

Safe Handling of Food at Open Markets

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Once food has been harvested, processed, and packaged, it can be offered for sale to the public. Maintaining a safe food product means protecting it from contamination, assuring proper temperatures, and preventing damage. This chapter will help you identify the critical control points in storage and display that are important to food safety in the market. Safe, fresh foods go hand in hand with clean, attractive displays.

The following topics are covered:

1. *Plan of Operation; Facilities and Utilities.* What products will be offered? Will this be a permanent structure, a tent, a shed? What is important about access to water, wastewater collection, trash service, and electricity? Do you need a food service license?
2. *Food Temperatures.* What temperatures keep the food safe? How can the temperature be maintained? Do you keep records?
3. *Display.* Do you keep tables and bins clean? Is packaging needed to protect food from possible contaminants?

Why should you be concerned?

A basic plan of operation will be useful in determining necessary equipment and standard procedures so that you offer safe foods for sale. As noted in previous chapters, safe foods involve controlling temperature, contamination sources, and time at improper temperatures allowing microbial growth. Your efforts in food protection give you confidence in your product with the added benefit of attractive displays, which can increase sales.

How will this chapter help you protect your product quality?

This chapter is a guide to help you better understand the conditions under which foods can deteriorate and/or become unsafe, and how to identify those points and improve food safety. Easy-to-understand assessment tables help identify situations and practices that are safe as well as ones that should be addressed promptly. Additional information on how to safeguard particular foods may be obtained from your local county extension office.

PART 1—Plan of Operation; Facilities and Utilities

Do you have a plan of operation based on food safety?

A plan of operation sets out what you want to do and how to accomplish your goals. Having it written out, sets guidelines for employees and is a reference for you in evaluating success and future improvements. Your plan will follow the path the food takes to reach sale. It will include when and where you get the product, how and where it will be displayed, any special handling or protection needed, hours of operation, and what will be done with unsold product. In Kansas, unregulated farmers' markets may sell only fresh fruits and vegetables. If your plan includes processing, you need to contact the **Kansas Department of Health and Environment (KDHE)** at (785) 296-5600 to discuss obtaining a food service license.

It is most important to note the critical points where control is necessary to keep food safe. Although each food is different, the common critical control points are:

- Food temperature
- The time potentially hazardous food is held without refrigeration or heat
- Potential paths of contamination/adulteration

Your plan should include the action you require to correct a failure in controlling each of these critical points. For example, if an employee uses the toilet and fails to wash hands before returning to setting up a fruit display, the correction is to isolate the possibly contaminated fruits for discard or re-washing, and proper hand washing by the employee before handling any more food.

What might determine the type of operation and facility needed?

The complexity of the operation is based on the foods' potential to cause food-borne illnesses. Fresh whole tomatoes are not potentially hazardous and are safe to sell without packaging, refrigeration, or even an overhead cover. Frozen meats, are potentially hazardous and must be carefully processed

and packaged, labeled, held under refrigeration, and protected from the weather. The potential hazard level of each product dictates the operation as well as the number and kind of critical controls.

Other considerations might include:

- Is the operation seasonal or year round—What about weather protection?
- Other time demands—if your time is limited, the operation should be simple.
- Location of processing and sale—Are surfaces paved? Are animal pens nearby?
- Employees—if needed, are they trained and supervised?

Are processed foods sold, or does any processing occur at the market place? In Kansas, the definition of a “farmers’ market” does not allow the sale of anything other than fresh produce; remember, a food service license may be necessary for the sale of processed food.

Do you need utilities? Which ones?

Simple seasonal operations like selling freshly harvested tomatoes or ears of corn function very well without power, running water, etc. If you decide to become a licensed retail market, utilities will be required. See Chapter 4 Drinking Water Well Management, Chapter 5 Wastewater: Septic Systems and Other Treatment Methods, and Chapter 6 Managing Production Waste for discussions on these areas.

Your plan of operation should alert you to utility needs. Be sure to confirm availability of utilities before committing time and money to establishing your facility. In general, a safe water supply and an acceptable wastewater treatment method are necessary when food processing involves water, or when sinks and toilets are in use. In some cases, the water supply may be required to meet public water supply requirements. A source of power is required for refrigeration, lighting, and machinery operation. Be sure to consider waste management so that insects and rodents are controlled.

Assessment 1—Plan of Operation; Facilities and Utilities

Use the table below to rate your risks. For each question, indicate your risk level in the right-hand column. Although some choices may not correspond exactly to your situation, choose the response that best fits. Refer to Part 1 if you need more information to complete the table.

	LOW	LOW-MEDIUM	MED-HIGH	HIGH	YOUR RISK
Operation without utilities	Marketing of only unprocessed produce. Sales on one day/week. (No need for utilities.)	Marketing of only unprocessed produce. Sales through week during harvest.	Some processed foods (baked goods) marketed. Sales through several months.	Processed foods marketed on an on-going basis throughout year; no utilities available.	<input type="radio"/> Low <input type="radio"/> Low-Med <input type="radio"/> Med-High <input type="radio"/> High
Food service license	Sell only fresh produce.	License obtained and in compliance.	License obtained, > year since last inspected, compliance unknown.	No license and selling processed foods.	<input type="radio"/> Low <input type="radio"/> Low-Med <input type="radio"/> Med-High <input type="radio"/> High

Responding to risks

Your goal is to lower your risks. Turn to the Action Checklist on Page 8-6 to record the medium-high and high-risk practices you identified. Use the recommendations in this section to help plan actions to reduce your risks.

PART 2—Safe Food Temperatures for Storage and Display

All foods are better protected if temperatures are controlled. Even canned goods and dry products such as herbs or grain meals and flours retain quality better at moderate temperatures than at high temperatures. Raw fruits and vegetables that have not been cut up or otherwise altered can be displayed without refrigeration if air temperature is above freezing. Fresh produce quality is generally prolonged by cool conditions. Processed meat like dressed poultry, must be kept cold at refrigeration temperatures (40°F or less) until delivered to the customer. Frozen meats must be held at or below 0°F.

In general, foods that have been processed and contain moisture are considered *potentially hazardous* and are more at risk from growth of bacteria or fungi.

How can microbes make food unsafe?

Pathogenic bacteria need several conditions in order to grow in foods: adequate pH, oxygen (or lack thereof) moisture, temperature, and time to reproduce. Pickling foods changes the pH to an unacceptable level for many bacteria. Replacing oxygen with a vacuum or another gas stops the growth of most types of bacteria; however, the bacteria that cause botulism grow in the absence of oxygen. One way we can stop bacterial growth is by removing moisture, such as when drying herbs. Another way to control growth is with temperature. Most bacteria cannot grow if the food is either quite hot (at least 140°F), or (below 40°F). The last growth factor—time—relates to foods kept at temperatures between 40°F and 140°F. We can still control growth by limiting the time potentially hazardous food is held in this temperature range to no more than two hours.

Another consideration is the number of microbes present. Most pathogens cause illness only after a minimum number of organisms have been produced. That number can range from one *Cryptosporidium*, to many thousands of *Streptococci*. If the food has been contaminated with only a few organisms, it takes longer to reach the numbers necessary to cause illness. When many organisms are present, it takes less time to reach this dangerous number. Anything that decreases the amount of bacteria therefore improves the food's safety factor. Preventing microbial contamination makes food safer. Consider a cantaloupe melon; as long as the rind is undamaged, the interior is uncontaminated and the melon is not potentially hazardous. When the melon is cut open, it becomes potentially hazardous because the interior is exposed to bacterial contamination. Therefore, once

cut open, the melon temperature must be kept below 40°F to control bacterial growth.

Some processing techniques may physically alter the food or remove natural barriers to contamination, making them potentially hazardous. Cooking alters vegetables by weakening cell walls, allowing microbes to grow better. If the variety and number of microbes change through the processing—as happens when cooking kills all bacteria—the natural competition that normally limits growth is altered. Should disease causing bacteria then contaminate the food, multiplication is unhindered by barriers or competition, and the food becomes dangerous more quickly. This is why keeping cooked foods safe involves controlling both time and temperature.

FAT-TOM TABLE

Factors necessary for bacterial growth
Control these, and you control bacteria

Food	all organisms need a source of energy
Acidity	pathogens grow in pH ranging from 4.6 to 9.0; very acid (sour) foods discourage bacterial growth
Time	bacteria can double in number every 15 to 20 minutes
Temperature	"Danger zone" for foods is 40°F - 140°F
Oxygen	the presence or absence of oxygen limits most bacteria
Moisture	as water becomes unavailable, bacteria cease to grow

What potentially hazardous food temperatures are safe?

You may think you can judge temperature by feel or by seeing steam, but the only sure indicator is a thermometer inserted into the food. As mentioned before, foods that have been heat treated or physically altered, are potentially hazardous and must be kept hot (at least 140°F) or cold (below 40°F). It is a good idea to document food temperatures, with date and time on a log sheet. Whenever more than one person is involved in processing temperature sensitive foods, there is no other way to know what the temperature history is.

How can you maintain proper temperatures in potentially hazardous foods?

During display it is necessary to have some means to maintain the appropriate temperature. Although insulated containers slow heat movement, remember the two-hour time limit for food out of temperature. Any time potentially hazardous foods will be out of temperature for more than two hours, mechanical devices are best to safely hold the food at the proper temperature. Be sure there is a stem thermometer to check food temperatures and a thermometer to monitor the unit's temperature. Checking the thermometer also lets you know that the unit is functioning properly. There are portable units that use a vehicle battery or a generator for a power source.

Sometimes crushed ice is used to maintain cold temperatures. In this case, the crushed ice should be in an insulated, lidded cooler, with a drain in the bottom for discharge of melt water into a bucket. (Health codes forbid the holding and display of ready to eat foods submerged in ice water.) Temperature sensitive foods should be surrounded by ice and not simply set on top. If the food is ready to eat and will not be cooked, it should be inside a covered container bedded in ice.



Assessment 2—Safe Food Temperatures for Storage and Display

Use the table below to rate your risks related to safe food temperatures during storage and display. For each question, indicate your risk level in the right-hand column. Although some choices may not correspond exactly to your situation, choose the response that best fits. Refer to Part 2 if you need more information.

	LOW RISK	LOW-MED	MED-HIGH	HIGH	YOUR RISK
Thermometer use	Thermometers available and used daily.	Thermometers available, used occasionally.		No thermometers in use.	<input type="radio"/> Low <input type="radio"/> Low-Med <input type="radio"/> High
Records of temperatures	Temperatures recorded and logs kept showing safe temperatures.	Temperatures occasionally recorded, logs show safe temperatures.		No records of temperatures—or—unsafe temperatures recorded.	<input type="radio"/> Low <input type="radio"/> Low-Med <input type="radio"/> High
Temperature maintenance of potentially hazardous foods	Powered hot boxes or refrigeration used.	Sale lasts less than 2 hrs. & ice or insulation properly used to hold temps.	Sale lasts more than 2 hrs. & ice or insulation properly used to hold temps.	Sale lasts more than 2 hrs; no ice or insulation.	<input type="radio"/> Low <input type="radio"/> Low-Med <input type="radio"/> Med-High <input type="radio"/> High

Responding to risks

To protect your produce from possible contamination, you should minimize your risks by adopting actions and practices that result in lower risks. Turn to the Action Checklist on Page 8-6 to record the medium-high and high-risk practices you identified. Use the recommendations in this section to help plan actions to reduce your risks.

PART 3—Display

What is the potential for contamination?

An attractive display enhances sales and should keep food safe. Temperature control has been discussed, but remember that the table, bin, or rack that contacts the food may be laden with microbes. Therefore, all such food contact surfaces must be kept clean and should be easily cleanable. Contamination risks can be decreased by dedicating the bin or container to the type of crop. For example, the same container should not be used for root crops and fruits. Kansas regulations require that foods be at least 18 inches off the ground for sidewalk (outdoor) display. Wrapped products sold intact, are protected from exposure to dust and insects. Baked goods should always be prewrapped for sale and never portioned at the sale.

Live animals increase the risk of contamination of nearby food displays. Not only does the animal manure attract flies, but blowing dust from their pens or cages can carry microbes to the food. If the community open-air market includes vendors selling live animals, those vendors should be grouped and separated from food booths.

Animals should be down wind from food displays, and as far away as possible. Privately owned markets on the farm site should be located up wind and well away from animal pens.

Are the surfaces clean and suitable?

Rough wooden tables and bins are difficult to clean, making them unsuitable for direct contact with some food products. Wood surfaces should be smooth and sealed with enamel or paint for ease of cleaning. Washable or disposable covers and liners are additional protection for the food, and make clean-up simpler. They present a more attractive display too.

You have control over the use and storage of your tables and display bins. It is best to dedicate these items for like products such as tubers, or fruits grown off the ground, or processed foods. This means that the bin used for potatoes is not later used for displaying apples. Display items should be stored where they cannot be contaminated by manure or chemicals.

Assessment 3—Display

Use the table below to rate your risks related to means of safe food display. For each question, indicate your risk level in the right-hand column. Although some choices may not correspond exactly to your situation, choose the response that best fits. Refer to Part 3 if you need more information.

	LOW RISK	LOW-MED	MED-HIGH	HIGH	YOUR RISK
Food displays	Food is displayed at least 18 in. off of the ground, covered, & under a roof.	Food is displayed at least 18 in. off of the ground & under a roof.	Most food displays are off of the ground, but less than 18 in.; some foods are covered—no roof.	Foods are on the ground; nothing is covered—no roof.	<input type="radio"/> Low <input type="radio"/> Low-Med <input type="radio"/> Med-High <input type="radio"/> High
Live animals	Animals are down wind more than 200 ft. from open-air food displays.	Animals are down wind & 100 -200 ft. from open-air food displays.	Animals are down wind & 50 -100 ft. from open-air food displays.	Animals are upwind—or—less than 50 ft. from open-air food displays.	<input type="radio"/> Low <input type="radio"/> Low-Med <input type="radio"/> Med-High <input type="radio"/> High
Cleanliness and suitability of tables, bins, boxes, etc.	All surfaces are smooth and sealed, clean. Food bins are labeled and used as dedicated.	All surfaces are smooth and sealed, not all are clean. Food bins are unlabeled but used for specific foods.	Most surfaces are smooth and sealed, but dirty. Food bins sometimes used interchangeably.	Most surfaces are rough and dirty. Food bins routinely used interchangeably.	<input type="radio"/> Low <input type="radio"/> Low-Med <input type="radio"/> Med-High <input type="radio"/> High

Responding to risks

Your goal is to lower your risks. Turn to the Action Checklist on Page 8-6 to record the medium-high and high-risk practices you identified. Use the information in this section to help plan actions to reduce your risks.

ACTION CHECKLIST

When you finish the assessment tables, go back over the questions to ensure that every high and medium risk you identified is recorded in the checklist below. For each risk, write down the improvements you plan to make. Use recommendations from this chapter and from resources elsewhere. Pick a target date that will keep you on schedule for making the changes. You do not have to do everything at once, but try to eliminate the most serious risks as soon as you can. It helps to start with inexpensive actions.

Action Checklist Safe Handling of Food at Open Air Markets

Write all high and medium risks below.	What can you do to reduce the risk?	Set a target date for action.
Sample: Same baskets used to display potatoes and tomatoes.	Clean baskets after market; label and dedicate use for each product.	Before next market day on April 8.



For More Information

K-State Research and Extension bulletins are listed below:

Food Safety for Farmers Markets, MF2260.

A Guide to Starting, Operating, and Selling in Farmer's Markets, MF1019.

Farmers Markets in Kansas: A Profile of Vendors and Market Organizations, SRP658 (electronic only).

Web sites:

<http://www.oznet.ksu.edu/>—Kansas State University Research and Extension; most publications can be found here.

<http://www.foodsafety.gov/~dms/prodguid.html>—U.S. Food and Drug Administration document, *Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables.*

*Kansas Home Food*A*Syst Helps Ensure Your Safety*

This Kansas Food*A*Syst handbook covers a variety of topics to help you examine and address your most important food safety and environmental concerns. See the complete list of chapters in the table of contents at the beginning of this handbook. The end of each chapter lists resources and other useful information. For more information about topics covered in Food*A*Syst, or for information about laws and regulations specific to your area, contact your local environmental health or county K-State Research and Extension office.

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