Section 23

Pesticides and Food

Pesticide Residues and Food Safety

Ontario farmers understand that they are responsible for the safety of the food they produce. They follow regulations and use good agricultural practices to make sure that the food they produce is safe.

Food safety is very important for consumers. Food product recalls and safety alerts do not happen often, but they make the public concerned about whether their food is safe. Consumers want to know about substances that may be on the food they buy - for example, residues from antibiotics or pesticides, or substances that may cause allergic reactions (allergens). They are also concerned about any kind of food contamination. Some consumers also want to know about pesticide residues on other products they may handle such as bedding plants, indoor plants, cut flowers and sod.

What is a Residue?

The term **pesticide residue** describes the amount of a chemical or biological pesticide that remains on a crop, animal or surface after it has been treated. Scientists are able to detect (measure) very small amounts of pesticide residue (traces). To ensure food safety, government agencies set Maximum Residue Limits for pesticides based on what is currently known about the effects of pesticides. At this time, there are no reports of acute (immediate) illness caused by pesticide residues in food in the developed world. However, less is known about the long-term effects of pesticides and mixtures of pesticides in food.

What is a Maximum Residue Limit (MRL)?

A **Maximum Residue Limit** (**MRL**) is the greatest amount of pesticide residue that may be present in or on food. The Pest Management Regulatory Agency (PMRA) sets MRLs for all pesticides registered in Canada. The MRL for a pesticide depends on the crop it is used on. The same pesticide may have different MRLs when it is used on different crops.

The PMRA considers a number of factors when it sets a MRL for a pesticide. First, it looks at information about pesticide residue submitted by the product manufacturer. Then the PMRA calculates the amount of the pesticide that a person might consume each day from all treated foods (this is called a dietary risk assessment). The PMRA also considers:

- the toxicity of the product
- its use on domestic and imported foods
- what the risks are over a person's lifetime
- what the risks are for special groups within the general population.

Risks from exposure to pesticide may be higher for some population groups. Children, older persons and persons with chronic illnesses may be affected by pesticides more than a healthy adult would be. Also, some children may have increased exposure to pesticides because they eat a lot of one kind of food as they grow and develop.

Where can you find information about Canadian MRLs?

If you want to know more about the residue limits in Canada you can check the PMRA web site located at:
www.pmra-arla.gc.ca/english/legis/legis-e.html

Are there pesticide residues in Canadian food products above the MRLs?

Approximately 98% of food samples tested in Canada have either no detectable residue, or residue below the Maximum Residue Limit (MRL).

Are Pesticide Residues a Health Risk?

Surveys show that consumers are concerned about the health risks from pesticide residues in food. However, the results of scientific tests available today suggest that the risks from pesticide residues in food are much lower than many consumers think.

Humans are exposed to many chemicals that occur in nature. Consumers often think that "chemicals" are man-made, and that only man-made chemicals are toxic. However, every natural chemical is also toxic at some dose. Pesticides, whether natural or man-made, do have some health risks if they are not used safely.

Most consumers are not directly involved in agriculture or food production. They may not know that Ontario farmers use good agricultural practices. They also might not be aware that Ontario farmers must take training before they can buy and use pesticides.

However, consumers remain highly sensitive to the issue of pesticides in food. If there is a concern about the safety of a particular food, consumers will choose another food instead.

Educate consumers when you can.

Clear communication between farmers and the public about pesticide use is important. Help the public to have confidence in Ontario's food supply and agricultural products. Let the public know that farmers in Ontario use pesticides only when they are necessary and that farmers are trained to handle them safely. Tell them about the steps you take on your farm to protect consumers from pesticide residues. Let consumers know that farmers make food safety a priority when they make their pesticide decisions.

Testing for Residues

Who is checking for pesticide residues in Ontario and Canada?

Government Agencies and Ministries are the main groups that monitor Canadian-grown and imported food products for pesticide residues. These organizations check for residues for different reasons. The Pest Management Regulatory Agency (PMRA) takes samples of plants and soils to see whether pesticides are being misused. The Canadian Food Inspection Agency (CFIA) and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) take samples of foods to make sure that the food supply is safe. CFIA and OMAFRA monitor foods for pesticide residues. Health Canada also tests food nationally, through their Total Diet Studies (TDS) program.

Food processors, wholesalers and distributors are also interested in food quality and safety to:

- protect consumers
- prevent liability, and
- make sure they can export food to other countries.

They may ask their suppliers, including farmers, to provide pesticide residue test results or they may do testing themselves. Some processors and buyers may set pesticide residue limits that are lower than the MRLs set by PMRA. Growers can send in samples for pesticide residue testing to a number of labs in Ontario. The Standards Council of Canada maintains a list of Good Laboratory Practice (GLP) accredited labs on their web site located at **www.scc.ca**

What types of residues are causes for concern?

Residue testing has identified three types of residue problems:

- **Residues greater than the Maximum Residue Limit**
  The residue is from a pesticide that is registered in Canada, but the amount is greater than the Maximum Residue Limit (MRL) set by PMRA.

- **Residues of Unregistered Pesticides**
  The residue is from a pesticide that is not registered in Canada for any use.

- **"Off label" Residues**
  The residue is from a pesticide that is registered for some uses in Canada, but not for the crop, animal or pest on which it was used.

Role of the Pest Management Regulatory Agency (PMRA)

PMRA tests for pesticide residue to make sure that pesticide users are following the requirements of the **Pest Control Products Act** and the pesticide label directions. Possible violations under the **Pest Control Products Act** include:

- use of an unregistered product, and
- "off-label" use of a registered product.

If the PMRA finds illegal residues in a farmer's crop, it has a number of options for action. The PMRA may require the farmer to pay a fine under the Administrative Monetary Penalties (AMPS) program. The farmer may also have to complete a training program.

Role of the Canadian Food Inspection Agency (CFIA)

CFIA has the authority to inspect food-producing facilities and to sample and test food products, to make sure that the requirements of the **Food and Drugs Act** are being met.

Under the "Residues in Agri-Foods Monitoring Program", the CFIA samples food produced in Canada or imported from another country. It is also responsible for testing other products which may not be consumed by humans, such as animal feed. The CFIA program is a three-step program of monitoring, surveillance, and compliance.

- **Monitoring Program**
  The monitoring program is a random sampling of food products. The results of this testing show CFIA what residues are present in food samples.

- **Surveillance Program**
  If the monitoring program identifies pesticide residue problems, then the surveillance program takes further samples from specific products to provide more information.

- **Compliance Program**
  If the surveillance program identifies residues that are higher than safety standards, CFIA carries out an investigation that may lead to the compliance phase. In the compliance phase, CFIA may remove a contaminated product from the market, or prevent it from being sold or distributed. The product will not be sold until further tests show that the residue level has been reduced and meets safety standards.

Check the CFIA web site located at **www.inspection.gc.ca** for more information about CFIA's monitoring program.

Role of the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

While CFIA has a major role in monitoring imports of food into Canada, OMAFRA has a major role in monitoring food produced in Ontario. Through its "Foods of Plant Origin Monitoring Program", OMAFRA tests foods such as fruits, vegetables, maple syrup, apple cider and honey for chemical residues. Random samples of harvested foods and prepared food products are taken from grocery stores, roadside stands and farmers' markets. The amount of sampling done for each food depends on its history of residue problems, the amount of the food produced (by acreage or volume), and how much and how often people eat the food. Most of the samples collected through this program show no sign of residues, or the residues are below the MRL.

OMAFRA's sampling program is looking for:

- residues of registered pesticides higher than the MRL
- residues of unregistered pesticides, and
- residues of "off label" uses of pesticides.

Off label use is the most common type of residue problem found through this program. Off label use refers to applying the pesticide to a crop or animal, or to control a pest, that is not listed on the label. The pesticide label gives directions for using the product. It is illegal to use the product for any purpose that is not listed on the label.

When OMAFRA staff find an illegal residue, they contact the farmer and arrange to visit the operation. During the visit, OMAFRA staff will explain the problem and the regulations. They will also work with the farmer to find out how the residue occurred and how to prevent residue problems in the future.

Farmers must ensure that the food they produce is safe. If tests show that illegal residues are present in a product, OMAFRA may have to hold the product and prevent it from being sold or distributed. Farmers may be charged under the Ontario **Farm Products Grades and Sales Act**. In addition, farmers may be charged by federal authorities under the **Canadian Agriculture Products Act**, the **Food and Drugs Act**, or the **Pest Control Products Act**.

Prevent Residues

Pesticide residues have the potential to hurt everyone - consumers and farmers. If pesticide residues are higher than the MRLs listed in the **Food and Drugs Act**, there is a risk that consumers could get sick. The farmer who is responsible can be charged for illegal residues under federal and provincial laws, and could face civil lawsuits and insurance claims. Reports of residues on food can also harm the farming industry. Consumers may lose confidence in the safety of foods from Ontario and choose products from other places. Opportunities to export foods to other countries may decrease.

The public relies on you to make good decisions about pest management. If you decide to use pesticides, find out how you can prevent pesticide residues. The following pages provide important information to help you do that.

Get the Latest Information

You could accidentally have an illegal residue if you are not aware of a change to a label or a residue limit.

Keep up to date about pest control through industry associations, crop consultants and suppliers. You can find out about research results, label and registration changes and new products by attending field days and meetings, and by reading newsletters and the farm press.

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) updates its publications regularly to include new research information. OMAFRA newsletters are also available for many crops. You can find information about OMAFRA publications and newsletters on the OMAFRA web site located at **www.omafra.gov.on.ca**

Read the Label

Before you use a pesticide, take the time to read the label carefully. Information may change from year to year. Make sure that you read the most up-to-date label before you use any pesticide product, even if you have used the product before. If you have pesticide from a previous growing season, be sure to get a copy of the new label from your pesticide dealer or sales representative. Some examples of label statements that may change, and that may affect residues, include:

- crops that the product can legally be applied to
- total number of applications that can be made per season
- crop rotations
- Pre-Harvest Intervals (PHI) or Days to Harvest (DTH)
- Pre-Slaughter Intervals (PSI)
- Pre-Grazing Intervals
- restrictions for feeding crop refuse to livestock.

Follow all Label Directions

To prevent residue problems, check the label before you use a pesticide and answer these questions:

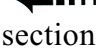
- Is the product registered for use in Canada? Can you find a **PCPA** Registration Number on the front panel?

- Is the crop or animal you plan to apply the pesticide to listed on the label?

- Is the pest listed on the label?

- Is the pest or crop at the right stage to use the pesticide?

- Have you done the math and measured the pesticide out correctly so that you will apply the correct rate given on the label?
   See the **Applying the Right Amount of Pesticide** section in the Grower Pesticide Safety Course Manual.

- Is your application equipment calibrated to deliver the volume given on the label?
   See the **Calibration of Application Equipment** section in the Grower Pesticide Safety Course Manual.

Before you harvest your crop or graze or slaughter animals, check the pesticide label for:

- Pre-Harvest Interval (PHI) or Days to Harvest (DTH)
- Pre-Grazing Interval
- Pre-Slaughter Interval (PSI).

If you do not follow these intervals (time limits) correctly, your products could contain residues.  See the **Pesticide Label** section in the Grower Pesticide Safety Course Manual for the definitions for these intervals.

Some common examples of interval and restriction statements found on pesticide labels include:

- The pre-harvest interval is ____ days.
- Do not apply within ____ days of harvest.
- Do not apply tank mixes within ____ days of harvest.
- Make a maximum of ____ applications per crop cycle.
- Do not slaughter cattle within ____ days.
- Do not treat animals for 10 days before or after shipping, weaning, dehorning, or after exposure to contagious or infectious diseases.

Note:
Pre-Harvest Intervals (PHI) and Days to Harvest (DTH) statements apply to crops that are **actively growing**. For example, if the PHI or DTH is 30 days, you cannot harvest after 15 days, store for a further 15 days and consider the crop safe to consume or sell. You must wait a full 30 days before harvesting.

Pre-Slaughter Intervals and Days to Slaughter statements apply to **healthy** animals. You may need to wait a longer time for the animal to break down (metabolize) the pesticide if the animal is old, stressed or ill.

Food Crops for Export to the United States

If you export a food crop to the United States, you are responsible for making sure that the residues in the food crop are lower than or equal to the United States (US) MRLs.

To find the US MRL for a pesticide:

- check the US Environmental Protection Agency web site located at:
  http://www.epa.gov/pesticides/food/viewtols.htm

- contact CropLife Canada at 1-866-375-4648 or check the web site located at **www.cropro.org**

Re-evaluation of Pesticides

PMRA is re-evaluating pesticides that were registered before December 1994 to make sure that they are still acceptable under the latest internationally-recognized human health and environmental safety standards. If PMRA decides that the risks for a pesticide product are not acceptable, PMRA may remove the registration for some, or all, of the uses for the product.

How could re-evaluation affect the pesticides you use?

Some of the products you have used in past years may be affected by re-evaluation. The PMRA may decide that the product should be used in a different way or that extra precautions must be included on the label. It may even suspend or cancel a product. Therefore, if you use a pesticide that has an out-of-date label, your crops or animals may have illegal residues.

You can avoid this type of residue problem by reading the up-to-date label for the product. Make sure that the label still gives directions for the crop or animal you plan to treat, as well as for the pest. If it doesn't, you need to change to another pesticide that is registered for that use.

If you find out that a particular pesticide may not be available in the future, start planning. Learn about other pest management practices and registered pesticides that you can use on your crops or animals. Then if you need to change to a different pesticide, you will already have information about things such as Pre-Harvest Intervals. This will help you to plan ahead to prevent residues.

What kind of risk assessment does PMRA use?

In the past, PMRA did pesticide risk assessments by looking at how people could be exposed to one pesticide, through only one route of exposure at a time. PMRA now uses two types of risk assessments called "aggregate" and "cumulative", to evaluate new pesticides and to re-evaluate currently registered products. These terms are explained below. PMRA risk assessments also now use the **risk cup** concept. The United States Environmental Protection Agency (US EPA) also uses the **risk cup** concept when they evaluate pesticides.

The **risk cup** assessment works in this way: a full **risk cup** holds the total amount of a pesticide that a person could be exposed to through a number of routes every day over a period of 70 years, without having any significant health risk. PMRA may change the size of the risk cup to allow for additional safety factors. For example, when the safety of children is being considered, the risk cup may become smaller.

Aggregate risk assessment studies look at **all the ways a person could possibly be exposed** to a pesticide. A particular pesticide may be registered for use on crops or animals. That same pesticide may also be registered for use in homes, gardens, parks, businesses and on pets. Aggregate risk assessment studies look at how someone might be exposed to this pesticide through all of these uses. All of these possible exposures are put into the risk cup.

Cumulative risk assessment studies look at the possible effects of **all the pesticides in the same pesticide group or family**. These pesticides will have similar toxic effects in the human body and they must share the same risk cup. This means that there is limited space in the risk cup for each individual pesticide and for all of the ways that each pesticide can be used.

What happens if all the aggregate and cumulative risks are greater than the size of the risk cup? That means that the risk of exposure to all pesticides, through all routes of exposure, is too high to be safe. In that case, the PMRA may:

- remove certain uses from the labels of some pesticides, or
- suspend or cancel the registrations for some pesticides within a pesticide family.

Emergency Pest Outbreaks

During the growing season, you may have a serious problem with weeds, insects or diseases that are difficult to control. The same pests may also be causing problems on other farms.

If you have a sudden pest outbreak, you may need help to:

- identify the pest
- find out if there are any non-chemical methods of controlling the pest
- find out if any pesticides have been registered for emergency use or minor use on your crop.

Contact the following resources for help and information:

- your crop consultant
- your pesticide retailer
- your industry association
- the OMAFRA Contact Centre in Guelph
  Call them toll free at 1-877-424-1300 (Local 519-826-4047)
  or
  e-mail them at ag.info@omafra.gov.on.ca
  The Contact Centre staff will refer your call to the OMAFRA specialist who can best help you.

If you have an emergency pest outbreak, **use only registered pesticides**. Pesticides that you have not been able to use before may become available to you through an Emergency Use Registration.

Emergency Use Registrations

PMRA may register a pesticide for a period of one year or less for emergency control if a pest outbreak occurs.

Before you use a pesticide that has an Emergency Use registration, get the Supplemental Label. You must follow all the information on **both** the Supplemental Label and the registered product label when you use the product.  See the **Pesticide Label** section in the Grower Pesticide Safety Course Manual for more information about Emergency Use Registrations.

Minor Use Pesticide Registrations

The Minor Use Pesticide program makes pesticides available to growers whose crops have a limited and/or unique production area.

Before PMRA can register a pesticide for use on a particular crop, the manufacturer of the product must send PMRA specific research results about use of the product on that crop. Manufacturers may decide not to carry out the research required to register the product for a minor crop because it costs more money to do the research than they can earn back by selling the product for these crops. The limited sales market is the main reason that few pesticides are registered for minor and specialty crops.

When a manufacturer doesn't want to commit resources to register a pesticide for a minor crop use, co-operating organizations can work together to collect the research data required for registration. In Ontario, OMAFRA has a provincial Minor Use Co-ordinator who works with industry organizations, companies and government agencies to identify minor use priorities and to apply to PMRA for minor use registrations. The co-operating organizations include Agriculture & Agri-Food Canada, CropLife Canada, the Ontario Fruit & Vegetable Growers Association, Ontario Vegetable Growers Marketing Board, the Canadian Horticultural Council, and other minor crop commodity organizations - as well as the research facilities of universities and private consulting firms.

If a pesticide is registered in the United States or another country, can you use it in Canada?

Look for the **PCPA** Registration number on the product label to make sure that the product is also registered for use in Canada. If the product is not registered in Canada, it is an offence under the **Pest Control Products Act** to use it in Canada.

User Requested Minor Use Registration Program URMUR

Products that are not currently registered in Canada, but are available in the USA or Europe, are eligible for the User Requested Minor Use Registration Program through PMRA. The application for registration must be approved by the registrants of the active ingredient, and supported by grower organizations, crop specialists and other industry personnel. All minor use proposals must be reviewed and approved by each provincial Minor Use Coordinator. If the PMRA approves the application, the pesticide may be used in Canada for specific purposes.

Can you use a pesticide that is registered for use in Canada if the crop, animal or pest you want to use it on does not appear on the label?

The pesticide label must give an application rate for the crop, animal or pest you wish to use the product on. If there are no directions for use on that crop, animal or pest, it is illegal to apply the product.

User Requested Minor Use Label Expansion Program URMULE

Products that are already registered in Canada for use on major and/or minor crops are eligible for the User Requested Minor Use Label Expansion Program. These applications to PMRA can be sponsored by Agriculture and Agri-Food Canada, industry organizations, crop specialists or other persons. The sponsor of the pesticide must agree in writing to the label expansion. If the PMRA approves the application, the pesticide may be used for specific additional crops.

Get Involved with the Minor Use Program

If you grow a minor or specialty crop and have few choices for pesticides, consider getting involved with the Minor Use program. Talk with other farmers and see if they are having similar pest problems. If they are, make sure that your industry association is aware of the problem. Encourage your association to contact the Provincial Minor Use Co-ordinator to have the problem identified as a priority for minor use registration.

Keep Good Records

Keep accurate and detailed records of the pesticides you use and the weather conditions when you use them. Good records can help you to:

- prevent residue problems before they happen - you will be able to count your pre-harvest intervals properly.
- solve residue problems if they do occur.
- satisfy requirements of food processors and buyers.

"Traceability" is becoming increasingly important. Traceability means that written records are available to show:

- who produced the food
- where the food was produced, and
- how it was handled at each step of production

- who processed the food
- where the food was processed, and
- how it was handled at each step of processing.

More and more food distributors and processors want to have "farm to fork" information for their products. If a food safety concern comes up, they can trace-back to show where the product came from and how it was grown and handled. Many processors now require you to submit detailed pesticide records for your crop. Agriculture and Agri-Food Canada is working toward having 80% of the food in Canada traceable by 2008.

If you have a residue problem, check your records and ask yourself these questions:

- Did you make a math or measuring error?
- Could there have been a problem with the application equipment? Was it calibrated correctly?
- Did you count the days to harvest interval correctly?
- Were there any unexpected weather conditions? Variable weather conditions can affect the growth rate, metabolism and maturity of the crop. Each of these factors may affect how quickly the pesticide is broken down by the crop. Weather conditions can also affect how quickly the pesticide will break down in the environment.

Get Help When You Need It

If you have a problem with residues, get the help and information you need to correct the problem.

Work with OMAFRA staff, your crop consultant, pesticide retailer and pesticide company representatives to find solutions that will work for your operation.

Protect Your Operation and Your Industry

Although 98% of foods tested in Canada have no detectable pesticide residues, or have residues below the MRL, preventing residues is very important. Consumers want to feel confident that the food they eat is 100% safe. Protect your operation, consumers, your market-share and your industry by doing everything you can to reduce pesticide residues.

Review Questions

1. What is a pesticide residue?

2. What is an MRL?

3. Where can you find listings of Canadian MRLs?

4. List three (3) ways you can prevent pesticide residues from occurring in your products.

   1.

   2.

   3.

5. The pesticide label for “Spray-Mite” gives directions for use to control mites on apples and pears. The label does not include directions for applying the pesticide to cherries. You have an outbreak of mites on your cherry trees.

   Should you apply this product to your cherry trees?

   Why, or why not?

6. Check your understanding of Pre Harvest Intervals by completing the following questions:

a) **The pesticide label states:**

> Proper timing of application is critical with this product. Monitor for insect pests and treat at early larval stages. Apply no more than 4 applications per year. Rotate the application with other insecticides. The pre-harvest interval is 3 days. Apply at intervals of at least 7 days. Do not feed crop refuse to livestock. Apply 0.5 L/ha in at least 400 L of water to control the insect. Do not re-enter treated areas within 12 hours.

You make your first application of this pesticide to the food crop on August 2nd at 7 am. You plan to make three (3) applications, seven (7) days apart. What is the **earliest** date that this crop can be harvested for food use?

1. August 17
2. August 18
3. August 19
4. August 20

August

Sun	Mon	Tues	Wed	Thur	Fri	Sat
		12	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

6. b) **The Pesticide Label states:**

> This ready-to-use solution for control of cattle grubs and lice should be applied to beef cattle at the rate of 18 mL per 100 kg of body weight for lice control. If heavily infested with lice, a second application may be applied. The second treatment should not be applied sooner than 35 days after the first treatment. Do not slaughter cattle within 35 days following a single treatment. If a second application is made, do not slaughter within 45 days of the second treatment.

You make your first application of this pesticide to beef cattle on August 3 at 10 am. If you make two (2) applications of the pesticide, according to label directions, what is the **earliest** day you can ship the animals for slaughter for food use?

1. September 7
2. October 13
3. October 22
4. October 27

August

Sun	Mon	Tues	Wed	Thur	Fri	Sat
		12	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

September

Sun	Mon	Tues	Wed	Thur	Fri	Sat
					12	
34	5	6	7	8	9	
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

October

Sun	Mon	Tues	Wed	Thur	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				