



Pesticide Residues and What you need to know!!

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“Frank do you see this dried stuff on this fruit? What is that?” asked Mary as they shopped for their weekly produce at the market. This is a common observation and not all citizens are aware that some of this “dried stuff” can contain pesticide residues. As a matter of fact you most likely cannot see pesticide residues on or in your food. But what are pesticide residues? Are pesticide residues dangerous? These are significant questions and the answers can contribute to leading a healthier lifestyle.

According to the Pesticide and Toxic Chemicals Act, 1979 “pesticide” means any substance which by itself, or in combination with other substances, is proposed, represented, or used for destroying or controlling pests but does not include any antiseptic, disinfectant, drug or preservative. Thus, pesticide residues are the very small amounts of pesticides that can remain in or on a crop after harvesting or storage and make their way into the food chain. Pesticide residues also include any breakdown products from the pesticide.

Pesticide residues can remain even when persons use the correct application rates which are found on the labels of the pesticide containers. In order for some pesticides to effectively work

these actually need to stay on the crop. In other instances the crop may have been exposed or in contact with areas being treated with pesticides. Pesticide applications are also made on the surface of a fruit or vegetable to protect it from pests during storage and this is the purpose of applying pesticides after harvest. Pesticide residues are also detected in animal feed and as such there can be a bioaccumulation of these residues in animal tissues. Therefore residues have been found in meat, fish and poultry products. They have also been located in vegetable oils.

So how are the general public exposed to pesticide residues? This commonly occurs via consumption of food treated with pesticides as well as being in close contact in areas where there are pesticide applications. It is emphasized that even though the majority of the general population may not come in direct contact with large quantities of pesticides, many of the pesticide residues that are ingested tend to be lipophilic and can bioaccumulate in the body. This is an interesting concept where persons might assume that there may be no effects from pesticides residues as it enters into the body occasionally. However, because these small amounts of pesticides can accumulate the toxic effects can increase drastically.

The **Environmental Protection Agency of the United States** have published a “**dirty dozen**” list which is a compilation of the fruits and vegetables in which the highest levels of pesticide residues have been found. These are as follows:

- **Apples**
- **Celery**
- **Strawberries**
- **Peaches**
- **Spinach**
- **Imported nectarines**
- **Imported grapes**
- **Sweet bell peppers**

- **Potatoes**
- **Domestic blueberries**
- **Lettuce**
- **Kale/collard greens**

From this list three of these food items are cultivated in Trinidad and Tobago but the rest are imported into the country. On the other hand the following is a list of the top food items that contain little or no pesticide residues.

- **Onions**
- **Avocados**
- **Sweet corn**
- **Pineapples**
- **Mango**
- **Sweet peas**
- **Asparagus**
- **Kiwi fruit**
- **Cabbage**
- **Eggplant**
- **Cantaloupe**
- **Watermelon**
- **Grapefruit**
- **Sweet potatoes**
- **Sweet onions**

This publication is extremely helpful to citizens as they become aware of certain information and can make responsible decisions. It is very important to note that continuous low dosage exposure of pesticides is linked to the cause of certain cancers. In addition to this children are at greater risks. This is because kids can ingest more than adults, and they may be exposed

more heavily to certain pesticides because they consume a diet different from that of adults. For instance, children typically consume larger quantities of fruits, milk, and orange juice per pound of body weight. As such parents need to be very particular in the purchase and preparation of foods for their children.

Neurotoxins and other chemicals that originate from pesticides pose the biggest threat to the developing human brain and nervous system. This is especially dangerous for kids who may be at their critical developmental stages. Studies have been conducted using urine samples and pesticide metabolites found is implicated in the cause of certain disorders children may have in school. These include attention deficit hyperactivity disorder (ADHD), autism, behavioral and emotional problems, and delays in development. It is suggested that because manufacturers are not legally required to provide information concerning long term health effects of their products it is difficult to determine if there is a direct correlation between the cause and effect.

The European Union has suggested that there are a number of pesticide residues found in food that can most likely cause hormone disruption in the human body. The effects of these are linked in affecting brain development as stated before as well as the development of reproductive organs. The studies go further to suggest this may cause low sperm counts and girls entering puberty earlier.

Others studies imply other effects such as acute and chronic injury to the nervous systems, lung damage and possible dysfunction of immune systems.

The levels of these residues in foods are often stipulated by regulatory bodies in many countries. The regulation of food safety in Trinidad and Tobago is the responsibility of the Ministry of Health, Chemistry /Food and Drugs Division. The food safety regulations in Trinidad and Tobago are based on the regulations of the United States, Canada and the European Union,

as well as Codex Alimentarius standards and WHO guidance. The Pesticide and Toxic Chemicals Inspectorate, Chemistry/Food and Drugs Division is the government agency charged with regulating pesticide residues in foods by the enforcement of the Pesticide & Toxic Chemical Act of 1979, Chapter 30:03 by implementation of the regulations attached to the Act. The Pesticide and Toxic Chemicals Board is a legal body and is comprised of a panel of experts aimed to act in an advisory capacity in the implementation of the regulations of the Pesticide and Toxic Chemicals Act, 1979, Chapter 30:03.

The Codex Alimentarius Commission was established in 1962 to implement the Joint FAO/WHO Food Standards Programme (FAO – Food and Agricultural Organisation; WHO – World Health Organisation). The Codex Alimentarius standards are not only used to set food safety standards but there is a Codex Committee on Pesticide Residues (CCPR), an intergovernmental body which advises the Codex Alimentarius Commission on matters related to pesticide residues and sets maximum residue limits (MRL's) for each pesticide. In order to achieve this there are supervised trials involving approved pesticides using "good agricultural practice" principles and data are collected on the residues. This data is then used to set MRLs. MRLs must be toxicologically acceptable in terms of estimated pesticide intake by consumers.

The relevant government entities also follow the Stockholm Convention on Persistent Organic Pollutants in terms of banned products, as well as the Rotterdam Convention for Prior-Informed Consent in terms of trade of pesticides and other contaminants. The Ministry of Health requires registration of all pesticides and licensing of pesticide importers and retailers. As such in keeping our citizens safe as well as to increase trade between countries these standards are utilized continuously.

For the citizens like Frank and Mary there are other ways we can minimize the exposure of pesticide residues. These helpful tips include:

- Cultivating your own crops without the use or little use of pesticides or what we term organic farming.
- Another way is to use fruit and vegetables washes to remove pesticide residues. Citizens can make their own produce washes by using a diluted solution of mild dishwashing detergent (1 tsp detergent per gallon, or 4 liters, water). Use warm water to rinse your fruits and vegetables after.
- Fruits especially apples have been found to contain a lot of pesticide residues and peeling fruits and certain vegetables can remove some of the residues. Keep in mind however that some pesticides can permeate into the fruit or vegetables.
- It has been claimed by food processors that in preparing fruit and vegetables for canning processes there are numerous washings and/or freezing processes which can destroy pesticide residues.
- Although apples rank high in pesticide residue, apple juice ranks low. Apple juice is a good substitute for non-organic apples.
- For the farmers out there the Ministry of Food Production and Agriculture as well as the Ministry of Health always support and recommend Integrated Pest Management principles to be used. It uses a range of non-chemical based agricultural practices for example biological control and pesticides are only used as a last resort. This way, the health of farmers and consumers are protected and negative impacts on the environment are reduced.

Thus, as a people we need to be proactive and observe our environment in terms of pesticide application as well as the intake of food so we can prevent possible adverse health effects. By doing our own research, educating ourselves and making wise decisions we are not only protecting ourselves but our future generations as well. So people spread the word! Pesticide residues exist! However, fortunately there are ways of minimizing exposure to pesticide residues and therefore their effects. Spend some time utilizing the tips outlined above as one of the main objectives of the Pesticide and Toxic Chemicals Inspectorate, Chemistry/Food and

Drugs Division and the Ministry of Health is to ensure that our citizens are protected, living healthier lives everyday.

References

1. All you wanted to know about Fruits and Vegetables. (Food Standards Agency). www.ava.gov.sg/FoodSector/FoodSafetyEducation/Food+Facts/AllAbtFruitsAndVeg/index.htm - 81k - [Similar](#)
2. Pesticide residue – Wikipedia
en.wikipedia.org/wiki/Pesticide_residue - 61k - [Similar](#)
3. ^a ^b Walter J Crinnion. (2009). "Chlorinated Pesticides: Threats to Health and Importance of Detection". *Environmental Medicine*. **14(4)**: 347–59. [PMID 20030461](#).
4. ^a ^b Stephen W.C. Chung, Benedict L.S. Chen. (2011). "Determination of organochlorine pesticide residues in fatty foods: A critical review on the analytical methods and their testing capabilities". *Journal of Chromatography A*. **1218(33)**: 5555–5567. [PMID 21742333](#).
5. Marina Bjørling-Poulsen, Helle Raun Andersen and Philippe Grandjean. (2008). "Potential developmental neurotoxicity of pesticides used in Europe". *Environmental Health*. **7:50**. [PMID 18945337](#).
6. Christos A. Damalas, and Ilias G. Eleftherohorinos. (2011). "Pesticide Exposure, Safety Issues, and Risk Assessment Indicators". *International Journal of Environmental Research and Public Health*. **8(5)**: 1402–19. [PMID 21655127](#).
7. Bernard Weiss, Sherlita Amler and Robert W. Amler. (2004). "Pesticides". *Pediatrics*. **113(4)**: 1030–6. [PMID 15060196](#).
8. Dirty Dozen produce carries more pesticide residue"US: high pesticide level marks 'Dirty Dozen' fruits, vegetables". <http://www.ewg.org/news/us-high-pesticide-level-marks-dirty-dozen-fruits-vegetables>
9. Pesticide residue testing.com
www.ncbi.nlm.nih.gov/pubmed/2745387.
10. **Pesticides** residues in food/Children's health protection/United States environmental protection agency

11. Organic Consumers Association -What types of Food have the highest and lowest levels of pesticide residues?
www.organicconsumers.org/organic/pesticide-residues.cfm

12.usda foreign agricultural service-global agricultural information network- FAIRS Country Report