

Chapter 14:

Food Handling

Learning Objectives

After completing this chapter, you will be able to:

- Explain proper food handling practices and their importance in the prevention of foodborne illness
- Describe the proper methods for displaying and sampling foods safely
- Identify specific temperatures for freezing, thawing, cooling, cooking, hot holding and reheating food safely
- Develop a food safety plan for food handling and sampling including standard operating procedures and record templates

Chapter 14: Food Handling



Rules of Thumb Don't Cut It

Heidi takes great pleasure in watching people's enjoyment as they sample her baking. After taking the Food Safe course through her regional health authority, she realizes that she must be careful with her food handling practices. She decides to develop guidelines for safe sampling of her products.

She writes up some rules about:

- *Using single use items, for example, plastic forks, portion cups, napkins, styrofoam plates, etc.*
- *Cleaning equipment (knife, utensils) after each use*
- *Displaying and serving the samples to prevent contamination by customers*
- *Length of time the samples sit out on the table*
- *Storage of samples*



Hazards

Food products at farm direct market outlets, including Alberta Approved Farmers' Markets, are subject to three types of hazards:

- Biological hazards from contamination by microorganisms if temperature control is inadequate, cross contamination from water, dirt, spills or other contaminants, and unsafe food handling practices
- Chemical hazards from residues or spillage of supplies used to clean or maintain equipment, demonstration or sale tables
- Physical hazards from loose jewelry, false finger nails and metal fragments that fall into the food

Safe Food Handling Practices

Handling food safely prevents contamination, eliminates the transmission of disease through food and maintains the wholesomeness of the food from production until it is consumed.

Safe handling and understanding the major causes of foodborne illness can reduce the risk of a food contamination incident. Remember, one case of food poisoning can close down a market or business. The four leading causes of foodborne illness include:

- Cross contamination
- Improper temperature control
- Poor personal hygiene
- Inadequate sanitation program

Cross Contamination

Cross contamination occurs when harmful microorganisms, allergens, chemical contaminants or foreign substances are transferred between food, food preparation surfaces and/or equipment. A common cause of cross contamination is incorporating contaminated ingredients into ready-to-eat foods or mixing batches of product. At the market, this may occur when the few last samples of a potentially hazardous food such as cooked sausage or cheese cubes are added to a new sample batch. However, cross contamination may also occur when raw foods contact cooked foods, employees mishandle foods or utensils, and equipment and materials are improperly cleaned and sanitized.

Cross contamination occurs when raw food contacts cooked food, employees mishandle foods or utensils, and equipment and materials are improperly cleaned and sanitized.

To minimize the risk of cross contamination you **must**:

- Use different preparation areas and equipment for potentially hazardous foods and ready-to-eat foods
- Clean and sanitize utensils, equipment and preparation areas between tasks and food types
- Use only food grade containers to prepare, hold, transport, store and serve foods; never reuse boxes that contained raw food
- Wrap or cover all food items, including individually served items; food grade plastic film shows off your food while keeping it safe
- Use tongs, toothpicks or other serving devices when handling unwrapped food

If you are selling different food types such as fruit pies and fresh vegetables, display the vegetables on a table separate from the bakery items to reduce the risk of cross contamination. Thorough washing does not completely remove all the pathogenic microorganisms that may be present on the vegetables.



For more information on cross contamination see Chapter 5: Danger Zone Ahead, Chapter 10: Storage and Chapter 12: Equipment.

Contaminated Ingredients

Cracked eggs and unwashed produce are common sources of contamination. Egg whites contaminated by pathogens such as *Salmonella* that enter through hairline cracks in the shell create problems when used for meringues. Produce, such as lettuce, green onions, spinach, etc. washed with untreated water can contaminate salads.

Temperature Control

Failing to cook potentially hazardous foods thoroughly, cool them quickly, reheat them adequately or freeze them completely can cause foodborne illness. Potentially hazardous foods must be kept out of the danger zone (4–60°C). The longer potentially hazardous food is held in the danger zone, the greater the chance it will become a food safety hazard.

To avoid contaminating ingredients, do not mix raw potentially hazardous foods with ready-to-eat items.

Keep potentially hazardous foods out of the danger zone between 4°C and 60°C.



Further information on practices you can use to ensure proper temperature control can be found in Chapter 5: Danger Zone Ahead, Chapter 10: Storage and Chapter 12: Equipment.

Heating Potentially Hazardous Foods

Do not use a crock pot to heat foods; only use it to keep hot foods hot. Operate it at the highest temperature setting and check the temperature of the food frequently to make sure it remains above 60°C.

Crock pots are designed to maintain the temperature of hot food that has been heated to the correct hot holding temperature in another appliance that can quickly heat the food, like an electric fry pan. If you use a crock pot to heat food, the food may be in danger zone temperatures for too long.

Never cook frozen meat in a crock pot. Before serving from a crock pot check the internal temperature of the food in three spots to be sure it is thoroughly cooked.

Before using a crock pot, check with your regional health authority to make sure they are can be used in your food establishment for the purposes you would like.

Bacteria multiply rapidly at temperatures between 4°C and 60°C. Keep food out of the danger zone.

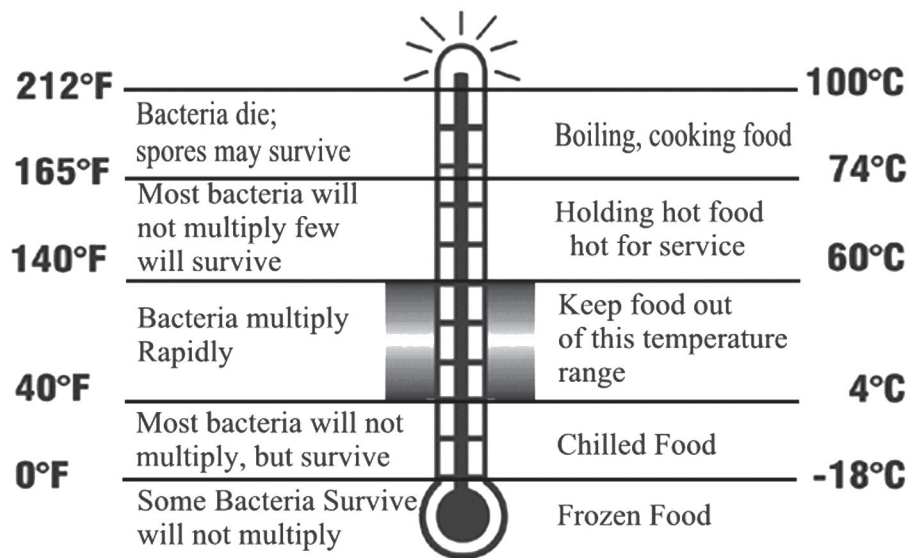


Figure 14.1 Danger Zone Temperatures

Thawing Potentially Hazardous Foods

Freezing suspends microbial growth in foods but does not destroy most microorganisms. Bacteria continue to grow when the food is thawed in refrigerated storage conditions. If food is refrozen, you have likely broken the time/temperature rule of no more than a total of two hours at the danger zone temperatures.

Temperature abuse frequently occurs during thawing. It is critical to thaw food at temperatures outside of the danger zone. Improper thawing allows bacteria to grow to harmful numbers and/or produce toxins. Defrost potentially hazardous food at refrigeration temperatures of 4°C or less.

Never thaw food on the counter. Food defrosts from the outside in. If defrosted at room temperatures, the outside of potentially hazardous foods may be at room temperature while the centre is still frozen. This creates ideal conditions for bacterial growth in the thawed sections.

Cooling Cooked Foods

Improper cooling is one of the most common reasons for foodborne illness. The longer it takes to cool the food, the greater the possibility for any bacteria present to grow and multiply resulting in a greater risk of food poisoning.

Potentially hazardous foods left at room temperatures for more than two hours provide the ideal conditions for pathogens to multiply rapidly. Placing hot food in large containers in the refrigerator also increases the risk of a food safety problem.

Once cooked, food **must** be cooled rapidly. Proper cooling involves removing heat from food fast enough to prevent pathogen growth. Potentially hazardous foods must be cooled from 60°C to 20°C or less within two hours and then from 20°C to 4°C or less within four hours.

To hasten cooling, pre-chill small batches of hot food in a freezer for about 30 minutes or place the containers in an ice water bath before refrigerating. In the refrigerator, separate food items so air can flow easily around them. Do not stack your containers.

Measure the temperature of the food periodically during cooling. Remember to clean and sanitize the thermometer between each temperature test.

Potentially hazardous foods must not be thawed at room temperature. Thaw food under refrigeration temperatures of 4°C or less – never on the counter. Thawing food outside of a refrigeration unit allows the outside of the food to thaw before the middle and provides prime conditions for pathogens to multiply.

Commercial refrigeration equipment is designed to hold cold food temperatures, not cool large masses of food. Cooked potentially hazardous food should be cooled quickly in a refrigeration unit in shallow pans or small portions and stirred frequently.



More information on safe temperature control of potentially hazardous food can be found in the Food Retail and Foodservices Code. Check it out at www.health.gov.ab.ca/professionals/ (Click on the first bullet, *Alberta Food and Foodservices Code*.)

The cumulative amount of time that potentially hazardous foods spend in the danger zone should never exceed two hours.

High Risk Situations

Many foods are at risk during preparation and service. As foods are thawed, cooked, held, served, cooled and reheated, they pass through the danger zone (4°C - 60°C) many times. The time spent in the danger zone is cumulative. The risk of foodborne illness increases especially after more than two hours in the zone.

The potential for growth of pathogenic bacteria is greater in reheated foods than raw foods. This is because the spoilage bacteria on raw products that inhibit the growth of pathogens through competition are killed during cooking. Subsequent recontamination allows pathogens to easily grow if temperature abuse occurs.

One of the most hazardous points in the food preparation process is cold food preparation because it:

- Usually takes place at room temperature, a temperature well into the danger zone
- Is one of the most common points of contamination and cross contamination.

Table 14.1 **Temperatures for Handling Potentially Hazardous Foods Safely**

Action	Internal Temperature of Food	Conditions
Freezing	0°C or less	-18°C or less is required to maintain food quality
Thawing	4°C or less 3.3°C or less, seafood	The time spent above 4°C including thawing, preparation, cooking and cooling must not exceed 4 hours
Refrigerated storage	4°C or less 3.3°C or less, seafood	
Cooking	71°C is the standard for cooking meat	Depending on the food type, required internal temperature ranges between 63°C and 74°C
Hot holding	60°C or hotter	Foods that have been prepared and cooked are to be served hot. Internal temperature should be at least 60°C



Specific internal temperatures and time for meat, poultry and fish to be properly cooked can be found in Appendix B (Time Temperature Control Raw Animal Foods) of the Food Retail and Foodservices Code. Check it out at www.health.gov.ab.ca/professionals/ (Click on the first bullet, *Alberta Food and Foodservices Code*).

The amount of time that potentially hazardous foods are in the danger zone will impact the shelf life of the product.

After potentially hazardous food is prepared, it **must** be stored:

- At the proper temperature
- In a clean, covered, food grade container
- In an area separate from raw foods
- Labelled with the date of manufacture



For more information on food storage see Chapter 10: Storage.

Personal Hygiene Practices

Wearing dirty clothing or aprons, failing to properly secure hair in a hat or hairnet and neglecting to thoroughly wash your hands after throwing out the trash are all examples of poor personal hygiene.

The best way you can control foodborne illnesses is to thoroughly wash your hands. You and your staff should properly wash hands or change gloves before handling food and after eating, smoking, coughing, sneezing, handling money and using the washroom, and after each food preparation task. In addition, working when sick with an infectious disease or with an open wound on your hands will increase the risk of foodborne illness.

Disposable latex gloves do not replace hand washing and should be used with caution. They do provide an additional barrier between hands and food and are an excellent alternative for handling ready-to-eat foods such as cooked meats.

The downside of wearing disposable gloves is they can provide a false sense of security as they protect your hands from feeling dirty. They **must** be changed as often as you would wash your hands, including after:

- Using the washroom
- Lunch and coffee breaks
- Smoking
- Sneezing
- Coughing
- Touching your face and hair
- Handling money
- Emptying garbage and picking up debris



For more information on recommended personal hygiene practices, see Chapter 13: Personal Hygiene.

Sanitation Program

Food left on work surfaces, equipment and utensils helps microorganisms grow and multiply. The microorganisms are then transferred to the food if the equipment or utensils are not thoroughly washed and sanitized before use.

Equipment, utensils and food contact surfaces, including those used to prepare food for sampling or demonstrating at the market, **must** be cleaned and sanitized as recommended:

- Before market startup, every 2 to 4 hours, between food types and after finishing a job.
- Between handling each production and sample batch

You and your staff should get into the habit of “clean as you go”. Keep market tables and sales areas clean and tidy throughout the market day. Clean up spills immediately.

Get into the habit. “Clean as you go!”



For more information on effective sanitation programs see Chapter 9: Sanitation.



Identify Unsafe Food Handling Practices

List all potentially unsafe food handling practices in your operation in each of the following areas and describe how you can eliminate them.

Cross Contamination _____

Temperature Control _____

Personal Hygiene _____

Sanitation Program _____

Insulated containers only slow heat movement and cannot keep cold foods out of the danger zone for long periods of time, especially if they are opened frequently.

Regulations prohibit the holding and display of ready-to-eat foods, including canned beverages, submerged in ice water.

Covering your food products will protect them from contamination while on display.

Displaying Food for Sale

When displaying foods for sale you must maintain appropriate temperatures. Use mechanical refrigeration units to safely hold potentially hazardous foods if displayed for more than 2 hours. Monitor the temperatures of the food and the equipment. Portable refrigeration units using a vehicle battery or generator for a power source are available if electricity is not available.

You can use a block or bags of crushed or cubed ice to maintain cold temperatures for short periods. Always use ice for displaying potentially hazardous foods, including eggs, if a refrigeration unit is not available. Prior to display, keep potentially hazardous food on ice in an insulated, lidded cooler with a drain in the bottom for discharge of melt water. Collect the melt water in a bucket and dispose of properly. Regulations prohibit the holding and display of ready-to-eat foods, including canned beverages, submerged in ice water.



Figure 14.2 **Covering Food Products**

Guidelines for Displaying Food Safely

- Surround cold samples of potentially hazardous foods with ice. Place food in a covered container embedded in a bag of loose ice. Do not simply set on top.
- Label meat that is thawed prior to sale as “previously frozen”.
- Uninspected eggs may be sold ONLY at Alberta Approved Farmers’ Markets. They must be sold in clean containers that are clearly marked “UNINSPECTED”. Eggs must be kept at a temperature of 7°C or less.
- Only pasteurized milk and milk products may be sold in Alberta. Unpasteurized cheese can be sold provided it has been produced in compliance with the *Food and Drugs Act*.
- Display only the amount of food product that you will sell in two hours or less. Refill the display from the back so products are purchased on a first displayed, first sold basis.
- Display different food types separately to avoid cross contamination. Always display raw animal foods well away from other food. Do not display perishable ready-to-eat food such as vegetables with bakery items or meat products. Display raw, cooked and ready-to-eat foods separately unless they are prepackaged.
- Protect food from sun, wind, dust and weather. Perishable products such as vegetables and potentially hazardous foods like meat are especially vulnerable to the effect of sun at outdoor markets.
- Protect all food on display from inadvertent handling and contamination by the public through the use of packaging, food (sneeze) guards, display cases or other effective means.
- Sell all products within their recommended shelf life. Identify the date of preparation on all potentially hazardous foods displayed and offered for sale.
- List ingredients and producer contact information on all food products. It’s required by law and useful to people with food allergies.

Display Surfaces

Rough wooden tables and bins are difficult to clean, making them unsuitable for direct contact with food products. Wood surfaces should be smooth and sealed with an approved paint for ease of cleaning and sanitizing. Washable or disposable table covers and bin liners offer additional protection for the food and make clean up simpler. They also make a more attractive display.

“None of our product is allowed to touch a wooden surface because there may be contaminated organisms in the wood. Everything we use has to be washable.” Helen Doef, Doef’s Greenhouses Ltd.

Use display bins and containers for dedicated purposes, that is, always use the same container for a product. This means that the bin used for potatoes is not later used for displaying peas, pickles or carrot marmalade. Store your display containers and tables where they are protected from chemicals, dirt, manure and other contaminants.

Keep your display table clean. Clean and sanitize it at the start of the market and as required throughout the day.

Food Sampling at the Market

Many regional health authorities prohibit food preparation at the market with the exception of sampling or under the authority of a separate food establishment permit. Food sampling is usually limited to bite size portions available at no charge. Check with your public health inspector before planning any food preparation activities.

“Customer safety is the first priority of the market. We’ve worked with Capital Health Region to develop stricter sampling procedures for our market. They are in addition to what is in the regulations. We want to ensure the reputation of the market stays strong.” Jim O’Neill, Old Strathcona Farmers’ Market

If you provide food samples at the market, minimize food handling to avoid cross contamination. Do not allow customers to touch the food samples directly. Portion the food into individual helpings and serve each portion in a portion cup, on a napkin, speared with a toothpick or wrapped in food-grade plastic wrap or plastic bags. Use tongs and disposable gloves when preparing the samples.

Do not allow customers to touch the food samples directly.

Display food samples in a single layer on a clean aluminum pan, paper plate or serving tray lined with waxed paper, tin foil or other food grade wrap. Avoid using wicker or wooden trays, as they are difficult to clean and sanitize properly. Use a new disposable serving item or replace the tray liner before laying out a new sample batch. To reduce the risk of contamination, ensure there is plenty of space between each sample so customers can easily pick up one sample without touching others.

Bring sufficient single use supplies such as napkins, styrofoam cups, paper plates, portion cups, plastic utensils, etc. for proper food sampling throughout the market day.

Keep your market area free from litter. Provide a garbage container at the sampling booth. Replace or empty the container as required and at the end of the market day. Do not allow garbage to spill out of the container or contact the display table or food.

Do not handle both food and money. Wear food-grade disposable gloves when preparing and displaying the samples. Remove and dispose of the gloves after handling money or other contaminated objects and before preparing more samples. Wash your hands and put on new gloves before handling the next batch of food samples.

“It’s important to cover your samples at the market but it’s more difficult to get the customer to sample them when they are covered. We have a staff member with the samples constantly to take the lid off, ask the customers to try the sample and then put the lid back on. It takes extra time to do that, but it makes us talk to our customers more and gives us a little extra contact. It does keep customers from helping themselves and prevents double dipping.”

Shelley Bradshaw, Innisfail Growers/Beck Farms

Bring sufficient single use supplies such as napkins, styrofoam cups, paper plates, portion cups, plastic utensils, etc. for proper food sampling for the full market day.

Keeping Food Samples Safe

- Wash hands prior to handling food.
- Cut pre-made or pre-cooked foods to sampling size after cooking.
- Maintain proper temperature control when preparing and serving food samples. Cook food completely prior to sampling. Do not partially cook food at home and set aside for final cooking later at the market. Keep hot foods hot (60°C or more) and cold foods cold (0 - 4°C) and serve immediately. Follow the time/temperature rule.
- Use an accurate thermometer to monitor product temperatures during preparation and sampling. Calibrate the thermometer at the beginning of each market day. Clean and sanitize the thermometer before each use.
- Protect the food from sun, wind, dust, flies and other contaminants when preparing and serving samples. Always keep food covered.
- Prepare small sample batches as needed. Wash and sanitize equipment, utensils and food preparation surfaces before starting the task and between each batch.
- Do not add fresh samples to existing ones. Empty the sample dish, clean and refill with fresh product.
- Use separate utensils for raw and cooked foods.
- Serve cooked products on a clean platter with clean utensils and clean hands.
- Prevent the public from handling food samples by handing the sample to the customer and using toothpicks or single service containers.
- Discard all contaminated samples as well as any that aren't consumed within two hours or the time recommended by your public health inspector.
- Talk to your regional health authority about what is required for a hand/equipment washing station at your stall. A large coffee urn or other container with a spigot to provide hot water, a basin, liquid dish soap, bleach, disposable (paper) towels, a receptacle to hold equipment while air drying and garbage container are usually required. Set it up and use the hand washing facilities frequently.
- Keep utensils and equipment used in the preparation of food samples covered to protect from contamination.
- Use single use paper towels or disposable dish cloths to wipe up spills, and clean and sanitize sampling table. Dispose of after use.
- Refrain from smoking, eating or chewing gum at food tables.

Clean and sanitize utensils and small equipment used to prepare and demonstrate food before you handle food. You can clean and sanitize these items before going to market provided they are transported to market covered in clean, sanitized containers.

Transport any chemicals such as bleach and dish soap in a container separate from food and food sampling supplies. The container should be constructed of a waterproof material to prevent contamination in the case of accidental spillage. Cover and label the container.



For more information on food sampling see Appendix H: Food Safety Tips.



Food Handling Word Scramble

Unscramble the words in the second column that correspond to the six hints and write them in the spaces provided.

1) sosrc noitnamianotc

2) perorp nadh shawnig

3) nagerd zneo

4) mepertreuat notrolc

5) nignaelc

6) meptretaeur buesa

1. Occurs when microorganisms are transferred between food, food preparation surfaces and equipment.

2. This is the number one way a food handler can help prevent foodborne illness.

3. Temperatures between 4°C and 60°C where microorganisms grow best.

4. One of the most important conditions to maintain in order to insure safe food.

5. This must always precede sanitation.

6. One of the most common causes of foodborne illness.

Keeping Records

Keeping records is one tool that helps you monitor the consistency and effectiveness of your food handling practices. Records provide proof that you followed recommended practices to keep food safe. Your record keeping system should include:

- Temperature logs where you record temperatures of foods sold and sampled at the market. It is especially important to track the temperatures of potentially hazardous products that are cooked and sampled hot at the market or kept at refrigerator temperatures and sold or served cold
- Identification of product batches sold and sampled at the market
- Staff training



Review Your Practices

1. Randomly review your temperature logs for food sold during six market days over the last year. Do your records show proper temperature control?

2. How often do you review safe food sampling practices with your market staff?

Staff Training

Train staff in the appropriate handling of different food types. Make sure they understand:

- The importance of each requirement
- Their role in the safe handling of food
- Why their actions are critical to the continued safety of your food products
- The importance of following your policies and procedures

Focus food handling training on the following areas:

- Proper handling of food to prevent contamination
- Proper food sampling procedures
- Proper ways to display food for sale
- Cleaning and sanitizing equipment and utensils after each use
- Appropriate use of hand washing stations
- Disposal of left over or contaminated food samples

Keep records documenting when training was conducted, who attended and the time spent reviewing specific safe handling practices. Monitor staff to determine if they understand what must be done and are implementing your operating procedures.

“We bring our staff together for a full day of training in June. In addition, we address any food safety concerns we see at the markets. We hire secret shoppers to look for a number of things. Staff doesn’t know who they are. It does provide us insight into how things are going.” Leona Staples, Innisfail Growers/The Jungle U-Pick Farm



Food Safety Plan – Food Handling

This section of your food safety plan should emphasize good food handling practices and what employees need to do to carry out their duties in a safe and sanitary manner.

Your written plan should include:

- Complete instructions on good food handling practices to be followed to ensure a food safe environment
- How to properly prepare and serve food samples
- How to maintain and monitor proper temperature control for potentially hazardous foods
- How to minimize the risk of cross contamination
- How to safely display food to be sold at the market
- What is to be done when mistakes happen
- What information is to be recorded, when, where and by whom
- Verification of activities carried out to ensure procedures are followed



Take the time to continue developing your food safety plan. Create a section in your binder for Food Handling. Use the information above to build the food handling component of your food safety plan.

Summary

Making and selling food carries with it certain responsibilities. Every person who handles food has an important responsibility to keep food safe and free of contamination and prevent food poisoning. Keeping food safe involves controlling temperatures, contamination sources and time in the danger zone. Your efforts in handling food to maximize food protection provide confidence in your product with the added benefit of attractive displays which can increase sales.

Measures must be taken to protect food from contamination by:

- Ensuring products, especially potentially hazardous foods, are not exposed to temperatures in the danger zone (4°C - 60°C)
- Calibrating and using accurate thermometers to record product temperatures
- Keeping equipment clean and in good repair
- Practicing proper food sampling techniques
- Displaying food safely

Market Manager Responsibilities

As an Alberta Approved Farmers' Market manager you need to ensure that the market is operating safely. It is your responsibility to monitor food handling practices at the market every market day and bring potential problems to the attention of the market vendors or employees for action.

As you walk the market:

- Monitor temperatures of potentially hazardous products. Use a metal stem thermometer to occasionally spot test temperatures. Remember to clean and sanitize your thermometer before each use
- Ensure products on display are held at the proper temperature and potentially hazardous foods are displayed in refrigeration units or on ice
- Ensure that vendors are following proper food sampling methods



Food Safety Checklists for Market Managers is in Appendix M.

What's Next

Pests contaminate foods and transmit diseases. To learn more about developing a pest control program for your food establishment, turn to Chapter 15: Pest Control.



Resources

If you need more information or have food safety questions about this chapter contact:

Safe Food Systems
Agri-Food Systems Branch, Food Safety Division
Alberta Agriculture, Food & Rural Development
Phone: (780) 427-4054. Dial 310-0000 first for toll free access.



Chapter Review

Take a few moments to review the chapter and answer True or False to the following statements.

1. Microorganisms can contaminate the internal contents of eggs. _____
2. Cross contamination occurs when microorganisms are transferred between food, food preparation surfaces and equipment. _____
3. Freezing destroys most microorganisms. _____
4. Temperature abuse frequently occurs during the thaw process. _____
5. Bison sausage samples can safely sit on your table for three hours. _____
6. A farmers' market manager can allow uninspected eggs to be sold at that market provided they are stored properly. _____

Answers to Chapter Review

- 1) True
- 2) True
- 3) False, freezing suspends microbial growth. It does not kill the organisms.
- 4) True
- 5) False, samples must be disposed of and replaced every two hours. Some regional health authorities require samples to be replaced every hour.
- 6) True, eggs must be displayed and stored at 7°C or less

