

FARMERS' MARKETS

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The safety and quality of our food supply is a concern we should all have—even those who sell fruits and vegetables at farmers' markets and roadside markets. Most people think that food safety problems from foodborne illnesses come solely from eating tainted meat, dairy and processed food products. People usually think fresh fruits and vegetables are safe, especially those grown locally. It is surprising, though, that fruits and vegetables have been the source of several cases and outbreaks of foodborne illness. Outbreaks of *Escherichia coli* 0157:H7 have been attributed to consuming lettuce and unpasteurized juices; salmonella cases have been attributed to melons; raspberries have been found to be the source of Cryptosporidium cases; and *Listeria* has been found in cole slaw.

Food safety hazards can be divided into three categories—biological physical and chemical.

Biological hazards are microorganisms that cause foodborne illness. *Salmonella*, *Staphylococcus aureus*, *Hepatitis*, *Listeria spp.*, *E. coli* 0157:H7, and *Campylobacter*, are among the many organisms that cause foodborne illness. Some of these pathogens have been found in fresh fruits and vegetables.

Physical hazards are foreign material in the product that can cause injury. Metal, glass, wood splinters, rocks, insects, hair, and dirt are included in this category. These physical hazards can cause injury or be a carrier of microorganisms.

Chemical hazards include agricultural chemicals used in the production of fruits and vegetables—insecticides, fungicides, miticides, growth regulators and sometimes fertilizers. Heavy metals are considered chemical hazards, too. They can be found in contaminated sewage sludge—the basis of some organic fertilizers, contaminated soils and tainted water. Chemicals used in cleaning and sanitizing also can be chemical hazards, if used incorrectly. Although most people think chemical hazards for fresh fruits and vegetables, such as pesticide poisoning, poses the most serious food safety hazard to people, more people have been harmed by biological hazards caused by contaminated fruits and vegetables. This does not mean the grower should not pay close attention to how they use agricultural chemicals—strict adherence to label instructions has kept the number of cases low.

In addressing food safety concerns as a grower selling in the farmers' market or roadside market, efforts should be made in three areas: production, harvest and handling, and marketing and sales.

Production

The three hazard categories—biological, chemical and physical—need to be addressed by the grower in the production phase to minimize problems later on. Agricultural production chemicals should only be used according to the label, which includes the application rate, re-entry date and safe harvest date. The prescribed use of these

chemicals will prevent any pesticide or chemical residues that pose a chemical hazard.

To reduce physical hazards, fields need to be clean. Uncleaned fields have materials that can be physical hazards and the soils may be contaminated with heavy metals and organic compounds such as PCB's (a chemical hazard). Fields should not be used as a dumping ground for trash—former dump sites are a poor choice for production fields. Equipment needs to be in good repair to avoid losing nuts and bolts that can become a physical hazard.

Biological hazards can originate in the production phase from the use of manures, unclean irrigation water, and from livestock freely roaming in your production area. Animal waste, especially fecal material, can contain pathogens that cause foodborne illness. Irrigation water should be tested for the presence of *E. coli*, and a new water source found if the *E. coli* levels are too high.

Cases of foodborne illness have been found in fruits and vegetables fertilized by raw manure. If manure is to be used for fertilization and soil building, only well-composted manure should be used. Organic production methods prohibit the use of manures 60 days before harvest of a crop. The composting process should bring the temperature of the manure to 160°F to kill the microorganisms. The composting operation should not allow cross contamination of mature compost with fresh uncomposted material.

Surface water where cattle have defecated near, should never be used for irrigation, pesticide spraying or for washing harvested produce. Ground water or well water also can be contaminated in this manner. Beef cattle are a major carrier of *E. coli* 0157:H7, and can easily contaminate water sources with their feces. Water should be routinely tested to determine if *E. coli* levels are too high for safe use.

To minimize exposure to animal waste, livestock should not be allowed to freely roam in production fields. Some cases of *E. coli* 0157:H7 have been attributed to apple cider processed from apples harvested from an orchard where cattle were allowed to graze.

Growing crops organically should not lull the grower into a false sense of security that their crops

will be safer because they do not use synthetic pesticides. Chemical and biological hazards exist with them, too. Most organic production systems allow the use of organic pesticides which can be more toxic than some synthetic pesticides if misused. Organic production systems also allow the use of animal manure for fertilizers and soil amendments but do require that they not be used 60 days before harvest. Cases of foodborne illnesses have been linked to the use of raw manures and immature composted manures on crops, especially those in contact with the soil. (As stated earlier only well-composted manures should be used.)

Harvest, Handling and Processing

A helpful guideline to consider when handling produce for the market is to treat it as you would if you were going to prepare it for yourself. Many customers will not wash the produce before they consume it. First, personal hygiene of the persons harvesting and handling the produce is of utmost importance. Person-to-person contact is a major way foodborne illness organisms are spread. Before harvesting, handling and selling produce, the individual carrying out these duties must wash their hands with hot soapy water after using the toilet, changing a diaper, handling raw meat or raw meat juices, and handling manure.

Produce that has had contact with the soil should be scrubbed to remove the dirt. Wash water should be potable or drinkable water. A final rinse with a 50 to 200 ppm chlorine solution (1 table-spoon household bleach per 1 gallon of water) is helpful in removing microorganisms. Never use recirculated water to wash produce because it can inoculate the produce with pathogens removed from previously washed produce. Current research has shown that the standard chlorine rinse concentration, 50 to 200 ppm, is not effective in killing *E. coli* 0157:H7. Other measures listed in the production phase need to be adopted to minimize exposure to *E. coli* 0157:H7.

Equipment and surfaces that are used to handle produce should be cleaned and sanitized with a 1:10 bleach (one part bleach to 10 parts water) solution daily. This includes harvest containers, cutting utensils used at harvest and selling, the handling area where washing, grading, sorting and packing occurs, packing containers, and cold

storage areas. The handling area for harvested produce should be used solely for that purpose to eliminate the possibility of cross contamination from animal waste and raw meat products.

Marketing

While marketing your produce, strong effort should be made to not “re-contaminate” the clean produce. As stated before, many customers will consume the fruits and vegetables fresh, without washing them. Strict personal hygiene habits should be used by all persons marketing the produce. Display areas should be clean. During the cutting of produce into smaller portions, the cutting surface and utensils need to be sanitized with a bleach solution. The fruit or vegetable being cut should be scrubbed and sanitized. The cutting utensil should only be used for cutting the produce. When giving out free samples of small cut pieces, samplers should have toothpicks to prevent cross-contamination. Produce should not be placed on the ground.

Other Food Products

Fresh, unpasteurized, chemical-free fruit juices are a popular item, but have been known to harbor *E. coli* 0157:H7. The only known treatment to kill *E. coli* 0157:H7 is pasteurization. Juices containing apple juice made from drops from an orchard where cattle graze present a food safety problem.

The sale of unpasteurized juices should be discouraged for safety sake.

Other food products that are processed, such as jams, jellies, preserves, other canned and pickled foods, baked goods, vinegars, meat and dairy products, sometimes appear at farmers’ markets. Sale of such food should be discouraged unless the vendor has prepared them in an inspected kitchen—the state statutes require all processed food products sold for human consumption have to be prepared in an inspected kitchen. Who does the inspection depends on the kind of food it is. Meat products require a USDA or FDA inspection process depending on the species of animal. Highly perishable foods like fresh meats, dairy products and creamed desserts should be discouraged from sale unless the vendor provides proper storage facilities for these products at the market.

In summary, food safety problems that farmers’ market growers and vendors can encounter may be addressed by

- Proper use of agricultural production chemicals and other products.
- Reducing exposure to potential contaminants during the production, harvest and handling steps.
- Good personal hygiene by all persons who handle the produce.

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