.48	0.2%
Totals								**255.87**	**100.0%**
spinach, fresh	Mexico	1996	methomyl	I	21	42.9%	0.228	214.46	34.4%
spinach, fresh	Mexico	1996	omethoate	I	17	35.3%	0.082	139.25	22.3%
spinach, fresh	Mexico	1996	dimethoate	I	21	9.5%	0.530	138.79	22.3%
spinach, fresh	Mexico	1996	endosulfan sulfate	I	21	38.1%	0.136	52.06	8.4%
spinach, fresh	Mexico	1996	permethrin	I	21	38.1%	0.584	43.09	6.9%
spinach, fresh	Mexico	1996	DDE	I	21	47.6%	0.005	5.90	0.9%
spinach, fresh	Mexico	1996	diazinon	I	21	14.3%	0.019	5.12	0.8%
spinach, fresh	Mexico	1996	chlorothalonil	F	21	4.8%	0.880	4.98	0.8%
spinach, fresh	Mexico	1996	mevinphos	I	21	4.8%	0.007	4.14	0.7%
spinach, fresh	Mexico	1996	chlorpyrifos	I	21	9.5%	0.009	3.83	0.6%
spinach, fresh	Mexico	1996	methamidophos	I	21	19.0%	0.007	2.89	0.5%
spinach, fresh	Mexico	1996	endosulfan II	I	21	19.0%	0.015	2.77	0.4%
spinach, fresh	Mexico	1996	esfenvalerate	I	12	8.3%	0.042	1.75	0.3%
spinach, fresh	Mexico	1996	carbaryl	I	21	4.8%	0.077	1.62	0.3%
spinach, fresh	Mexico	1996	endosulfan I	I	21	19.0%	0.005	0.96	0.2%
spinach, fresh	Mexico	1996	acephate	I	21	4.8%	0.018	0.94	0.2%
spinach, fresh	Mexico	1996	benomyl	F	22	4.5%	0.120	0.52	0.1%
spinach, fresh	Mexico	1996	fenvalerate	I	21	4.8%	0.050	0.27	0.04%
spinach, fresh	Mexico	1996	dicloran	F	21	4.8%	0.010	0.03	0.005%
Totals								**623.39**	**100.0%**
spinach, fresh	Mexico	1995	permethrin	I	14	42.9%	0.366	30.38	29.5%
spinach, fresh	Mexico	1995	mevinphos	I	14	7.1%	0.025	22.17	21.6%
spinach, fresh	Mexico	1995	methomyl	I	14	7.1%	0.120	18.85	18.3%
spinach, fresh	Mexico	1995	endosulfans	I	14	35.7%	0.052	18.64	18.1%
spinach, fresh	Mexico	1995	DDE	I	14	42.9%	0.009	9.54	9.3%
spinach, fresh	Mexico	1995	methamidophos	I	14	7.1%	0.020	3.22	3.1%
Totals								**102.80**	**100.0%**
spinach, fresh	US	1997	permethrin	I	497	54.1%	1.580	165.77	47.5%
spinach, fresh	US	1997	omethoate	I	497	13.1%	0.099	62.45	17.9%
spinach, fresh	US	1997	methomyl	I	497	9.7%	0.168	35.60	10.2%
spinach, fresh	US	1997	dimethoate	I	486	6.6%	0.141	25.58	7.3%
spinach, fresh	US	1997	dieldrin	I	193	1.6%	0.011	21.97	6.3%
spinach, fresh	US	1997	DDE	I	497	41.4%	0.017	16.66	4.8%
spinach, fresh	US	1997	DDT	I	375	9.9%	0.013	6.35	1.8%
spinach, fresh	US	1997	endosulfan sulfate	I	497	8.7%	0.065	5.65	1.6%
spinach, fresh	US	1997	diazinon	I	497	1.4%	0.089	2.40	0.7%
spinach, fresh	US	1997	parathion-methyl	I	497	0.2%	0.003	1.17	0.3%
spinach, fresh	US	1997	chlorpyrifos	I	497	2.2%	0.011	1.12	0.3%
spinach, fresh	US	1997	methamidophos	I	497	2.2%	0.019	0.95	0.3%
spinach, fresh	US	1997	chlordane cis	I	79	1.3%	0.002	0.75	0.2%
spinach, fresh	US	1997	chlordane trans	I	79	1.3%	0.002	0.75	0.2%
spinach, fresh	US	1997	acephate	I	497	2.6%	0.024	0.70	0.2%
spinach, fresh	US	1997	endosulfan II	I	497	2.2%	0.024	0.53	0.2%
spinach, fresh	US	1997	endosulfan I	I	497	1.4%	0.020	0.28	0.1%
spinach, fresh	US	1997	metalaxyl	F	79	10.1%	0.013	0.08	0.02%
spinach, fresh	US	1997	lindane	I	497	0.4%	0.008	0.04	0.01%
spinach, fresh	US	1997	o-phenylphenol	F	431	2.3%	0.017	0.03	0.01%
spinach, fresh	US	1997	DDD	I	431	0.2%	0.005	0.02	0.01%
spinach, fresh	US	1997	iprodione	F	497	0.2%	0.030	0.02	0.01%
spinach, fresh	US	1997	diphenylamine (DPA)	F	485	0.2%	0.050	0.02	0.004%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
spinach, fresh	US	1997	vinclozolin	F	497	0.2%	0.014	0.01	0.003%
spinach, fresh	US	1997	dicloran	F	497	1.6%	0.007	0.01	0.002%
spinach, fresh	US	1997	quintozene	F	497	0.6%	0.002	0.01	0.002%
spinach, fresh	US	1997	chlorothalonil	F	440	0.2%	0.007	0.00	0.001%
Totals								**348.91**	**100.0%**
spinach, fresh	US	1996	permethrin	I	491	61.5%	1.641	195.69	39.5%
spinach, fresh	US	1996	methomyl	I	491	10.8%	0.531	125.99	25.4%
spinach, fresh	US	1996	omethoate	I	409	16.6%	0.056	45.04	9.1%
spinach, fresh	US	1996	dimethoate	I	491	7.3%	0.200	40.40	8.2%
spinach, fresh	US	1996	DDE	I	491	58.9%	0.017	23.59	4.8%
spinach, fresh	US	1996	endosulfan sulfate	I	491	12.8%	0.142	18.25	3.7%
spinach, fresh	US	1996	dieldrin	I	169	3.0%	0.004	14.44	2.9%
spinach, fresh	US	1996	DDT	I	403	13.2%	0.018	11.81	2.4%
spinach, fresh	US	1996	demeton-S-sulfone	I	74	1.4%	0.013	5.78	1.2%
spinach, fresh	US	1996	azinphos-methyl	I	491	0.8%	0.183	3.99	0.8%
spinach, fresh	US	1996	oxamyl	I	491	0.4%	0.049	2.22	0.4%
spinach, fresh	US	1996	chlorpyrifos	I	491	4.9%	0.008	1.84	0.4%
spinach, fresh	US	1996	cypermethrin	I	283	1.1%	0.194	1.49	0.3%
spinach, fresh	US	1996	endosulfan II	I	491	5.1%	0.020	1.00	0.2%
spinach, fresh	US	1996	diazinon	I	491	2.2%	0.023	1.00	0.2%
spinach, fresh	US	1996	endosulfan I	I	491	4.3%	0.021	0.90	0.2%
spinach, fresh	US	1996	acephate	I	491	3.1%	0.018	0.61	0.1%
spinach, fresh	US	1996	methamidophos	I	491	3.1%	0.006	0.41	0.1%
spinach, fresh	US	1996	metalaxyl	F	156	5.8%	0.094	0.33	0.1%
spinach, fresh	US	1996	carbofuran-3 OH	I	491	0.2%	0.033	0.26	0.1%
spinach, fresh	US	1996	chlorothalonil	F	491	0.6%	0.111	0.08	0.02%
spinach, fresh	US	1996	piperonyl butoxide	I	74	1.4%	0.060	0.06	0.01%
spinach, fresh	US	1996	DDD	I	403	0.2%	0.014	0.06	0.01%
spinach, fresh	US	1996	iprodione	F	491	0.4%	0.038	0.05	0.01%
spinach, fresh	US	1996	carbaryl	I	491	0.2%	0.039	0.04	0.01%
spinach, fresh	US	1996	dicloran	F	489	3.3%	0.014	0.03	0.01%
spinach, fresh	US	1996	quintozene	F	491	0.8%	0.006	0.02	0.004%
spinach, fresh	US	1996	captan	F	485	1.4%	0.051	0.02	0.003%
spinach, fresh	US	1996	o-phenylphenol	F	425	0.7%	0.016	0.01	0.002%
spinach, fresh	US	1996	malathion	I	491	0.2%	0.003	0.00	0.0001%
Totals								**495.42**	**100.0%**
spinach, fresh	US	1995	permethrin	I	593	61.6%	2.446	291.77	52.7%
spinach, fresh	US	1995	dimethoate	I	592	5.1%	0.482	67.10	12.1%
spinach, fresh	US	1995	omethoate	I	501	17.6%	0.055	46.42	8.4%
spinach, fresh	US	1995	methomyl	I	593	10.8%	0.183	43.31	7.8%
spinach, fresh	US	1995	DDE	I	593	49.4%	0.022	26.10	4.7%
spinach, fresh	US	1995	dieldrin	I	128	1.6%	0.013	25.09	4.5%
spinach, fresh	US	1995	endosulfans	I	593	13.7%	0.120	16.47	3.0%
spinach, fresh	US	1995	DDT	I	503	17.1%	0.015	13.14	2.4%
spinach, fresh	US	1995	mevinphos	I	592	2.5%	0.027	8.62	1.6%
spinach, fresh	US	1995	demeton-S-sulfone	I	70	1.4%	0.010	4.70	0.8%
spinach, fresh	US	1995	chlorpyrifos	I	593	7.8%	0.011	3.75	0.7%
spinach, fresh	US	1995	diazinon	I	592	3.0%	0.038	2.22	0.4%
spinach, fresh	US	1995	cypermethrin	I	281	0.7%	0.300	1.54	0.3%
spinach, fresh	US	1995	acephate	I	592	4.9%	0.025	1.33	0.2%
spinach, fresh	US	1995	carbofuran-3 OH	I	593	0.2%	0.140	0.92	0.2%
spinach, fresh	US	1995	methamidophos	I	592	2.2%	0.009	0.43	0.1%
spinach, fresh	US	1995	DDD	I	502	1.6%	0.008	0.24	0.04%
spinach, fresh	US	1995	carbaryl	I	593	1.3%	0.032	0.19	0.03%
spinach, fresh	US	1995	carbofuran	I	593	0.2%	0.025	0.16	0.03%
spinach, fresh	US	1995	metalaxyl	F	22	18.2%	0.008	0.09	0.02%
spinach, fresh	US	1995	lindane	I	593	0.3%	0.015	0.06	0.01%
spinach, fresh	US	1995	vinclozolin	F	593	0.3%	0.042	0.05	0.01%
spinach, fresh	US	1995	chlorothalonil	F	580	1.0%	0.021	0.03	0.005%
spinach, fresh	US	1995	dicloran	F	593	2.2%	0.010	0.01	0.002%
spinach, fresh	US	1995	o-phenylphenol	F	379	0.3%	0.052	0.01	0.002%
spinach, fresh	US	1995	fenvalerate	I	553	0.2%	0.038	0.01	0.001%
spinach, fresh	US	1995	malathion	I	593	0.7%	0.011	0.00	0.001%
Totals								**553.77**	**100.0%**
spinach, canned	US	1997	permethrin	I	168	83.9%	1.187	193.17	94.5%
spinach, canned	US	1997	DDE	I	168	25.0%	0.011	6.50	3.2%
spinach, canned	US	1997	parathion-ethyl	I	146	2.7%	0.012	4.60	2.2%
spinach, canned	US	1997	diphenylamine (DPA)	F	168	1.2%	0.109	0.19	0.1%
spinach, canned	US	1997	trifluralin	H	168	0.6%	0.025	0.03	0.01%
Totals								**204.49**	**100.0%**

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
sweet corn	US	1995	o-phenylphenol	F	593	0.3%	0.020	0.01	52.1%
sweet corn	US	1995	endosulfans	I	651	0.2%	0.003	0.00	47.9%
Totals								**0.01**	**100.0%**
sweet corn	US	1994	benomyl	F	364	0.3%	0.084	0.02	100.0%
Totals								**0.02**	**100.0%**
sweet peas, canned/frozen	US	1996	parathion-methyl	I	346	0.9%	0.006	10.07	47.1%
sweet peas, canned/frozen	US	1996	dimethoate	I	346	14.2%	0.018	7.07	33.0%
sweet peas, canned/frozen	US	1996	omethoate	I	346	6.9%	0.009	2.94	13.7%
sweet peas, canned/frozen	US	1996	carbaryl	I	346	2.0%	0.093	0.84	3.9%
sweet peas, canned/frozen	US	1996	endosulfan sulfate	I	346	1.2%	0.013	0.15	0.7%
sweet peas, canned/frozen	US	1996	methoxychlor	I	346	0.6%	0.028	0.12	0.6%
sweet peas, canned/frozen	US	1996	endosulfan II	I	346	0.6%	0.011	0.06	0.3%
sweet peas, canned/frozen	US	1996	diazinon	I	346	0.6%	0.005	0.06	0.3%
sweet peas, canned/frozen	US	1996	o-phenylphenol	F	346	2.3%	0.024	0.04	0.2%
sweet peas, canned/frozen	US	1996	methamidophos	I	346	0.3%	0.005	0.03	0.2%
sweet peas, canned/frozen	US	1996	endosulfan I	I	346	0.3%	0.006	0.02	0.1%
Totals								**21.40**	**100.0%**
sweet peas	US	1995	parathion-methyl	I	660	1.4%	0.004	11.73	53.9%
sweet peas	US	1995	dimethoate	I	660	11.7%	0.019	6.19	28.5%
sweet peas	US	1995	omethoate	I	574	7.1%	0.008	2.64	12.1%
sweet peas	US	1995	carbaryl	I	660	1.2%	0.105	0.56	2.6%
sweet peas	US	1995	diazinon	I	660	1.1%	0.016	0.33	1.5%
sweet peas	US	1995	methoxychlor	I	660	0.3%	0.081	0.19	0.9%
sweet peas	US	1995	parathion-ethyl	I	660	0.2%	0.003	0.06	0.3%
sweet peas	US	1995	endosulfans	I	660	0.3%	0.009	0.03	0.1%
sweet peas	US	1995	o-phenylphenol	F	592	1.4%	0.024	0.02	0.1%
Totals								**21.76**	**100.0%**
sweet peas	US	1994	dimethoate	I	346	6.9%	0.019	3.69	62.0%
sweet peas	US	1994	omethoate	I	288	2.1%	0.010	1.01	17.0%
sweet peas	US	1994	carbaryl	I	346	1.2%	0.177	0.90	15.2%
sweet peas	US	1994	methomyl	I	346	0.6%	0.025	0.32	5.3%
sweet peas	US	1994	diazinon	I	346	0.3%	0.005	0.03	0.5%
Totals								**5.94**	**100.0%**
sweet potatoes	US	1997	dicloran	F	675	57.2%	0.290	9.92	40.4%
sweet potatoes	US	1997	parathion-methyl	I	691	0.3%	0.009	4.76	19.4%
sweet potatoes	US	1997	chlorpyrifos	I	691	11.0%	0.009	4.36	17.7%
sweet potatoes	US	1997	phosmet	I	667	5.7%	0.101	3.16	12.9%
sweet potatoes	US	1997	aldicarb sulfoxide	I	679	0.1%	0.017	0.88	3.6%
sweet potatoes	US	1997	DDE	I	677	1.5%	0.015	0.55	2.2%
sweet potatoes	US	1997	piperonyl butoxide	I	179	4.5%	0.081	0.29	1.2%
sweet potatoes	US	1997	carbaryl	I	691	0.3%	0.150	0.19	0.8%
sweet potatoes	US	1997	endosulfan sulfate	I	691	1.4%	0.009	0.13	0.5%
sweet potatoes	US	1997	aldoxycarb	I	563	0.2%	0.017	0.07	0.3%
sweet potatoes	US	1997	endosulfan I	I	691	0.7%	0.006	0.05	0.2%
sweet potatoes	US	1997	o-phenylphenol	F	667	1.5%	0.033	0.04	0.2%
sweet potatoes	US	1997	endosulfan II	I	691	0.6%	0.006	0.04	0.1%
sweet potatoes	US	1997	diazinon	I	691	0.4%	0.004	0.04	0.1%
sweet potatoes	US	1997	benomyl	F	689	0.1%	0.180	0.03	0.1%
sweet potatoes	US	1997	permethrin	I	691	0.4%	0.021	0.02	0.1%
sweet potatoes	US	1997	methamidophos	I	691	0.1%	0.005	0.02	0.1%
sweet potatoes	US	1997	acephate	I	676	0.1%	0.007	0.01	0.05%
sweet potatoes	US	1997	fenvalerate	I	676	0.1%	0.050	0.01	0.03%
sweet potatoes	US	1997	diphenylamine (DPA)	F	691	0.1%	0.017	0.00	0.01%
sweet potatoes	US	1997	thiabendazole	F	691	0.3%	0.029	0.00	0.01%
sweet potatoes	US	1997	malathion	I	691	0.1%	0.023	0.00	0.01%
Totals								**24.55**	**100.0%**
sweet potatoes	US	1996	aldicarb sulfoxide	I	507	1.0%	0.071	24.70	44.0%
sweet potatoes	US	1996	dicloran	F	497	63.6%	0.375	14.28	25.4%
sweet potatoes	US	1996	phosmet	I	507	5.9%	0.145	4.72	8.4%
sweet potatoes	US	1996	chlorpyrifos	I	507	10.5%	0.010	4.70	8.4%
sweet potatoes	US	1996	dieldrin	I	129	0.8%	0.003	2.99	5.3%
sweet potatoes	US	1996	DDT	I	272	5.1%	0.008	2.11	3.7%
sweet potatoes	US	1996	DDE	I	507	4.7%	0.008	0.88	1.6%
sweet potatoes	US	1996	carbaryl	I	507	0.2%	0.670	0.58	1.0%
sweet potatoes	US	1996	piperonyl butoxide	I	129	10.9%	0.066	0.56	1.0%
sweet potatoes	US	1996	aldoxycarb	I	372	0.5%	0.033	0.41	0.7%
sweet potatoes	US	1996	endosulfan sulfate	I	507	1.6%	0.005	0.08	0.1%
sweet potatoes	US	1996	endosulfan II	I	507	1.0%	0.005	0.05	0.1%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
sweet potatoes	US	1996	methamidophos	I	507	0.4%	0.006	0.05	0.1%
sweet potatoes	US	1996	acephate	I	507	0.4%	0.008	0.03	0.1%
sweet potatoes	US	1996	endosulfan I	I	507	0.4%	0.005	0.02	0.03%
sweet potatoes	US	1996	o-phenylphenol	F	507	0.8%	0.025	0.01	0.03%
sweet potatoes	US	1996	thiabendazole	F	507	0.4%	0.100	0.01	0.02%
sweet potatoes	US	1996	diphenylamine	F	507	0.2%	0.015	0.00	0.01%
sweet potatoes	US	1996	malathion	I	507	1.6%	0.005	0.00	0.01%
Totals								**56.18**	**100.0%**
tomatoes	Canada	1997	oxamyl	I	21	4.8%	0.043	23.05	87.4%
tomatoes	Canada	1997	iprodione	F	21	9.5%	0.068	2.00	7.6%
tomatoes	Canada	1997	dicloran	F	21	9.5%	0.212	1.21	4.6%
tomatoes	Canada	1997	myclobutanil	F	21	4.8%	0.040	0.13	0.5%
Totals								**26.38**	**100.0%**
tomatoes	Mexico	1997	chlorpyrifos	I	191	37.2%	0.036	60.04	37.8%
tomatoes	Mexico	1997	methamidophos	I	191	38.2%	0.034	29.17	18.4%
tomatoes	Mexico	1997	azinphos-methyl	I	190	4.7%	0.104	13.15	8.3%
tomatoes	Mexico	1997	parathion-methyl	I	191	0.5%	0.012	12.16	7.7%
tomatoes	Mexico	1997	fenamiphos sulfoxide	I	61	3.3%	0.021	9.89	6.2%
tomatoes	Mexico	1997	oxamyl	I	192	2.6%	0.028	8.27	5.2%
tomatoes	Mexico	1997	endosulfan II	I	192	43.2%	0.013	5.85	3.7%
tomatoes	Mexico	1997	endosulfan sulfate	I	192	35.9%	0.012	4.45	2.8%
tomatoes	Mexico	1997	fenamiphos sulfone	I	148	2.0%	0.013	3.88	2.4%
tomatoes	Mexico	1997	endosulfan I	I	192	32.8%	0.011	3.51	2.2%
tomatoes	Mexico	1997	omethoate	I	191	4.2%	0.017	3.45	2.2%
tomatoes	Mexico	1997	permethrin	I	191	16.2%	0.072	2.26	1.4%
tomatoes	Mexico	1997	cypermethrin	I	63	3.2%	0.050	1.15	0.7%
tomatoes	Mexico	1997	vinclozolin	F	191	2.1%	0.086	0.58	0.4%
tomatoes	Mexico	1997	fenamiphos	I	192	0.5%	0.007	0.54	0.3%
tomatoes	Mexico	1997	benomyl	F	193	1.6%	0.122	0.18	0.1%
tomatoes	Mexico	1997	metalaxyl	F	11	9.1%	0.026	0.14	0.1%
tomatoes	Mexico	1997	iprodione	F	191	1.0%	0.044	0.14	0.1%
tomatoes	Mexico	1997	chlorothalonil	F	191	1.6%	0.025	0.05	0.03%
tomatoes	Mexico	1997	fenvalerate	I	191	1.0%	0.027	0.03	0.02%
tomatoes	Mexico	1997	diazinon	I	191	0.5%	0.003	0.03	0.02%
tomatoes	Mexico	1997	dicloran	F	191	1.0%	0.029	0.02	0.01%
tomatoes	Mexico	1997	o-phenylphenol	F	176	1.1%	0.016	0.01	0.01%
tomatoes	Mexico	1997	diphenylamine (DPA)	F	186	0.5%	0.013	0.01	0.01%
tomatoes	Mexico	1997	captan	F	192	1.0%	0.023	0.01	0.004%
Totals								**158.98**	**100.0%**
tomatoes	Mexico	1996	chlorpyrifos	I	31	38.7%	0.036	62.91	51.2%
tomatoes	Mexico	1996	methamidophos	I	31	41.9%	0.013	11.98	9.7%
tomatoes	Mexico	1996	azinphos-methyl	I	31	19.4%	0.022	11.15	9.1%
tomatoes	Mexico	1996	endosulfan II	I	31	45.2%	0.023	10.49	8.5%
tomatoes	Mexico	1996	endosulfan I	I	31	38.7%	0.019	7.32	6.0%
tomatoes	Mexico	1996	endosulfan sulfate	I	31	38.7%	0.014	5.44	4.4%
tomatoes	Mexico	1996	permethrin	I	31	22.6%	0.110	4.80	3.9%
tomatoes	Mexico	1996	omethoate	I	30	10.0%	0.007	3.55	2.9%
tomatoes	Mexico	1996	benomyl	F	33	18.2%	0.098	1.70	1.4%
tomatoes	Mexico	1996	vinclozolin	F	27	11.1%	0.036	1.30	1.1%
tomatoes	Mexico	1996	esfenvalerate	I	20	10.0%	0.025	1.25	1.0%
tomatoes	Mexico	1996	iprodione	F	31	3.2%	0.100	1.00	0.8%
tomatoes	Mexico	1996	myclobutanil	F	31	3.2%	0.025	0.06	0.05%
Totals								**122.93**	**100.0%**
tomatoes	US	1997	methamidophos	I	486	29.4%	0.043	28.19	51.7%
tomatoes	US	1997	dicofol	I	497	2.4%	0.065	5.11	9.4%
tomatoes	US	1997	dieldrin	I	131	0.8%	0.005	4.90	9.0%
tomatoes	US	1997	chlorpyrifos	I	483	4.1%	0.025	4.59	8.4%
tomatoes	US	1997	endosulfan II	I	497	15.1%	0.014	2.12	3.9%
tomatoes	US	1997	omethoate	I	483	2.5%	0.015	1.80	3.3%
tomatoes	US	1997	endosulfan I	I	484	11.8%	0.015	1.73	3.2%
tomatoes	US	1997	endosulfan sulfate	I	497	14.3%	0.012	1.70	3.1%
tomatoes	US	1997	chlorothalonil	F	484	10.5%	0.115	1.44	2.6%
tomatoes	US	1997	permethrin	I	483	10.1%	0.061	1.20	2.2%
tomatoes	US	1997	o-phenylphenol	F	424	8.5%	0.062	0.40	0.7%
tomatoes	US	1997	ethion	I	483	0.2%	0.049	0.27	0.5%
tomatoes	US	1997	esfenvalerate	I	277	1.4%	0.038	0.27	0.5%
tomatoes	US	1997	benomyl	F	496	1.6%	0.107	0.17	0.3%
tomatoes	US	1997	carbaryl	I	497	0.4%	0.085	0.15	0.3%
tomatoes	US	1997	acephate	I	483	0.8%	0.009	0.08	0.1%
tomatoes	US	1997	azinphos-methyl	I	482	0.2%	0.013	0.07	0.1%
tomatoes	US	1997	diazinon	I	483	0.2%	0.015	0.06	0.1%
tomatoes	US	1997	piperonyl butoxide	I	92	1.1%	0.067	0.06	0.1%

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
tomatoes	US	1997	fenvalerate	I	483	0.8%	0.054	0.05	0.1%
tomatoes	US	1997	dimethoate	I	482	0.2%	0.005	0.03	0.1%
tomatoes	US	1997	DDD	I	327	0.3%	0.005	0.03	0.1%
tomatoes	US	1997	diphenylamine (DPA)	F	488	0.6%	0.025	0.02	0.04%
tomatoes	US	1997	dicloran	F	483	0.6%	0.060	0.02	0.04%
tomatoes	US	1997	vinclozolin	F	483	0.4%	0.013	0.02	0.03%
tomatoes	US	1997	iprodione	F	483	0.2%	0.025	0.02	0.03%
Totals								**54.50**	**100.0%**
tomatoes	US	1996	methamidophos	I	134	38.1%	0.035	30.00	47.6%
tomatoes	US	1996	dicofol	I	132	3.8%	0.097	11.85	18.8%
tomatoes	US	1996	chlorothalonil	F	134	14.9%	0.209	3.71	5.9%
tomatoes	US	1996	oxamyl	I	134	1.5%	0.022	3.61	5.7%
tomatoes	US	1996	esfenvalerate	I	68	8.8%	0.060	2.66	4.2%
tomatoes	US	1996	omethoate	I	117	3.4%	0.015	2.40	3.8%
tomatoes	US	1996	chlorpyrifos	I	134	3.0%	0.013	1.67	2.6%
tomatoes	US	1996	permethrin	I	134	8.2%	0.093	1.47	2.3%
tomatoes	US	1996	azinphos-methyl	I	134	1.5%	0.024	0.96	1.5%
tomatoes	US	1996	endosulfan II	I	134	11.2%	0.007	0.82	1.3%
tomatoes	US	1996	carbofuran-3 OH	I	134	0.7%	0.024	0.70	1.1%
tomatoes	US	1996	endosulfan sulfate	I	134	9.0%	0.007	0.60	1.0%
tomatoes	US	1996	endosulfan I	I	134	7.5%	0.008	0.56	0.9%
tomatoes	US	1996	iprodione	F	134	1.5%	0.120	0.56	0.9%
tomatoes	US	1996	DDE	I	134	1.5%	0.014	0.51	0.8%
tomatoes	US	1996	o-phenylphenol	F	111	14.4%	0.031	0.33	0.5%
tomatoes	US	1996	fenvalerate	I	134	3.0%	0.086	0.29	0.5%
tomatoes	US	1996	piperonyl butoxide	I	24	4.2%	0.067	0.22	0.3%
tomatoes	US	1996	ethion	I	134	0.7%	0.004	0.08	0.1%
tomatoes	US	1996	acephate	I	134	0.7%	0.007	0.06	0.1%
Totals								**63.06**	**100.0%**
wheat	US	1997	parathion-methyl	I	623	0.2%	0.031	9.63	30.1%
wheat	US	1997	chlorpyrifos-methyl	I	622	55.6%	0.106	8.06	25.2%
wheat	US	1997	malathion	I	623	68.2%	0.213	6.77	21.2%
wheat	US	1997	chlorpyrifos	I	623	6.4%	0.011	3.19	10.0%
wheat	US	1997	pirimiphos-methyl	I	623	3.7%	0.003	1.77	5.5%
wheat	US	1997	methoxychlor	I	617	5.2%	0.042	1.67	5.2%
wheat	US	1997	carbofuran	I	623	1.0%	0.010	0.39	1.2%
wheat	US	1997	phorate sulfone	I	564	0.2%	0.008	0.24	0.8%
wheat	US	1997	diazinon	I	623	0.8%	0.013	0.20	0.6%
wheat	US	1997	imazalil	F	543	1.5%	0.015	0.07	0.2%
wheat	US	1997	carbaryl	I	623	0.3%	0.005	0.01	0.02%
wheat	US	1997	thiabendazole	F	291	0.7%	0.020	0.00	0.01%
Totals								**32.01**	**100.0%**
wheat	US	1996	chlorpyrifos-methyl	I	340	73.2%	0.092	9.23	31.9%
wheat	US	1996	chlorpyrifos	I	340	14.4%	0.011	7.24	25.0%
wheat	US	1996	parathion-methyl	I	340	0.3%	0.010	5.69	19.7%
wheat	US	1996	malathion	I	340	70.3%	0.070	2.30	7.9%
wheat	US	1996	disulfoton sulfone	I	340	0.3%	0.025	1.14	3.9%
wheat	US	1996	parathion-ethyl	I	340	0.3%	0.022	0.89	3.1%
wheat	US	1996	methoxychlor PP	I	340	4.7%	0.024	0.88	3.1%
wheat	US	1996	phorate sulfone	I	340	0.6%	0.008	0.81	2.8%
wheat	US	1996	azinphos-methyl	I	340	0.9%	0.022	0.52	1.8%
wheat	US	1996	imazalil	F	340	2.9%	0.011	0.11	0.4%
wheat	US	1996	diazinon	I	340	0.3%	0.013	0.07	0.3%
wheat	US	1996	carbaryl	I	340	0.3%	0.013	0.02	0.1%
wheat	US	1996	thiabendazole	F	340	0.3%	0.012	0.00	0.003%
Totals								**28.90**	**100.0%**
wheat	US	1995	chlorpyrifos-methyl	I	600	54.2%	0.105	7.82	43.7%
wheat	US	1995	chlorpyrifos	I	600	19.5%	0.006	5.49	30.7%
wheat	US	1995	malathion	I	600	71.0%	0.101	3.28	18.3%
wheat	US	1995	diazinon	I	600	3.0%	0.016	0.94	5.3%
wheat	US	1995	methoxychlor	I	600	1.0%	0.042	0.32	1.8%
wheat	US	1995	carbaryl	I	600	0.5%	0.008	0.02	0.1%
wheat	US	1995	imazalil	F	600	0.5%	0.010	0.02	0.1%
Totals								**17.89**	**100.0%**
winter squash, fresh	Honduras	1997	endosulfan sulfate	I	10	90.0%	0.013	12.05	53.2%
winter squash, fresh	Honduras	1997	hexachlorobenzene	F	10	10.0%	0.005	5.91	26.1%
winter squash, fresh	Honduras	1997	endosulfan I	I	10	20.0%	0.012	2.41	10.6%
winter squash, fresh	Honduras	1997	endosulfan II	I	10	10.0%	0.012	1.20	5.3%
winter squash, fresh	Honduras	1997	thiabendazole	F	10	20.0%	0.248	1.07	4.7%
Totals								**22.64**	**100.0%**

Food	Origin	Year	Pesticide	Type	Number of Samples	Percent Positive	Mean Residue	Toxicity Index	Share of Toxicity by Pesticide
winter squash, fresh	Mexico	1997	dieldrin	I	24	4.2%	0.006	32.12	78.3%
winter squash, fresh	Mexico	1997	endosulfan sulfate	I	161	37.3%	0.014	5.36	13.1%
winter squash, fresh	Mexico	1997	endosulfan I	I	161	7.5%	0.011	0.79	1.9%
winter squash, fresh	Mexico	1997	esfenvalerate	I	125	0.8%	0.190	0.76	1.9%
winter squash, fresh	Mexico	1997	methamidophos	I	161	5.0%	0.005	0.59	1.4%
winter squash, fresh	Mexico	1997	hexachlorobenzene	F	161	0.6%	0.007	0.51	1.3%
winter squash, fresh	Mexico	1997	DDE	I	161	1.2%	0.010	0.30	0.7%
winter squash, fresh	Mexico	1997	endosulfan II	I	161	3.1%	0.008	0.24	0.6%
winter squash, fresh	Mexico	1997	acephate	I	161	1.9%	0.008	0.17	0.4%
winter squash, fresh	Mexico	1997	chlorothalonil	F	140	6.4%	0.014	0.11	0.3%
winter squash, fresh	Mexico	1997	fenvalerate	I	161	0.6%	0.050	0.04	0.1%
winter squash, fresh	Mexico	1997	metalaxyl	F	24	4.2%	0.010	0.03	0.1%
winter squash, fresh	Mexico	1997	permethrin	I	161	0.6%	0.013	0.02	0.0%
Totals								**41.03**	**100.0%**
winter squash, fresh	US	1997	dieldrin	I	54	35.2%	0.034	1,541.74	90.4%
winter squash, fresh	US	1997	heptachlor epoxide	I	47	8.5%	0.009	142.31	8.3%
winter squash, fresh	US	1997	oxychlordane	I	30	3.3%	0.005	4.94	0.3%
winter squash, fresh	US	1997	endosulfan sulfate	I	258	15.1%	0.021	3.21	0.2%
winter squash, fresh	US	1997	DDE	I	258	6.6%	0.014	2.27	0.1%
winter squash, fresh	US	1997	chlordane cis	I	30	3.3%	0.002	1.98	0.1%
winter squash, fresh	US	1997	chlordane trans	I	30	3.3%	0.002	1.98	0.1%
winter squash, fresh	US	1997	DDT	I	137	2.9%	0.010	1.45	0.1%
winter squash, fresh	US	1997	dicofol	I	258	0.4%	0.081	1.02	0.1%
winter squash, fresh	US	1997	endosulfan I	I	258	7.0%	0.013	0.90	0.1%
winter squash, fresh	US	1997	methamidophos	I	258	2.7%	0.014	0.87	0.1%
winter squash, fresh	US	1997	endosulfan II	I	258	6.6%	0.011	0.74	0.0%
winter squash, fresh	US	1997	chlorothalonil	F	244	7.4%	0.077	0.67	0.0%
winter squash, fresh	US	1997	acephate	I	258	1.2%	0.040	0.51	0.0%
winter squash, fresh	US	1997	permethrin	I	258	3.1%	0.072	0.43	0.0%
winter squash, fresh	US	1997	piperonyl butoxide	I	30	6.7%	0.067	0.35	0.0%
winter squash, fresh	US	1997	captan	F	257	0.4%	1.600	0.15	0.0%
winter squash, fresh	US	1997	fenvalerate	I	258	0.4%	0.070	0.03	0.0%
winter squash, fresh	US	1997	metalaxyl	F	65	4.6%	0.011	0.03	0.0%
winter squash, fresh	US	1997	diazinon	I	258	0.4%	0.003	0.02	0.0%
winter squash, fresh	US	1997	quintozene	F	258	0.4%	0.010	0.02	0.0%
winter squash, fresh	US	1997	o-phenylphenol	F	235	0.4%	0.017	0.01	0.0%
winter squash, fresh	US	1997	myclobutanil	F	258	0.4%	0.013	0.00	0.0%
winter squash, fresh	US	1997	thiabendazole	F	252	0.4%	0.015	0.00	0.0%
Totals								**1,705.61**	**100.0%**
winter squash, frozen	Mexico	1997	endosulfan I	I	20	40.0%	0.023	9.09	44.0%
winter squash, frozen	Mexico	1997	endosulfan sulfate	I	20	40.0%	0.019	7.43	36.0%
winter squash, frozen	Mexico	1997	DDE	I	20	10.0%	0.012	2.91	14.1%
winter squash, frozen	Mexico	1997	endosulfan II	I	20	10.0%	0.012	1.20	5.8%
								20.63	**100.0%**
winter squash, frozen	US	1997	dieldrin	I	91	73.6%	0.028	2,603.44	86.4%
winter squash, frozen	US	1997	heptachlor epoxide	I	79	29.1%	0.007	362.17	12.0%
winter squash, frozen	US	1997	chlordane cis	I	53	7.5%	0.011	25.17	0.8%
winter squash, frozen	US	1997	chlordane trans	I	53	5.7%	0.005	8.39	0.3%
winter squash, frozen	US	1997	DDE	I	199	8.0%	0.029	5.75	0.2%
winter squash, frozen	US	1997	oxychlordane	I	53	3.8%	0.004	4.47	0.1%
winter squash, frozen	US	1997	endosulfan I	I	199	2.5%	0.040	1.01	0.0%
winter squash, frozen	US	1997	endosulfan sulfate	I	199	3.5%	0.017	0.59	0.0%
winter squash, frozen	US	1997	chlorpyrifos	I	199	2.0%	0.005	0.45	0.0%
winter squash, frozen	US	1997	endosulfan II	I	199	1.5%	0.016	0.24	0.0%
winter squash, frozen	US	1997	acephate	I	199	0.5%	0.043	0.24	0.0%
winter squash, frozen	US	1997	ethion	I	199	1.5%	0.005	0.20	0.0%
winter squash, frozen	US	1997	methamidophos	I	199	0.5%	0.015	0.17	0.0%
winter squash, frozen	US	1997	carbaryl	I	199	0.5%	0.042	0.09	0.0%
winter squash, frozen	US	1997	diphenylamine (DPA)	F	199	0.5%	0.025	0.02	0.0%
winter squash, frozen	US	1997	metalaxyl	F	78	1.3%	0.013	0.01	0.0%
winter squash, frozen	US	1997	thiabendazole	F	199	2.0%	0.015	0.01	0.0%
winter squash, frozen	US	1997	o-phenylphenol	F	155	0.6%	0.005	0.00	0.0%
								3,012	**100.0%**

Table 6. Odds of Exceeding "Safe" Daily Doses for Selected Pesticides in Selected Foods Tested by the USDA Pesticide Data Program, 1996 and 1997

Pesticide	Food	Country of Origin	Year	Reference Concen-tration (RfC) (ppm)	Number of Samples	Number of Positives	Percent Positive	Number Samples >RfC	Percent Positive Samples >RfC	Odds 100g Serving >RfD	Maximim Residue	Ratio of Max Residue to RfC
Dieldrin	Winter Squash, Frozen	U.S.	1997	0.01	91	67	73.6%	44	65.7%	48.0%	0.1	10
Heptachlor epoxide	Winter Squash, Frozen	U.S.	1997	0.002	79	23	29.1%	23	100%	29.1%	0.025	12.5
	Combined odds:									**77.1%**		
Methyl parathion	Peaches	U.S.	1996	0.004	198	82	41.4%	82	100%	41.4%	0.5	125
Azinphos-methyl	Peaches	U.S	1996	0.3	198	17	8.6%	0	0.0%	0.0%	0.26	0.87
	Combined odds:									**41.4%**		
Methyl parathion	Peaches	Chile	1996	0.004	126	0	0.0%	0	0%	0.0%	n.a.	n.a.
Azinphos-methyl	Peaches	Chile	1996	0.3	126	91	72.2%	5	5.5%	4.0%	0.41	1.37
	Combined odds:									**4.0%**		
Dieldrin	Winter Squash, Fresh	U.S.	1997	0.01	54	20	37.0%	15	75.0%	28.0%	0.093	9.3
Heptachlor epoxide	Winter Squash, Fresh	U.S.	1997	0.002	47	4	8.5%	4	100%	8.5%	0.015	7.5
	Combined odds:									**36.5%**		
Methyl parathion	Apples	U.S.	1996	0.004	502	30	6.0%	30	100%	6.0%	0.21	52.5
Chlorpyrifos	Apples	U.S.	1996	0.06	502	140	26.4%	20	14.3%	3.8%	0.23	3.83
Azinphos-methyl	Apples	U.S.	1996	0.3	502	267	53.2%	3	1.1%	0.6%	0.44	1.47
Dimethoate	Apples	U.S.	1996	0.1	502	15	3.0%	2	13.3%	0.4%	0.2	2.0
	Combined odds:									**10.8%**		
Methyl parathion	Apples	New Zealand	1996	0.004	15	0	0.0%	30	0%	0.0%	n.a.	n.a.
Chlorpyrifos	Apples	New Zealand	1996	0.06	15	12	80.0%	3	25.0%	20.0%	0.09	1.50
Azinphos-methyl	Apples	New Zealand	1996	0.3	15	14	93.3%	0	0.0%	0.0%	0.093	0.31
Dimethoate	Apples	New Zealand	1996	0.1	15	0	0.0%	0	0.0%	0.0%	n.a.	n.a.
	Combined odds:									**20.0%**		
Methyl parathion	Green Beans, Frozen	U.S.	1997	0.004	691	32	4.6%	29	90.6%	4.2%	0.38	95.0
Acephate	Green Beans, Frozen	U.S.	1997	0.24	654	303	46.3%	23	7.6%	3.5%	1.2	5.0
	Combined odds:									**7.7%**		
Omethoate	Grapes	Chile	1996	0.06	234	79	33.8%	19	24.1%	8.1%	0.23	3.83
Dimethoate	Grapes	Chile	1996	0.1	279	79	28.3%	20	25.3%	7.2%	0.66	6.6
Chlorpyrifos	Grapes	Chile	1996	0.06	279	56	20.1%	10	17.9%	3.6%	0.44	7.33
	Combined odds:									**18.9%**		
Omethoate	Grapes	U.S.	1996	0.06	183	4	2.2%	0	0.0%	0.0%	0.03	0.50
Dimethoate	Grapes	U.S.	1996	0.1	211	3	1.4%	0	0.0%	0.0%	0.008	0.1
Chlorpyrifos	Grapes	U.S.	1996	0.06	211	16	7.6%	0	0.0%	0.0%	0.059	0.98
Dicofol	Grapes	U.S.	1996	0.24	211	17	8.1%	8	47.1%	3.8%	2.5	10.4

Pesticide	Food	Country of Origin	Year	Reference Concen-tration (RfC) (ppm)	Number of Samples	Number of Positives	Percent Positive	Number Samples >RfC	Percent Positive Samples >RfC	Odds 100g Serving >RfD	Maximim Residue	Ratio of Max Residue to RfC
	Combined odds:									**3.8%**		
Omethoate	Spinach	U.S.	1997	0.06	497	65	13.1%	27	41.5%	5.4%	0.76	12.7
Dieldrin	Spinach	U.S.	1997	0.01	193	3	1.6%	2	66.7%	1.0%	0.016	1.6
Dimethoate	Spinach	U.S.	1997	0.1	486	32	6.6%	8	25%	1.7%	1.9	19.0
	Combined odds:									**8.1%**		
Omethoate	Spinach	Mexico	1996	0.06	17	6	35.3%	1	16.7%	5.9%	0.43	7.2
Dimethoate	Spinach	Mexico	1996	0.1	21	2	9.5%	2	100%	9.5%	0.81	8.1
	Combined odds:									**15.4%**		
Methyl parathion	Pears	U.S.	1997	0.004	588	35	6.0%	23	65.7%	3.9%	0.079	19.8
Azinphos-methyl	Pears	U.S.	1997	0.3	582	395	67.9%	23	5.8%	4.0%	0.99	3.3
	Combined odds:									**7.9%**		
Methyl parathion	Pears	Chile	1997	0.004	66	0	0.0%	0	0.0%	0.0%	n.a.	n.a.
Azinphos-methyl	Pears	Chile	1997	0.3	66	42	63.6%	2	4.8%	3.0%	0.48	1.6
	Combined odds:									**3.0%**		
Chlorpyrifos	Soybeans	U.S.	1997	0.06	157	126	80.3%	5	4.0%	**3.2%**	0.195	3.3
Chlorpyrifos	Tomatoes	Mexico	1997	0.06	191	71	37.2%	10	14.1%	5.2%	0.31	5.20
Azinphos-methyl	Tomatoes	Mexico	1997	0.3	190	9	4.7%	1	11.1%	0.5%	0.71	2.36
	Combined odds:									**5.7%**		
Chlorpyrifos	Tomatoes	U.S.	1997	0.06	483	20	4.1%	2	10.0%	0.4%	0.081	1.35
Methamidophos	Tomatoes	U.S.	1997	0.2	486	143	29.4%	6	4.2%	1.2%	0.35	1.75
	Combined odds:									**1.6%**		
Methyl parathion	Peas, Canned/Frozen	U.S.	1996	0.004	355	3	0.8%	3	100%	**0.8%**	0.007	1.75

NOTES:

(1) The Reference Concentration (RfC), expressed in ppm, is the residue concentration at which a 100-gram serving of the food will contain a Reference Dose (RfD), expressed in mg/kg/day, of the pesticide for a 20-kg child.

(2) The Odds of getting a dose >RfD equal the percent positive for the residue times the percent of residues >RfC.

(3) Occurrence of different residues is presumed to be independent, such that probabilities are additive. In cases where residues are coupled, the combined "odds" column overstates the percentage of samples exceeding the RfD for single chemicals but understates the degree to which a combined RfD would be exceeded.

Table 7. Multiple Pesticide Residues: Frequency Distribution of Samples With Different Numbers of Residues Detected by the USDA Pesticide Data Program, 1996

			Number of Residues per Sample																
Food	**Country of Origin**	**Total Number of Samples**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**One or More**	**% Samples One or More**
Apples	U.S.	502	9	27	68	133	125	78	33	13	7	7	2					493	98.2%
	South Africa	6	0	1	1	2		2										6	100.0%
	New Zealand	15	0	1	5	4	4	1										15	100.0%
	Canada	4	0	2	1		1											4	100.0%
	Chile	3	0		2	1												3	100.0%
	All Sources	530	9	31	77	140	130	81	33	13	7	7	2					521	98.3%
Apple Juice	U.S.	164	55	59	26	15	8	1										109	66.5%
	Argentina	11	2	3	4	1	1											9	81.8%
	Mexico	1	0	1														1	100.0%
	Other Countries	3	3																0.0%
	All Sources	179	60	63	30	16	9	1										119	66.5%
Grapes	U.S.	211	65	61	46	20	14	4		1								146	69.2%
	Chile	279	29	42	79	47	38	30	9	4	1							250	89.6%
	South Africa	10	0	5	2	3												10	100.0%
	Mexico	24	10	7	5	2												14	58.3%
	Unknown	1	1															0	
	All Sources	525	104	115	132	72	52	34	9	5	1							420	80.0%
Tomatoes	U.S.	135	52	38	23	11	4	3	4									83	61.5%
	Mexico	34	6	8	5	3	6	1	3		2							28	82.4%
	Canada	5	4			1												1	20.0%
	Netherlands	1	0	1														1	100.0%
	Unknown	4	2	1	1													2	50.0%
	All Sources	179	64	48	29	15	10	4	7	0	2							115	64.2%
Peaches	U.S.	199	12	24	47	40	44	18	12	1	1							187	94.0%
	Chile	130	1	15	27	32	24	15	6	6	3	1						129	99.2%
	All Sources	329	13	39	74	72	68	33	18	7	4	1						316	96.0%
Carrots	U.S.	481	107	133	126	78	21	14	1	1								374	77.8%
	Canada	10	1	2	1	2	2	2										9	90.0%
	Mexico	8	4	3	1													4	50.0%
	Unknown	1	0			1												1	100.0%
	All Sources	500	112	138	128	81	23	16	1	1								388	77.6%
Oranges	U.S	512	79	193	149	74	14	2	1									433	84.6%
	Australia	5	1	3	1													4	80.0%
	Mexico	2	1	1														1	50.0%
	All Sources	519	81	197	150	74	14	2	1									438	84.4%
Sweet Potatoes	U.S.	511	168	242	64	27	6	4										343	67.1%
Sweet Peas	U.S.	346	273	45	26	2												73	21.1%
	Italy	1	0	1														1	100.0%
	Canada	6	5		1													1	
	Mexico	2	2															0	0.0%
	All Sources	355	280	46	27	2												75	21.1%
Spinach	U.S.	498	56	130	161	68	43	28	7	1	1		2				1	442	88.8%
	Mexico	22	3	1	9	3		1	2	1	1				1			19	86.4%
	Unknown	5		2	1													3	60.0%
	All Sources	525	59	133	171	71	43	29	9	2	2	0	2	0	1	0	1	464	88.4%
Green Beans	U.S.	525	240	80	126	48	22	5	2	1		1						285	54.3%
	Canada	5	5																
	Unknown	1	1																
	All Sources	531	246	80	126	48	22	5	2	1		1						285	53.7%

Table 8. Applications of Selected High-Risk Pesticides to Selected Crops, 1993-1997

		1993	1994	1995	1996	1997
Acephate	Green Beans	-	47,619	-	74,620	-
	Peas	-	-	-	-	-
Aldicarb	Peaches	-	-	-	-	-
	Potatotes	-	-	-	169,260	369,750
Azinphos-Methyl	Apples	905,585	-	1,029,553	-	909,610
	Pears	167,752	-	158,130	-	130,284
	Peaches	76,820	-	54,180	-	57,622
	Grapes	4,896	-	11,025	-	-
	Tomatoes	-	8,547	-	8,320	-
Carbaryl	Apples	214,338	-	386,897	-	248,690
	Pears	11,024	-	5,880	-	4,512
	Peaches	109,719	-	36,330	-	26,602
	Grapes	97,410	-	159,915	-	82,720
	Oranges	162,122	-	176914	-	175864
	Green Beans	-	16,650	-	17,030	-
Chlorpyrifos	Apples	769,643	-	788,557	-	820,430
	Peaches	48,931	-	43,470	-	19,458
	Grapes	3,366	-	16,275	-	19,270
	Oranges	330,733	-	612,150	-	1,108,536
	Tomatoes	-	82,584	-	-	-
Diazinon	Peaches	142,952		86,835		35,156
Dimethoate	Apples	199,048	-	68,096	-	51,740
	Grapes	61,608	-	26,355	-	19,740
	Green Beans	-	7,215	-	6,110	-
	Peas	-	13,320	-	8,320	-
Formetanate HCL	Peaches	13,694	-	4,620	-	1,880
	Grapes	-	-	-	-	-
Methamidophos	Green Beans	-	-	-	-	-
	Potatoes	-	-	479,460	495,040	594,500
	Tomatoes	-	207,681	-	122,720	-
Methidathion	Oranges	86,932	-	87026	-	48880
Methomyl	Grapes	9,792	-	42,735	-	-
Methyl Parathion	Apples	155,124	-	181,545	-	363,480
	Pears	4,368	-	10,605	-	25,944
	Peaches	162,825	-	173,670	-	86,574
	Green Beans		25,419		45,340	-
Oxamyl	Apples	48,650	-	42,560	-	43,810
	Pears	-	-	-	-	-
Phosmet	Pears	62,088	-	46,200	-	40,420
	Peaches	40,915	-	40,635	-	74,072
Totals Across 40 Uses		3,890,335	409,035	4,769,618	946,760	5,359,544
		% Increase 95 to 97		12.4%		
		% Increase 94 to 96		131.5%		
		% Increase 93 to 97		37.8%		