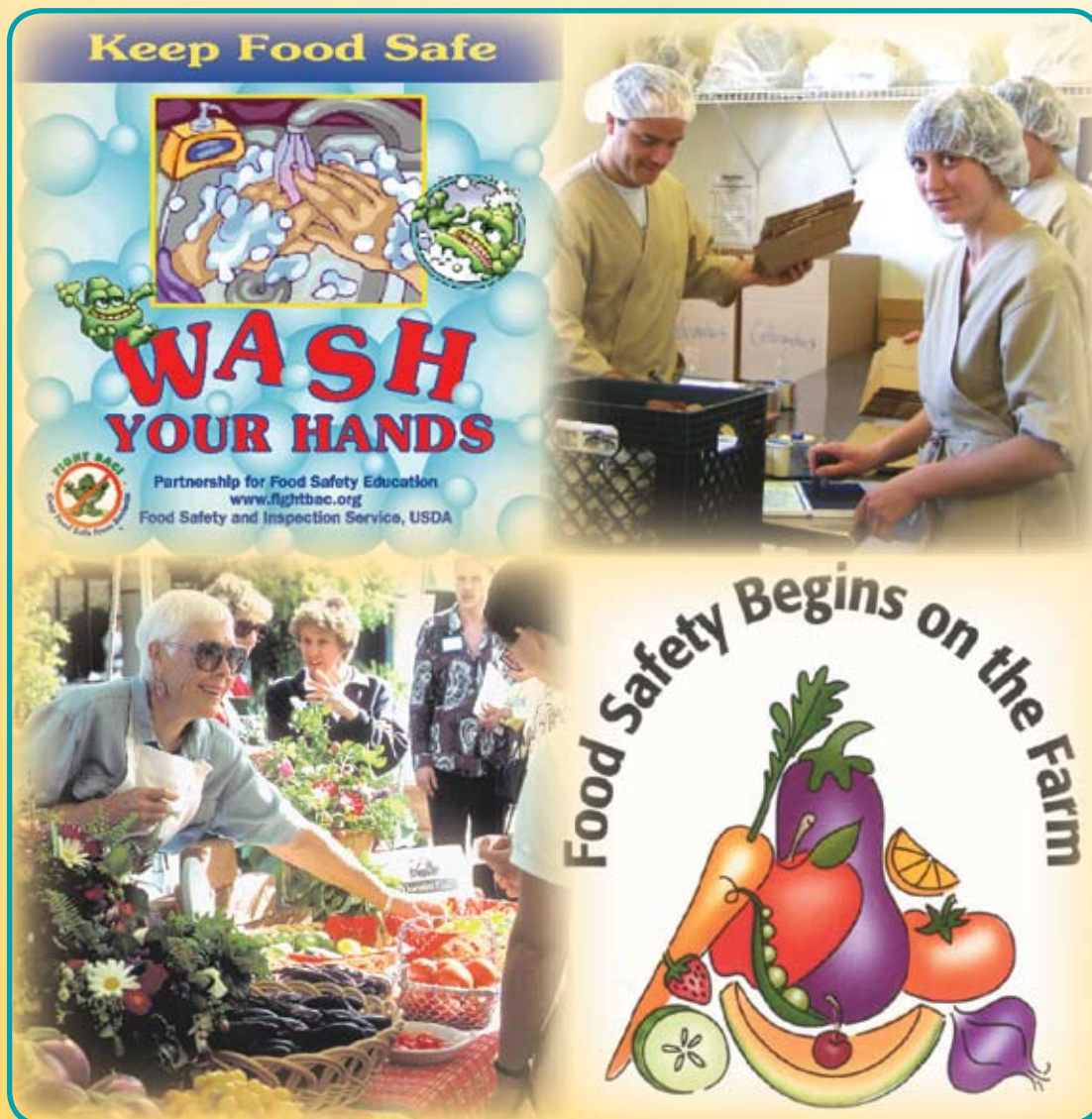


# Food Safety at Farmers Markets and Agritourism Venues

## A Primer for California Operators



A publication of the UC Small Farm Center

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## Contents

Introduction _____	1
What is Food Safety? _____	2
Types of Food-Safety Hazards _____	3
biological food safety – chemical food hazards – physical food hazards	
Assessing Risks and Planning for Controls _____	7
preventive strategies – in the field – produce and other foods – value-added and processed foods – other products – occasional events – handling money and equipment – customer education	
Documentation and Liability Issues _____	19
labeling – recordkeeping – liability insurance – regulatory exemptions for agritourism operations	
Hazard Analysis and Critical Control Points (HACCP) ____	21
critical control points – haccp flowchart – control points table	
Self-Evaluation and Planning Worksheets _____	25
self-evaluation checklist – prioritizing actions worksheet – timetable for implementation	
Food-Safety Resources _____	29
Appendix _____	34





## Food Safety at Farmers Markets and Agritourism Venues: A Primer For California Operators

This publication provides a basic guide to understanding food-safety issues relevant to California certified farmers markets and agritourism operations. It is designed for farmers, ranchers, and certified farmers market managers but can also be useful as a resource for educating employees about food-safety concerns and regulations and as a reference for other agricultural professionals. While every effort has been made to insure the information presented here is up to date and accurate, it is intended to be only an introductory guide for developing effective and cost-efficient food-safety practices. Best management practices for food safety will vary depending on each operation's particular characteristics and the specific activities in which it engages. Local environmental health agencies are ultimately responsible for regulating these activities as defined by California law. In addition, forces affecting food safety and its regulation are constantly changing. It is therefore



Even if your operation does not serve prepared foods, this guide may be of use to you if you sell through or operate a:

- farmers market
- farm stand
- agritourism venue
- direct marketing operation

A busy day at an urban market can draw thousands of visitors.



incumbent on operators to gain access to up-to-date information on best practices and regulatory changes as it becomes available.

Food-safety education, assessment, and planning are essential activities for managers and owners of businesses that directly market agricultural products. Informed, well-planned management of food-safety risks helps to ensure that businesses, families, employees, and customers all receive the full health benefits of fresh and processed agricultural products as well as agricultural and rural experiences with minimal exposure to health risks.

## What Is Food Safety?

For the purposes of this guide, food safety is a measure of the risk to health and safety posed by handling and consuming agricultural products or prepared foods purchased at a farmers market or agritourism

### FOLLOW THE FOOD CHAIN!



Demand for a specific kind of produce is subject to public perceptions of food safety. A single well-publicized incident can significantly reduce sales of a product nationwide. Such a food-safety scare associated with strawberries in 1996 devastated sales of that product nationally. According to one source, "Before that one was over, the industry suffered nearly \$40 million in lost sales, 5,000 lost jobs, and a 10 percent reduction in crop acreage the following year."<sup>a</sup> Another example is the 1989 crisis involving apples and Alar, a growth regulator. After CBS' *60 Minutes* aired a segment challenging the safety of apples sprayed with that chemical, "California and Washington apple growers got pounded, losing an estimated \$500 million in sales."<sup>b</sup>

<sup>a</sup> Stockwin, Will. "Deja Vu . . . Strawberry Industry Fights Back from Media Scare." *Ag Alert*, 9 April 1997.

venue. The lower the risk, the safer the food. Consideration of food-safety issues should enter into every aspect of management, from planning and production to merchandising and marketing. While consumers are usually the first to experience hazards associated with faulty food-safety practices, the consequences can affect everyone in the food chain, from employees to managers to owners and eventually to the public in general. Despite lessons learned from previous incidents, agricultural products continue to pose a risk of infrequent but sometimes widespread food illness outbreaks<sup>1</sup> because foods are biologically active products. As such, they are always targets for bacteria and other potentially hazardous organisms.

Favorable public perceptions of food safety evidenced by a high level of confidence can influence consumer purchasing decisions and result in increased demand

for some products over others and certain markets and venues over others. These preferences may also further translate into a consumer's willingness to pay higher prices for products perceived to be safer. For example, consumer concerns about pesticide residues in food have, in recent years, contributed to growth in the organic produce industry. Its products often receive a price premium over conventionally grown produce. According to a recent U.S. Department of Agriculture (USDA) report, growth in retail sales of organic products has averaged 20 percent or more annually since 1990, and organic products are currently sold in 73 percent of all conventional grocery stores.<sup>2</sup>

<sup>1</sup> Lee, Mike. "Almond Recall Grows; Nut Processor Is Sued." *The Sacramento Bee*, 25 May 2004.

<sup>2</sup> Dimitri, Carolyn, and Greene, Catherine. *Recent Growth Patterns in the U.S. Organic Foods Market*. Washington DC: USDA Economic Research Service Agriculture Information Bulletin AIB777, 2002.

## Types of Food-Safety Hazards

Food safety can be compromised in a number of ways. Understanding the nature of food-safety hazards helps operators manage them effectively. The three most common types of risks to food safety are biological, chemical, and physical.

### Biological Food Safety

According to the Centers for Disease Control (CDC), each year an estimated 76 million persons in the United States contract food-borne illnesses.<sup>3</sup> Some of the products that are typically associated with biological food-borne illnesses include meat and dairy products, lettuce, seed sprouts, cabbage, carrots, tomatoes, melons, unpasteurized juices, berries, and other fruits and vegetables. While some foods are generally safer than others, any food can become hazardous when not handled safely. To illustrate, under the right conditions a single bacterium dividing every ten minutes can multiply to more than 500 million in five hours.<sup>4</sup> Factors that affect biological pathogens and their rates of growth include *pH* (acidity level), *temperature*, *available water and oxygen*, and *access to nutrients*. The five biological causes of risk to human health associated with agricultural products and foods are *bacteria*, *viruses*, *parasites*, *allergens*, and *prions* (causal agent of

A biological pathogen is an organism that can cause disease or

Mad Cow Disease, also known as BSE or bovine spongiform encephalopathy).

Examples of common bacterial pathogens include *Escherichia Coli*, *Salmonella*, and *Shigella*. Viruses include hepatitis A, Norwalk, and

<sup>3</sup> Mead P.S., et al. "Food-Related Illness and Death in the United States." *Emerging Infectious Diseases* (5) 1999: 607–625.

<sup>4</sup> Simmonne, Amy H. *Food Safety: What Can Be Done at a Small Farm Level?* Gainesville FL: University of Florida Institute of Food and Agricultural Sciences. (No date.) Available online in March 2005 at [www.smallfarm.ifas.ufl.edu/SFDevelopment/Pubs/FoodSafety.pdf](http://www.smallfarm.ifas.ufl.edu/SFDevelopment/Pubs/FoodSafety.pdf).

#### Types of Food-Safety Hazards

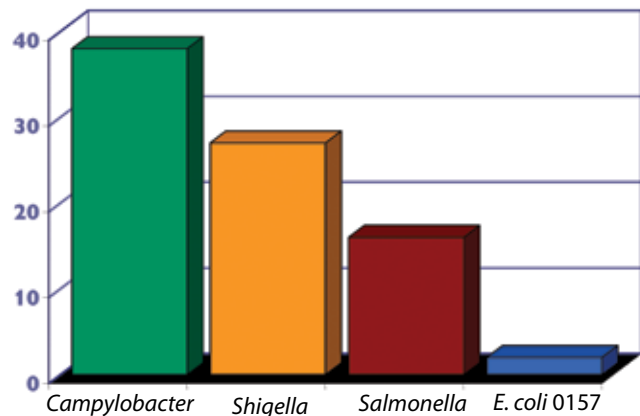
- **Biological** – pathogens and their toxic byproducts plus allergens naturally present in some foods.
- **Chemical** – pesticide, fertilizer, cleanser, and sanitizer residues.
- **Physical** – stones, pits, metal, glass, plastic objects.

rotavirus. Parasites include *Giardia*, *Toxoplasma*, and *Cryptosporidium*. Figure 1 shows the incidence of diagnosed food-borne illness per 100,000 persons in California during 2000 for selected counties chosen to best represent the U.S. population as part of a national disease-surveillance network. It shows that the top four pathogens that cause food-borne diseases are all bacteria.

### Bacterial Food-Borne Illnesses

Three different types of food-borne illnesses result from bacteria in the food chain. One type of food-borne infection results from *proliferation of bacteria after consumption*. *Salmonella* and *Listeria* are examples of organisms that

Figure 1. Bacterial Origin of Outbreaks of Food-Borne Illnesses in California in 2000



Centers for Disease Control. "Preliminary FoodNet Data on the Incidence of Foodborne Illnesses—Selected States, United States, 2000." *CDC MMWR Weekly* 50(13) 2001: 241–246.



can cause infection when ingested. *Bacterial intoxication (poisoning)* occurs when an illness is caused by toxins produced in food prior to consumption as with *Clostridium botulinum*, the agent of botulism. *Toxin-mediated food-borne infection* is an illness that is caused by toxins produced by a bacterial infection such as from *Clostridium perfringens*.

Contamination of agricultural products with disease-causing bacteria can occur at any point in the food chain via animals, insects, soil, water, equipment, and human handling. Identifying potential points of contamination is critical since control measures are most effective when targeted at *preventing contamination at the source*. For example, control measures aimed at reducing contamination of fruits and vegetables in the packing shed during post-harvest operations will not prevent contamination that already occurred in the field.

Once food is contaminated, the risk of infection from bacteria increases with improper handling and storage, such as processing that damages the natural protective coating of fruits and vegetables or exposure to temperatures that favor bacterial growth. Cross-contamination can also occur at any step in the process. As a result, when assessing risks of bacterial hazards, effective control measures should take into account critical control points throughout the food chain.

## Viruses

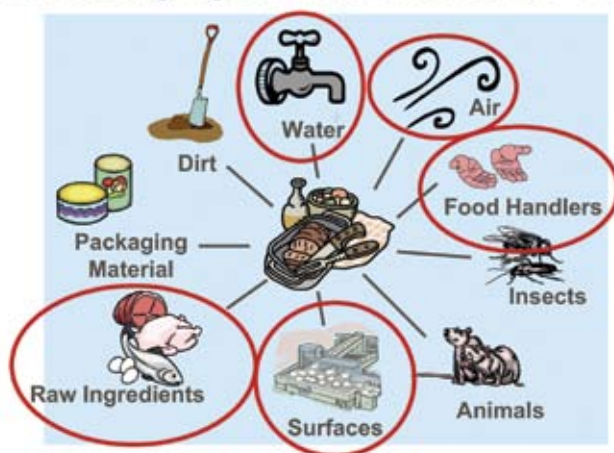
Viruses commonly associated with food-borne illness, such as hepatitis A, require a human host in which to reproduce and multiply. Thus, these pathogens often enter the food chain through infected individuals who handle a product before consumption. In this case, employee health and hygiene are critical factors at every point in the food chain at which human contact occurs. Water contaminated with feces from an infected person can also introduce these pathogens (in a tank mix before spraying or in a rinsing phase of postharvest handling, for example). This generates the need for control measures at specific points in the food chain.

Other viruses of concern include ones that cause diseases such as avian flu. While such outbreaks are rare, the impact of these diseases is usually catastrophic, resulting in the slaughter of thousands of animals and billions of dollars in lost sales. Farmers and ranchers should follow reports of these diseases carefully and respond proactively to official recommendations.

## Parasites

Parasites that cause food-borne illness include more commonly known organisms such as *Giardia lamblia* and less familiar species such as *Cryptosporidium parvum* and *Cyclospora cayetanensis*. Because reliable methods for detecting parasites in raw produce are lacking, very few incidence studies are available.<sup>5</sup> Indications are, however, that these pathogens enter the food chain through contamination with fecal matter from infected individuals or animals or through contact with already contaminated water. Therefore, as with other biological pathogens, minimizing this risk requires diligent employee hygiene, careful se-

### Introducing Agents into Processed Foods



<sup>5</sup> U.S. Food and Drug Administration (FDA), Center for Food Safety and Applied Nutrition. *Analysis and Evaluation of Preventive Control Measures for the Control and Reduction/Elimination of Microbial Hazards on Fresh and Fresh-Cut Produce*. Washington DC, 2001. Available online at [www.cfsan.fda.gov/~comm/ift3-toc.html](http://www.cfsan.fda.gov/~comm/ift3-toc.html).

lection of water sources, and effective control of both domestic and wild animals on a farm or ranch.

## Prions

Prions are proteins associated with a group of diseases called *Transmissible Spongiform Encephalopathies* (TSEs). In humans, the illness suspected of being food-borne is *variant Creutzfeldt-Jakob disease* (vCJD). The human disease vCJD and the cattle disease, *bovine spongiform encephalopathy* (BSE), also known as Mad Cow Disease, appear to be caused by the same agent. Other similar but not identical TSE diseases exist in animals, but there is no known transmission of these to humans. Included among these is chronic wasting disease of deer and elk and the oldest known of these diseases—scrapie—which occurs in sheep and goats. No early acute clinical indications for TSEs have been described. After an extended incubation period of years, these diseases result in irreversible damage to the central nervous system. More information on this food-safety risk can be obtained from agencies listed in the *Resources* section of this guide.

## Allergens

Food allergens are usually proteins present in foods that can cause an allergic reaction in people. Though estimates are that less than 3 percent of adults have food allergies, the health risks associated with allergic reactions can be severe and even fatal. Therefore, food allergens should be identified and controlled as part of any food-safety plan. According to the U.S. Food and Drug Administration (FDA), the following foods can cause serious allergic reactions and account for more than 90 percent of all food allergies: peanuts, tree nuts, wheat, soybeans, milk, eggs, and fish and other seafood. Any products containing these ingredients should be labeled as such. Because of the risks of cross-contamination, products processed in facilities or with equipment that may have come in contact with potential allergens should also be labeled. For example, a label might note “*may contain traces of tree nuts*” to warn allergic consumers of potential risks.

Another class of potential allergens used in agricultural products such as wine and dried fruits is *sulfites*. Asthmatic persons are particularly sensitive to these chemicals and FDA requires labeling of packaged foods that have sulfites added and on alcoholic beverages that contain 10 parts per million or more of sulfites. Users of this chemical food additive should check with FDA for current labeling requirements.

## Chemical Food Hazards

Contamination of food by chemical hazards is a worldwide public health concern and may occur through environmen-

## Steps in Hand-Washing for Food Handling





tal pollution of air, water, and soil (as in the case with toxic metals and dioxins) or through intentional use of various chemicals such as pesticides, animal drugs, and other agrochemicals. Food additives and contaminants resulting from food manufacturing and processing can also adversely affect health. Assuring safety from these risks involves not only safe handling and use practices but also requires farmers and ranchers to assess the reliability of the sources for all their inputs and to keep records that allow them to *trace any possible contamination back to its source*. Some agricultural chemicals such as pesticides are regulated specifically to reduce the risks they pose to human health. In California, pesticide use is regulated by the U.S.

Environmental Protection Agency and by the California Department of Pesticide Regulation.

*Know the history of the ground you use.* Are there residues of chemicals from previous activity at the location on which you intend to graze or grow a crop? Chemical hazards are discussed again in the sections on specific control points.

## Physical Food Hazards

Physical food hazards represent a broad category of naturally occurring and man-made substances that generally present risks of choking, lacerations, or tooth damage. These hazards include, for example, stones, small sticks or other pieces of wood, pits, and pieces of plastic, metal, or glass. Such hazards can enter the food chain at almost any step, from field to point of sale. Examples include small stones from the field in dried beans, shell fragments from cracking nuts, plastic and metal fragments from equipment in salad mixes, and any other product or personal object from an employee, including pens, pencils, and jewelry. Manual or automatic sorting and screening can help minimize some of these hazards as can inspection of all equipment and facilities.