



Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

Canadian Food Inspection Agency



Our vision:

To excel as a science-based regulator, trusted and respected by Canadians and the international community.

Our mission:

Dedicated to safeguarding food, animals and plants, which enhances the health and well-being of Canada's people, environment and economy.

Overview of Monitoring activities for Pesticide Residues in Canadian foods.

Dr. Robert Charlebois, DVM, M. Sc.
Director, Food Safety Division
Food Safety & Consumer Protection Directorate, CFIA
#1704881

Canada



Outline

- Legal framework under which the CFIA operates.
- The ranking process
- Monitoring activities
 - General introduction
 - Definitions
 - Methods
- National Chemical Monitoring Program Results
- The Children's Food Surveys
- Next steps and future activities for CFIA



The CFIA is a partner in the Federal Regulatory system.

- **HC PMRA** (pesticides approval/registration, MRL, Health Risk Assessments)
- **HC VDD** (Veterinary Drugs registration, MRL, AMRL, Health Risk Assessments)
- **HC Food Directorate** (Food Safety Standards & Policies, pre-market assessment of additives, Health Risk Assessments)
- **PHAC** (Monitoring of human health, link with Provincial Health Authorities)



The CFIA Act states:

Health Canada sets food safety and nutritional standards and

The CFIA is responsible for:

- **enforcement** of the Food and Drugs Act and Regulations that are related to food
- administration of the provisions of the Food and Drugs Act as they relate to food, except those that relate to public health, safety or nutrition

Legal authority - FDA and Regulations

From the stand point of chemical residue and more specifically pesticides residues in foods

- ❖ **FDA: Section 4** - No person shall sell an article of food that...
 - (a) has in or on it any poisonous or harmful substance;
 - ...
 - (d) is **adulterated**; or
 - (e) was manufactured, prepared, preserved, packaged or stored under unsanitary conditions
- ❖ **Regulation A.01.040 of FDA** - “No person shall import into Canada for sale a food the sale of which in Canada would constitute a violation of the Act or these Regulations”
- ❖ **Pest Control Products Act & Regs**
- ❖ **Trade & Commerce Acts and Regulations** (Meat, Fish, CAPA)



Legal Authority

- ❖ Most standards for chemical “**adulteration**” are to be found in Division 15 of the Regulations
- ❖ For **agricultural chemicals, including all pesticides**, a default maximum residue limit (MRL) of **0.1 ppm** is established in the FDA & Regs.
- ❖ Published MRLs apply to raw agricultural products and manufactured food prepared from those raw commodities



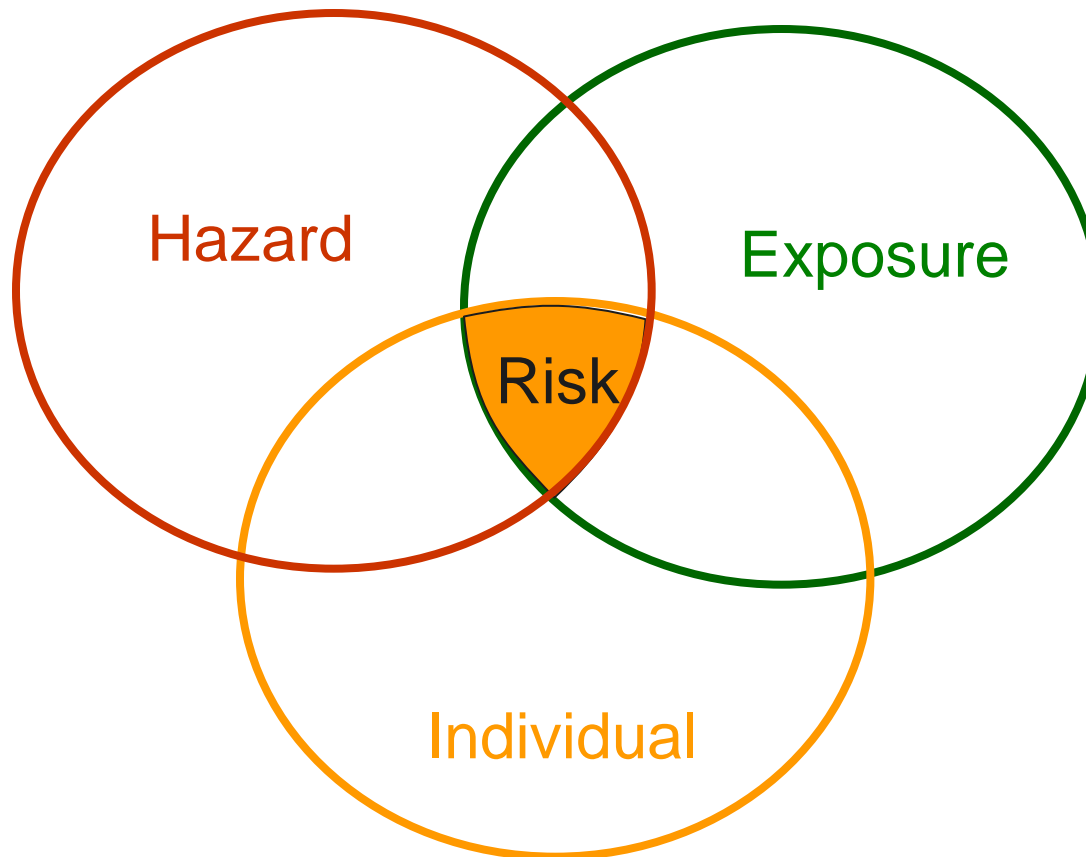
Establishing Risk-Based Priorities Science Committee Process

- Committee Expert Membership
 - CFIA (Programs, Operations and Science Branch (Labs))
 - Health Canada (PMRA, Food Directorate, VDD)
 - Provinces and Territories
- Science Committees
 - Microbiology
 - **Chemistry**
 - Composition
 - Nutrition
 - Allergens

The Ranking Process

- ❖ There are 100's of pesticides used through out the world.
- ❖ Currently the CFIA tracks and ranks approx. 1400 **chemically defined** pesticide.
- ❖ The purpose of the ranking process is to aid CFIA establish priorities when determining the need for the development of **analytical methods & monitoring**.
- ❖ The information sources used:
 - 1) Data submitted to the Canadian Government,
 - 2) Data submitted to other International Regulators,
 - 3) Peer reviewed research from the open literature,
 - 4) Unpublished information (e.g. internet)

Risk =
Hazard + Exposure (level of residue x consumption)



- Thus to estimate risk we need to know the level of the hazard in a food item, the volume of food that is consumed by an individual and the toxicity of the hazard.



Sampling & Testing Activities

Types of sampling:

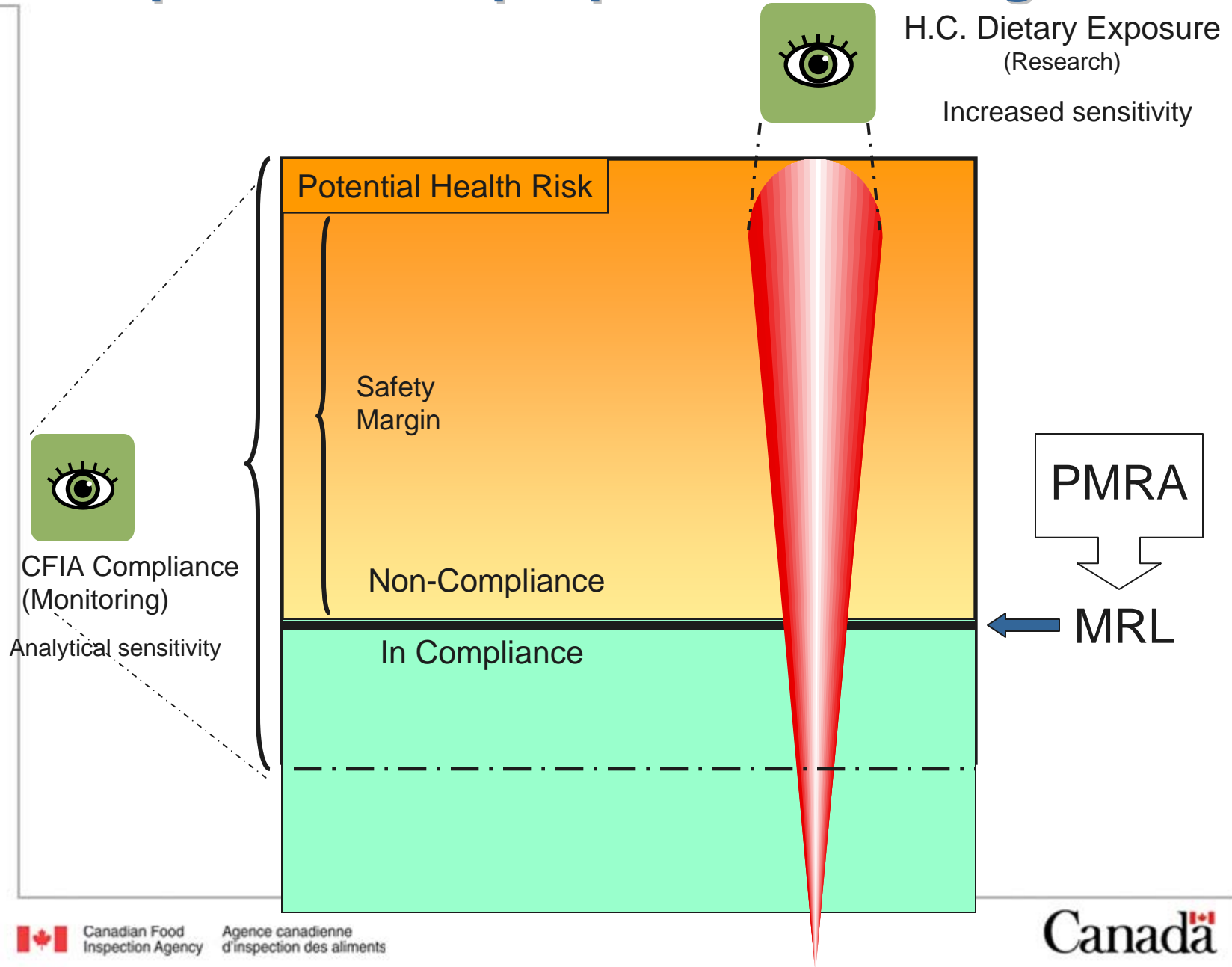
- ***Monitoring (random)***
- Directed Sampling (targeted)
- Compliance Sampling
- Special or Pilot Surveys
- Blitz (short time lines)
- Legal Sampling



Monitoring Activities

- ❖ Purpose: To **verify compliance** to MRLs - **Not** a dietary exposure study
- ❖ Based on CODEX Alimentarius principles.
 - Assumes that the levels of residue in foods will be mostly compliant.
 - Sampling activity is random (statistical basis).
 - Shipments are not held.
 - Sampling occurs at many locations.
 - Sampling occurs at different times of the year.
 - Samples are tested on food as sold (no preparation such as cooking or washing).

Importance of purpose for testing





Chemical Residue Monitoring Program Design

- The program is implemented on a fiscal year basis (April 1 to March 31)
- Priorities, i.e., selection of food and residues is based on risk
- Statistically randomized sampling schedule specifies the date, time, commodity, (species, tissues) country of origin, testing laboratory and pre assigned sample number for every submission
- The schedule is provided to the CFIA operations for implementation

Monitoring activities- Laboratory methods

- ❖ CFIA methods must be validated and fit for purpose for both the residue and the type of food.
- ❖ Preference is the development of multi-residue methods vs single residue methods.
- ❖ Single residue methods are always possible provided that the cost and effort can be justified.
- ❖ The Canadian National Chemical Residue Monitoring Program is audited regularly by other Countries to ensure validity & scientific rigour
- ❖ Care must be taken when comparing results with other countries



Monitoring activities

CFIA monitors for the presence of pesticide residues in the following commodities:

- **Fresh fruits and vegetables**
- Processed fruits and vegetables
- Meat
- Eggs
- Milk
- Honey
- Fish and seafood

The bulk of the data that will be presented focuses on fresh fruits and vegetables



Monitoring-Historical trend for fresh fruits and vegetables

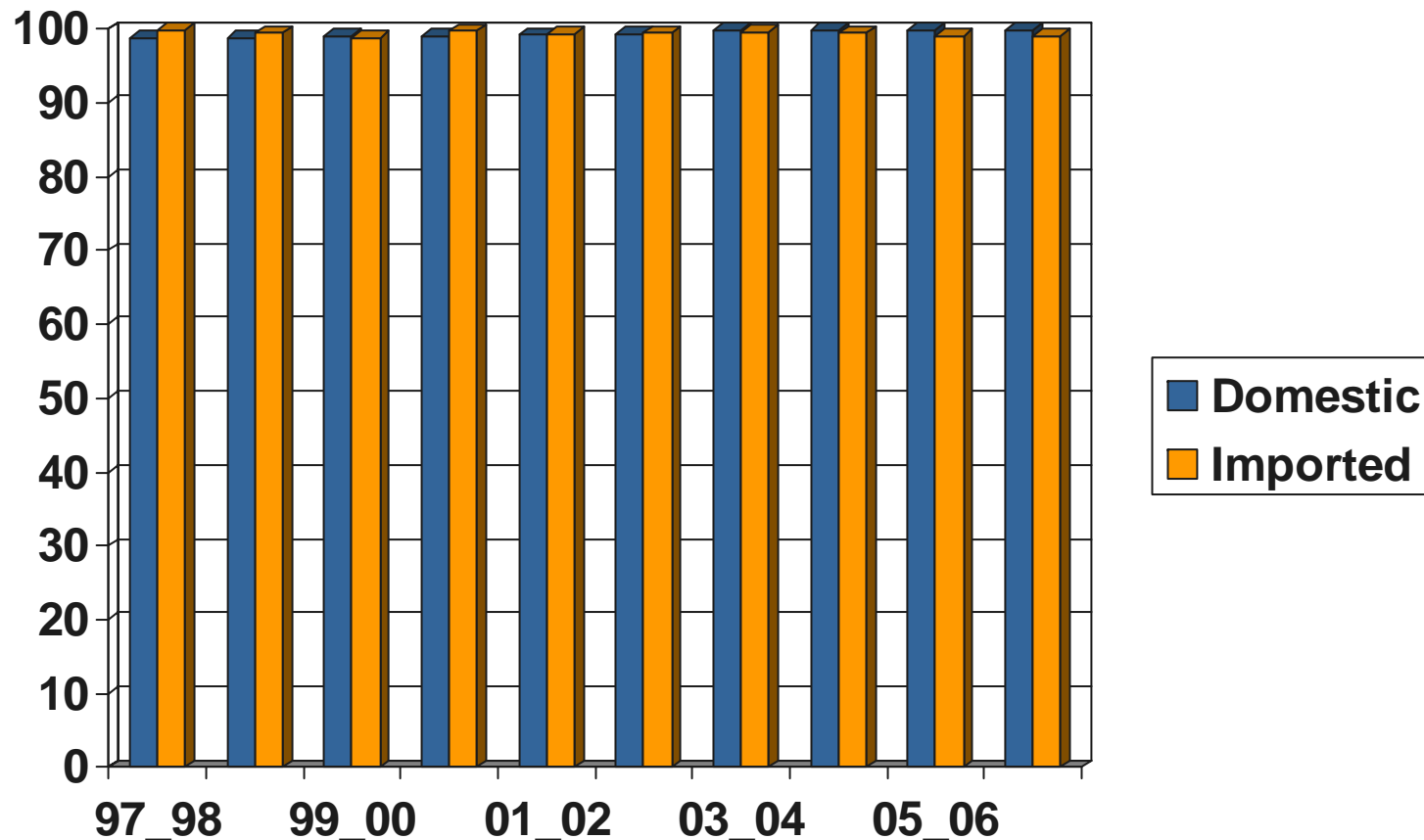
Domestic compliance rates

1997/98 - 98.74%
1998/99 - 98.78%
1999/00 - 99.02%
2000/01 - 98.97%
2001/02 - 99.15%
2002/03 - 99.30%
2003/04 - 99.81%
2004/05 - 99.77%
2005/06 - 99.90%
2006/07 - 99.85%

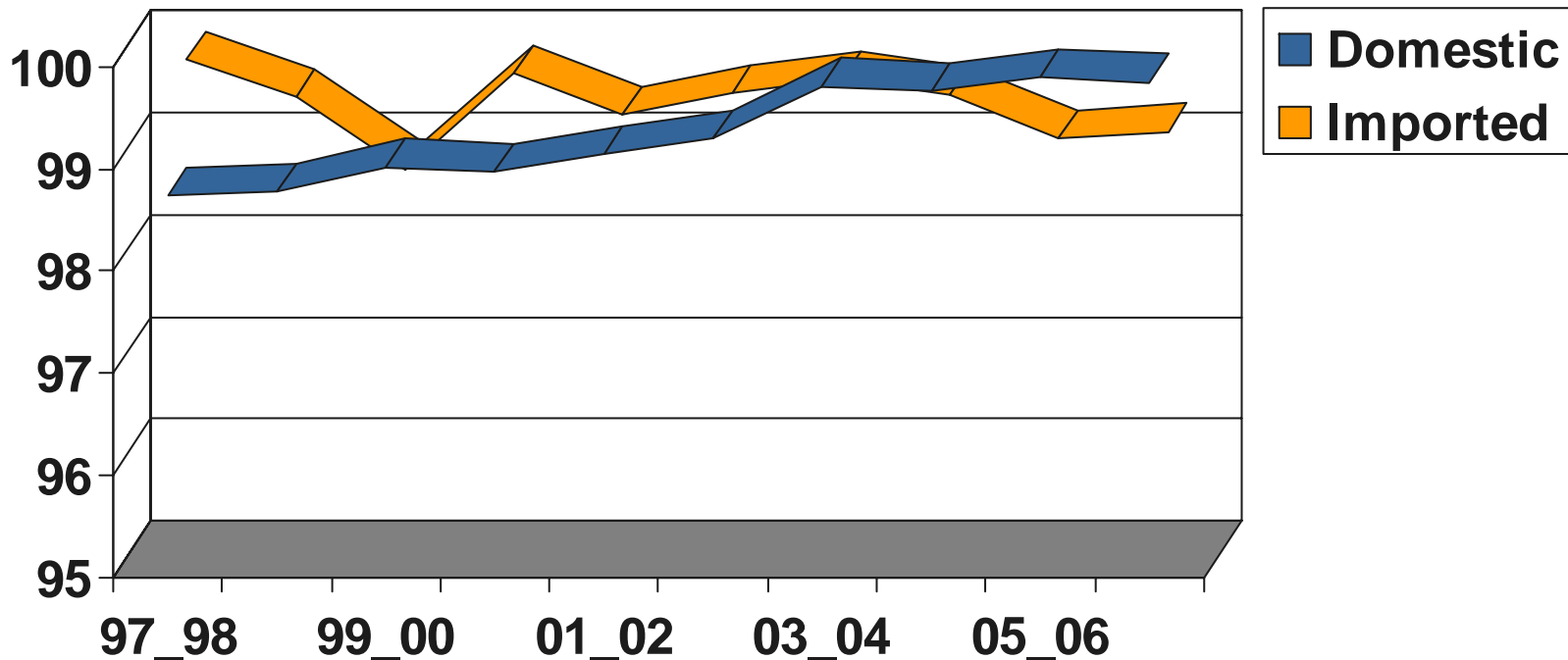
Import compliance rates

1997/98 - 99.80%
1998/99 - 99.43%
1999/00 - 98.71%
2000/01 - 99.66%
2001/02 - 99.25%
2002/03 - 99.47%
2003/04 - 99.60%
2004/05 - 99.45%
2005/06 - 99.03%
2006/07 - 99.09%

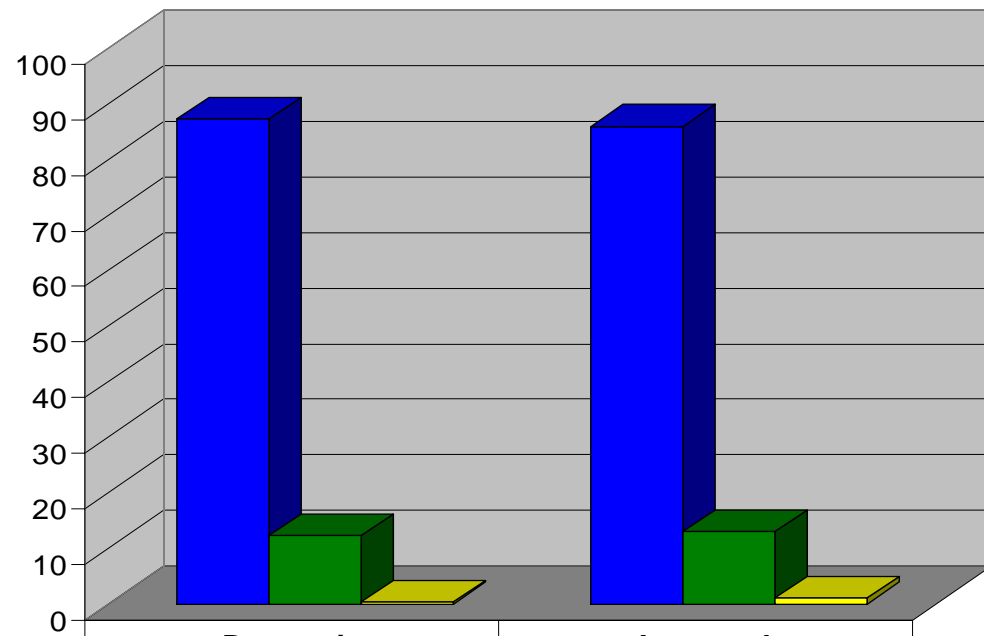
Monitoring-Historical compliance trend for fresh fruits and vegetables



Monitoring-Historical compliance trend for fresh fruits and vegetables

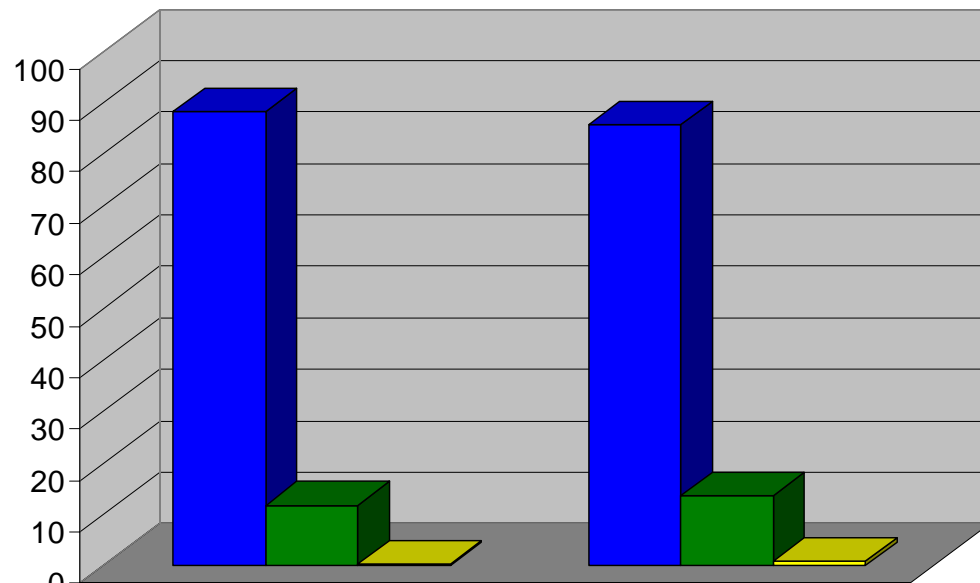


Monitoring activities- Recent information Fresh fruits and vegetables 05/06



	Domestic	Imported
■ No detectable residues	87,31	85,94
■ Compliant Positives	12,28	13,07
■ Non-Compliance	0,42	0,99

Monitoring activities- Recent information Fresh fruits and vegetables 06/07

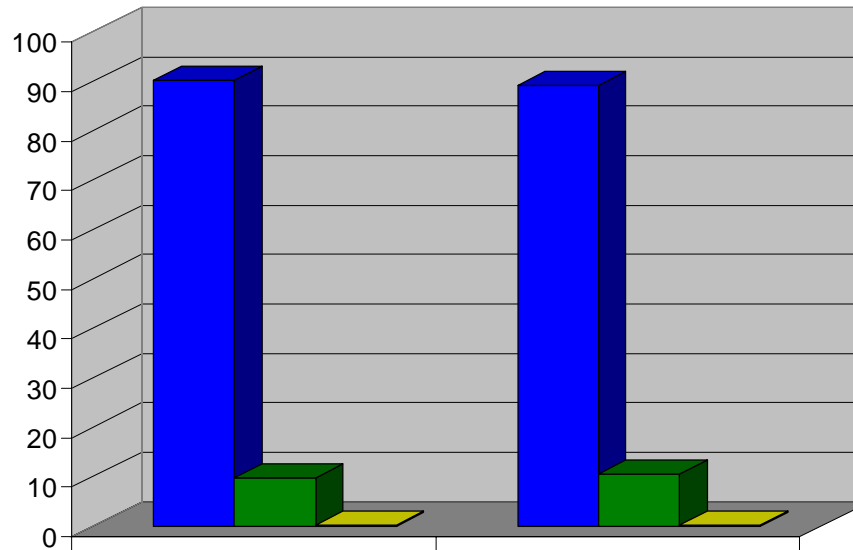


	Domestic	Imported
No detectable residues	88,07	85,61
Compliant Positives	11,74	13,61
Non-Compliance	0,19	0,78



Monitoring activities –Recent data

Processed fruits and vegetables 05/06



	Domestic	Imported
No detectable residues	90,07	89,08
Compliant Positives	9,77	10,62
Non-Compliance	0,16	0,2

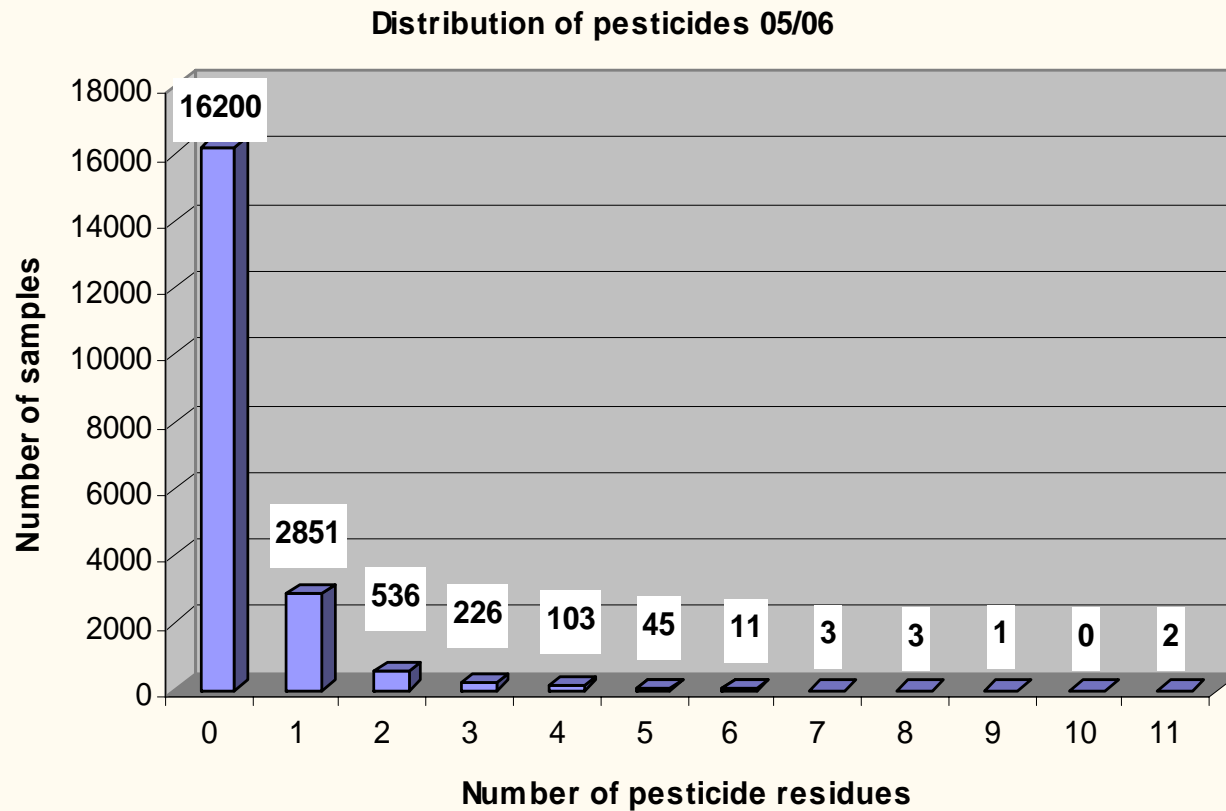
% of non-compliances not adjusted by volume

	Samples	Non Compl.	Non Compl. (%)
USA	9198	40	0,1765%
China	932	27	0,1191%
Mexico	2799	16	0,0706%
Chile	1796	14	0,0618%
Canada	6282	14	0,0618%
Brazil	492	10	0,0441%
Taiwan	116	7	0,0309%
Dominican Republic	184	7	0,0309%
Thailand	292	7	0,0309%
Peru	127	6	0,0265%
Spain	339	5	0,0221%
Guatemala	457	4	0,0176%
Columbia	152	3	0,0132%
Italy	234	3	0,0132%
Cuba	33	2	0,0088%
Belize	51	2	0,0088%
Kenya	6	1	0,0044%
Trinidad & Tobago	11	1	0,0044%
Japan	20	1	0,0044%
Malaysia	26	1	0,0044%
Israel	81	1	0,0044%
Ecuador	197	1	0,0044%
Argentina	372	1	0,0044%
Costa Rica	455	1	0,0044%
South Africa	669	1	0,0044%
Others	1348	0	0,0000%

% of non-compliances adjusted for No. of samples

	Samples	Non-Compl	Non-Compl. (%)
Kenya	6	1	16,6667%
Trinidad & Tobago	11	1	9,0909%
Cuba	33	2	6,0606%
Taiwan	116	7	6,0345%
Japan	20	1	5,0000%
Peru	127	6	4,7244%
Belize	51	2	3,9216%
Malaysia	26	1	3,8462%
Dominican Republic	184	7	3,8043%
China	932	27	2,8970%
Thailand	292	7	2,3973%
Brazil	492	10	2,0325%
Columbia	152	3	1,9737%
Spain	339	5	1,4749%
Italy	234	3	1,2821%
Israel	81	1	1,2346%
Guatemala	457	4	0,8753%
Chile	1796	14	0,7795%
Mexico	2799	16	0,5716%
Ecuador	197	1	0,5076%
USA	9198	40	0,4349%
Argentina	372	1	0,2688%
Canada	6282	14	0,2229%
Costa Rica	455	1	0,2198%
South Africa	669	1	0,1495%
Others	1348	0	0,0000%

Monitoring Activities Samples with multiple residues – FF&V For FY 05/06





Conclusion trends in Food

- ❖ Pesticide regulation and enforcement is a coordinated effort amongst multiple Government Departments and Agencies.
- ❖ Both domestically produced and imported fresh fruits & vegetables are safe i.e., good compliance rate to MRLs.
- ❖ Residue data compiled over the last 10 years indicates that the compliance rate is consistently very high for Fresh F&V.
- ❖ Given that we import a large portion of our fresh fruits and vegetables, care must be taken when doing detailed comparison of non-compliance rates.
- ❖ For the small portion of food where residues are detected, the vast majority is single residue.

Special Sampling & Testing Project

Food consumed by Children

- ❖ To make extra effort to look at vulnerable segment of the population (children)
 - ❖ Yearly projects that monitors for pesticide residue in children foods.
 - ❖ Limited number of samples but targeted
 - ❖ Collected over a short period of time
 - ❖ Collected in one location
 - ❖ Foods are ready-to-eat i.e., highly processed.
 - ❖ Total number of residues tested for is over 400 for these samples
- ❖ Analysis is carried out using both multi and single residue methods
- ❖ The 2008/2009 - a new multi residue method in a limited number of samples.

Sampling & Testing Activities- Children's food project types of foods

Year	Types of food	Compliance rate
2002/03	Up to 18 months	99.76%
2003/04	2 to 10 years	100.0%
2004/06	6 months to 15years*	98.8%
2006/07	6 months to 15 years*	100.0%
2007/08	Ethnic foods All ages	98.49%
2008/09	Up to 18 months**	in progress

* Different types of foods (cookies, puddings, apple sauce, etc.)

**100 samples analyze using both LCMS and GC/MS

Main Conclusion Childrens/Baby Food Surveys

- ❖ New method results (100 samples) increased scope of monitoring.
- ❖ All baby food compliant - few additional pesticide detected with new method but below MRL level.
- ❖ Foods tested were jarred baby food
- ❖ Profile is very similar to monitoring results in general
- ❖ Compliance for all age groups is very good
- ❖ No positive result represented a health risk
- ❖ Based on limited information internationally, the compliance rate in Canadian foods is very similar to the USA and EU.



Future directions for CFIA

- ❖ Keep gathering info & ranking pesticides (both domestically registered or not).
- ❖ Currently testing 285 chemicals with current method (GC/MS)
- ❖ Expand use of the new method, by ~2010, (LC/MS/MS) will increase number tested chemicals to over 400 compounds.
- ❖ Scope of monitoring will put Canada second in the world just behind Germany.
- ❖ Food Safety Action Plan – Targeted Surveys & Risk Mapping along food chain

Canada 

<http://www.inspection.gc.ca>

<http://www.healthycanadians.ca>