

## Chapter 9

# DEVELOPING A PEST MANAGEMENT PROGRAM

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The presence of a pest in a food product is a physical contaminant.

Pests are insects, rodents, birds and other animals that can contaminate food, spread disease and seriously threaten public health. Pests are known to cause biological, physical and chemical contamination.

Some pests can also be sources (e.g. feathers, hairs) or carriers (e.g. rocks, glass) of physical hazards and disease. Pests can contaminate ingredients, packaging and even finished products with disease.

Also, pesticides or herbicides used to control pests bring chemical hazards into the processing environment. If these chemicals aren't controlled they contaminate food. This happens because of high residue levels (amounts of chemicals) left on the product. It also happens because of spills or other accidental ways chemicals touch ingredients, packaging materials or finished products.

Pest control is one of the easiest ways to increase food safety. Both prevention and treatment steps are needed.

Here are just a few examples of pest activities:

- Orchard bees looking for a nesting place;
- Rabbits eating flowers and shrubs beside a processing facility;
- Pigeons nesting on or near loading docks;
- Empty wasp nests;
- Bug infested pallets or lumber on premises;
- Unusual bugs in production areas; and
- Mice, birds and other animals on or near premises.

## 1.0 INTEGRATED PEST MANAGEMENT PROGRAM

Integrated Pest Management (IPM) is an excellent way to control pests. Like HACCP, IPM is a decision making process about managing pests. It helps to catch problems that could happen and prevents them from happening in future.

The integrated (or overall, overlapping) process of IPM uses several ways to create lasting solutions. This includes a number of activities such as staff education, waste management, building repair, and maintenance. It also includes biological and mechanical controls. By using all of these, pests can be managed without depending on chemicals that might create chemical hazards. Pesticides should only be used as a last resort.

### Steps for Setting Up an IPM

Setting up an integrated pest management program includes five steps.

#### **Step 1: Assess the current situation**

Assessing the current situation means to check for what's currently happening at the facility. Look for pest problems that are happening or that could happen. Inspect, monitor and observe for the following:

- Inspect to discover and name the kinds of pests present (check with a pest control company);
- Monitor to understand and study the pest problem and where it is in the facility;
- Double check the results of the inspection and monitoring; and
- List the possible sources of pests (e.g. incoming ingredients such as flour beetles).

To put together a complete pest control plan, research pest problems in other processing facilities that make the same kinds of products. Also research food processors in the surrounding area near the facility. Ask for help from other facility owners or a local pest management company.

## Step 2: Develop the plan

Research what ways there are to control pests. Some control methods can include barriers, traps, and removing food debris (bits of food). It can also include changing the environmental conditions (including temperature and humidity).

Think about all parts of the prerequisite programs and how they might affect the pest management program. Identify the key areas that need to be developed or built up to support the pest management plan. Make sure to look at:

- Sanitation (cleaning to remove things that attract pests);
- Transportation and storage (stock rotation);
- Production scheduling ('Just-In-Time' production to minimize stock build-up); and
- Purchasing controls (don't purchase as many ingredients ahead of time to make sure that food products aren't stored too long).

## Step 3: Implement the plan

To set up a pest management plan put the following in place:

- Employee education – Each employee should know what pests are and be able to point them out. Tell all employees about the facility's pest management policies. Be sure to include the importance of sanitation and maintenance.
- Communication – Prepare standard written procedures for all parts of the pest management program. Include a way to check these procedures.
- Monitoring activities – Be able to show that pest management activities are working well for the target pest populations. Be able to show that these activities are successful at controlling pests.
- Records – Produce user friendly, written procedures. And as with all prerequisite programs, keep records of management's commitment to the food safety program.

#### **Step 4: Evaluate the plan**

Check regularly to see that the pest management plan is working. Review pest control documents. Check or verify whether pests are still being seen around the facility. Check to see whether control methods and corrective actions are working. Make sure these methods are meeting the company's needs.

#### **Step 5: Make adjustments**

Adjust the plan for ongoing improvements. Check regularly for new ways to control pests. Also check regularly for ways to reduce the use of herbicides and pesticides. Make sure adjustments also take into consideration that pest behaviours change with the seasons.

## **2.0 ELEMENTS OF A PEST MANAGEMENT PLAN**

Prevention is the key to a workable program. Stopping pests from coming into the facility and keeping the facility clean helps prevent infestation.

There are several key things all pest management programs must have:

### **1. Building and Equipment Design**

The first control in a pest management program is the design of the facility and the way equipment is installed. Make sure that the facility layout discourages pests. Make sure it allows for quick and easy controls.

### **2. Exclusion Practices**

Keeping pests from entering the facility is the next level of control.

Do this by:

- Preventing food or ingredients with infestations from getting into the facility;
- Using stock rotation to make sure ingredients and finished products aren't stored too long;
- Developing supplier selection and purchasing requirements; and
- Separating the receiving area from the food production areas.

Maintenance of doors and windows is important to keep pests from coming in. Control pest entry into the processing areas by checking incoming materials in the receiving area.

### 3. Good Sanitation

Like all living things, pests need food, water and warmth. This means that cleaning and sanitation are among the most important steps to stop pest infestation. Clutter, old equipment and poor storage habits all create safe places for pests to settle in.

#### **Tips to Prevent Pest Problems**

##### *Exterior building and property*

- Lessen or remove places where pests might live by storing materials off the ground;
- Make sure that garbage handling systems are sealed and don't attract pests;
- Eliminate vegetation and objects that can provide food or shelter for insects and rodents; and
- Inspect the building's exterior regularly for signs of rodents, insects and birds.

##### *Interior facility*

- Inspect the building's interior regularly for rodents, insects and birds;
- Seal and keep clean all cracks in floors, walls and ceilings;
- Continually maintain and clean suspended ceilings (where pests will nest);
- Keep floor drains clean and routinely inspect cover plates and catch basins;
- Build doors and windows to repel pests; and
- Develop and enforce door closing and window use policies.

##### *Storage areas*

- Store all food products away from walls and off the floor to prevent pest access and to allow for inspection and sanitation;
- Use first-in, first-out procedures; and
- Store all rejected, damaged or infested product that might attract pests, or cause cross-contamination, away from raw materials and finished goods.

#### **4. Building Maintenance**

Regular and ongoing preventative maintenance of the building will make sure pests don't find new ways to enter the facility. Reduce dust as much as possible. Prevent and immediately repair leaks in pipes. Fix holes and cracks in floors, walls and ceilings right away to keep pests away and to reduce dust.

#### **5. Inspection and Monitoring**

Inspect for pests in all food production facilities. Regular inspections show how well pest control methods are working.

Monitoring usually involves trapping pests. Methods for trapping pests can include pheromone traps, glue boards, mechanical traps and light traps. Follow the manufacturer's instructions. Place traps in a grid pattern throughout the facility. Create and maintain a location map and catch records. These will help to decide how, where and when to set traps and monitor them.

Check all traps regularly. Sudden increases in pests mean there's an infestation. If necessary, ask a pest control company to help identify issues and solutions.



*See Form E.2.2: Pest Trap Monitoring Record.*

#### **6. Pest Identification**

Identifying or knowing what kinds of pests there are, is key when choosing the best way to control them. Talk to a pest control company or another specialist before starting control actions.

## 3.0 CONTROL METHODS

Insecticides, rodenticides and other control methods that use chemicals to kill pests are not recommended for use in the food industry. These chemicals must never come in contact with or contaminate raw materials, packaging or finished products.

It's very important to understand the difference between the control methods used in non-food areas and those used in food areas.

Non-food areas include:

- Locker rooms
- Machine rooms
- Employee bathrooms
- Maintenance rooms
- Garbage storage rooms
- Boiler rooms

Food areas include any location where food is:

- Stored
- Processed
- Handled

### 3.1 Insect Control

In general, there are two kinds of insects that can cause trouble for a food manufacturing facility. The first kind is crawling insects such as ants, cockroaches, warehouse beetles and various flour beetles. The other group is flying insects such as wasps, houseflies and meal moths.

Usually processors need programs to control both types.

#### **Crawling Insects**

Most crawling insects are pests that feed on waste products (e.g. feces, animal waste and decomposing food products). They can be found in sewers, warehouses and food storage areas.

*Most food manufacturers treat their entire facility and its premises as food areas. This is a good practice. It lowers the chances of accidental cross-contamination by pest control chemicals.*

### *Cockroaches*

Cockroaches can be found in any area where there is food. Although these insects are generally associated with feces and animal wastes, having cockroaches may not be a sign of unsanitary conditions.

Cockroaches can enter a building in a several ways including:

- Used equipment or furniture;
- Infested shipments or carriers; and
- Empty shipping cartons and other food containers.

Cockroaches are more active at night and can easily travel through a facility without being noticed.

The best way of controlling cockroaches is through exclusion (keep them out) and prevention (keep them from getting in again). To do this:

- Clean and sanitize used equipment or furniture before allowing them into the facility; and
- Inspect carriers and shipments carefully for signs of infestation.

Make sure that the facility is maintained by filling in all the cracks and crevices, screening vents, open pipes and drains.

If these methods don't stop an infestation, chemical methods may be needed.

### *Ants*

Ants are one of the most annoying insects for the food industry. They can infest areas where pests seem impossible. Ants sometimes are found nesting in spaces in walls or in moist areas such as water pipes.

Important tips for controlling ants in food facilities include:

- Immediately sponge up ants with soapy water when they're found;
- Plug all possible ant entryways with petroleum jelly or caulking; and
- Use baits to control the ant colony (the wrong bait can make things worse).

Often baiting is the best way to control these determined insects, but don't hesitate to call a professional as chemicals may be necessary.

### *Stored Product Pests*

Moths (meal worms) and beetles feed on and contaminate stored grains. They often come into a facility through an infested food package. These insects can pass through openings that the human eye can't see. As with other crawling insects, the best control is prevention and exclusion.

To exclude or prevent these pests from getting into a facility:

- Rotate raw materials and stock using the first-in, first-out principle, since old stock is most likely to become infested;
- Check all incoming raw materials for packaging infestation. Don't accept any products in broken or damaged packages. Obvious signs of insects are tiny holes in the package and webbing;
- Don't put open packages of foods on shelves. Store all opened packages in sealed containers with tight fitting lids;
- Never mix old and new lots of food products; and
- Remove contaminated product immediately.

Addressing food-infesting insects takes ongoing effort. Some insects can live many weeks without food or water; others can chew through sealed packages. By the time these insects are noticed, they will have spread to other areas or packages. If moths, meal worms, beetles or other pests are found in the facility, identify and get rid of their food source.

### **Flying Insects**

In the food industry, disease spreading and damaging flying insects including houseflies, wasps and certain moths are especially worrisome.

#### *Flies*

Flies tend to be the most trouble in warm weather but they can stay around in smaller numbers through the year. Houseflies can contaminate food and must be eliminated. Exclusion and trapping are the most common methods of control. If flies appear to be coming from nearby facilities, ask the neighbours to cooperate by installing controls.

Houseflies breed in dung, fermenting vegetable waste and garbage. Check the premises for what could be attracting them. Look for their breeding environments.

### *Other Flying Insects*

To eliminate other flying insects:

- Avoid placing or pointing lighting at doors or right above entryways;
- Use sodium vapour bulbs (yellow tinged lights) for all outside lighting, including in parking lots (They attract fewer insects than incandescent lighting);
- Don't attach outside lighting directly to the building as it will attract insects into the building;
- Shelter bulbs with covers, canopies or shades;
- Maintain doors and windows in good condition so they close and seal tightly;
- Don't store product near entry doors and windows; and
- Make sure garbage is removed and keep containers clean and covered when not in use.

The key to controlling flying insects is a good monitoring program. Insect light traps (ILTs) are often used to keep track of the number of flying insects in food production facilities.

When using Insect Light Traps (ILTs), keep these points in mind:

- Never place these traps where they can attract pests into the facility (e.g. facing the entrances of loading docks);
- When using light traps don't place other lights nearby;
- In some areas, insect light traps don't work well because of high moisture levels (do not risk electrocution);
- When trying to catch flying insects, place the insect light traps at lower heights. This catches the insects closer to their food source; and
- When monitoring the insects, place the insect lights closer to the ceiling. This will keep these traps from attracting insects close to the processing areas.

Draw a location map for ILTs to help decide how to control flying insects and at what levels.

## 3.2 Rodent Control

A good rodent management program is needed in any facility that produces food. This is especially true in buildings near large fields, wooded areas or other places that rodents like to live. Rodents include rats, mice, squirrels, gophers and voles.

In order for a rodent control program to work for a long time, pay attention to inspection and sanitation. Exclusion (keeping rodents out) and reduction (reducing rodent numbers) are also very important.

### *Inspection*

As with flying insects, the keys to rodent control are monitoring and inspection. Look for the following when inspecting the facility:

- Droppings
- Tracks
- Gnaw marks
- Burrowing
- Runways
- Grease marks
- Urine stains
- Live or dead rodents
- Rodent sounds and odours

Knowing where to place the bait and traps will depend on how good the inspection and monitoring is.

### *Sanitation*

Like all living things, rodents need food, water and a place to live. Removing or reducing these requirements for life eliminates or reduces pests.

### *Exclusion*

The best way to control rodents is by making it impossible for them to enter the production facility. A building can be rodent-proofed by getting rid of all openings larger than a dime. Open doors and windows can allow rodents to get in. Plumbing and other utility lines can also provide entry. Monitor and control these areas.

### *Population Reduction*

Traps are the most common way to quickly reduce rodent populations. As with insect traps, the use of rodent traps will need monitoring. Since rodents tend to follow walls of buildings, rodent traps should be placed in these locations. Store product, raw ingredients and other materials far enough away from walls, and off the floor, to allow for inspection and sanitation.

## 3.3 Bird Control

Birds in and around a processing plant, or even near ventilation, can cause serious health problems. Common problems relating to birds include:

- Droppings in-house or on stored materials (bird droppings are known to contain E. coli and other micro-organisms);
- Airborne contamination of food;
- Bringing food or garbage into a facility, attracting other pests;
- Damage to wiring and electrical systems;
- Product destroyed from birds feeding on it; and
- Setting off motion alarm systems.

In most cases, making it hard for birds to find places to stay is a good way to control them. Keep them away from the premises completely. Be sure to use non-chemical methods when handling bird infestation. Keep in mind that some types of birds are protected by law.

The most common control method for birds is nest removal. This means to physically remove the nest and its eggs. It also means to put an end to the return of the young and their parents to the site. They will try to return because of their 'habitual imprinting' instinct. Imprinting means that parents will return to a successful breeding site. The young will also return to their birthplace. Break this cycle permanently.

Often, after a first nest removal, the birds will re-nest. After a second nest removal, the birds will most likely be:

- Physically unable to re-nest (both nest building and laying eggs demands a great deal of their energy);
- Discouraged from breeding in the same place; and
- Highly motivated to move to another location.

## 4.0 DOCUMENTING A PEST MANAGEMENT PROGRAM

As with all prerequisite programs, set up a thorough documentation system for the pest management program.

Detailed records are necessary when using monitoring and inspecting devices. Whether customizing a monitoring program, or using one from a pest management company, record the following:

- Labels and Material Safety Data Sheets (MSDS) for all products used in the facility;
- In-house policies or service rules;
- Standard Operating Procedures for all activities that deal with pest management;
- Location map of all pest control devices;
- Pest sighting logs;
- Name or job title of person responsible for each activity;
- Detailed description of activities, procedures and corrective actions for pest control; and
- Company name, individual representative name, and services provided by any outside company that may be used.

Also keep treatment records, including:

- Copy of pesticide applicator's license;
- Name of the product and a copy of the label;
- Location where applied;
- Concentration levels; and
- Method and frequency of application.

Like the HACCP plans, pest management programs must deal with changes in production processes, building modifications and variations in pest activity.



See *Form E.2.1: Pest Control Service Record*, *Form E.2.3: Pesticide Record*, and *Form E.2.4: Pesticide Usage Log*.

## 5.0 PEST CONTROL FORM TEMPLATES

- E2.1 Pest Control Service Record
- E2.2 Pest Trap Monitoring Record
- E2.3 Pesticide Record
- E2.4 Pesticide Usage Log

## 6.0 SOURCES OF INFORMATION

1. Alberta Food Processors Association FPA Food Safety Counseling Program – *Sanitation and Pest Control Workshop Participant Manual* (January 2001).
2. Schuler, George A.; Nolan, Maxcy P.; Reynolds A.E.; and Hurst W.C. *Cleaning, Sanitizing, and Pest Control in Food Processing, Storage and Service Areas*. Extension Food Science, The University of Georgia and Ft. Valley State University, and the U.S. Department of Agriculture. (June 2005). <http://www.pubs.caes.uga.edu/caespubs/pubcd/b927-w.html>.
3. Methyl Bromide Industry Government Group *Integrated Pest Management In Food Processing: Working Without Methyl Bromide*. <http://res2.agr.ca/winnipeg/storage/pubs/ipm-proc.pdf>.
4. NPCA Food Protection Symposium Pest Management '99' *Hazards from Pests in Food Premises*. (October 1999). <http://www.killgerm.com/downloads/Hazards%20Pests%20Food%20Premises.pdf>.
5. Randall, Carolyn. MSU Pesticide Education Program, *General Pest Management* MSU manual number: E-2048 Chapter 4: Pest Management in Food Handling and Other Specialized Facilities. (October 1998). [http://www.pested.msu.edu/Resources/bulletins/pdf/2048/E-2048PestManagement\\_FoodHandling.pdf](http://www.pested.msu.edu/Resources/bulletins/pdf/2048/E-2048PestManagement_FoodHandling.pdf).
6. Copesan. *Managing Insect Pests in Food Storage Facilities* (June 2000). <http://www.copesan.com/pdf/ipm-booklet.pdf>.
7. Department of Environment, Government of Newfoundland and Labrador *The Backyard Bug Brigade: Tips on Pest Control*. <http://www.env.gov.nl.ca/env/env/final/ipm.html>.
8. Abe, Thomas. *Flying Insect Monitoring in the Food Industry*. Online Article, Actron Inc. Website (Date: 2004). <http://www.actroninc.com/flymonfi.htm>.
9. Department of Agriculture, Fisheries and Forestry, Australian Government. *Pest Bird Control National Consultative Committee on Animal Welfare (NCCAW) Position Statement*. (October 1997) <http://www.affa.gov.au/content/output.cfm?ObjectID=D2C48F86-BA1A-11A1-A2200060B0A00797>.