

Good Agricultural Practices for High Tunnel Crop Production

► Learning good agricultural practices, establishing a food safety plan, and achieving food safety certification can help expand business and open new markets.

Good agricultural practices (GAPs) are basic practices that minimize food safety hazards. The purpose of GAPs is to guide the safe production, harvesting, packing, handling, and holding of fruits and vegetables resulting from a well-developed farm food safety plan. Examples of GAPs include worker hygiene and health, manure use, animal intrusion, and water quality throughout the production and harvesting process.

In addition to using GAPs, a protected growing environment, such as a high tunnel, offers control over many aspects of production, including wildlife intrusion and water quality. Being familiar with the biological, chemical, and physical hazards that exist in a high tunnel is the first step toward minimizing risk. One advantage of high tunnels is that they are protected from outside influences. Generally, they are unlikely to be subject to flooding, wildlife intrusion, or the neighbor's herd of cows accidentally getting into the field. However, this means that extra attention must be paid to what *intentionally* enters a high tunnel. More information about GAPs can be found on the USDA Agricultural Marketing Service website (ams.usda.gov) by navigating to Services > Auditing & Accreditation > Fruits, Vegetables & Specialty Crop Audits.

Other important considerations for protected growing environments include the following:

Safe sources of water. Safe sources of water are important for any specialty crop but especially important for crops that will be consumed raw and crops that are overhead irrigated. For example, spinach is sometimes overhead irrigated to help cool the plant during the day. The stomata, however, can allow for the entry of human pathogens; therefore, the water source must be safe.

Safe water is also important during postharvest handling. Although consumers are advised to wash produce before eating it, they do not always do this, and washing will not typically remove pathogens that have internalized or are attached to a surface.



Safe soil amendments. Safe soil amendments are also important to ensure that human pathogens are not being brought into the high tunnel. The soil amendments of primary concern are the ones derived from animals (for example, manure or mortality compost). These soil amendments must be properly composted or processed to reduce the risk of pathogens. When purchasing these soil amendments, ask for documentation from the supplier verifying that they have undergone a process, such as composting, to reduce pathogens and that the amendments have been protected from recontamination after processing. Alternatively, if raw manure is being used, then special attention should be paid to application to harvest intervals. The USDA National Organic Program provides guidelines for the use of raw manure on specialty crops and recommends a 90-day application to harvest interval for crops that do not contact soil and a 120-day application to harvest interval for crops that come into contact with the soil. More information can be found on the AMS website (ams.usda.gov) by navigating to National Organic Program.

Worker hygiene and training. In any growing environment, worker hygiene and training are key. Workers must have convenient, clean, and well-stocked restrooms with handwashing facilities so that they can properly wash hands after using the restroom and at other times when hands may have become contaminated. Sick workers must be restricted from handling produce so that they do not pass illnesses to consumers. Training is also key—no one wants to pass on a foodborne illness, so helping workers understand how to prevent this can go a long way toward making produce as safe as possible.

Sanitation of equipment. Equipment must be cleaned and sanitized on a regular schedule and the process documented so that equipment is not a source of contamination. When possible, designate specific equipment for different areas of the farm. For example, minimize cross contamination by designating a set of shovels for use in the high tunnel and another set for use on other parts of the farm.

Food Safety Modernization Act and Produce Safety Rule

The Food Safety Modernization Act (FSMA) was signed into law in 2011. It initiated a new public health mandate for the United States Food and Drug Administration (FDA) to establish science-based standards for the prevention of foodborne illness throughout the supply chain. The law is also meant to ensure that foreign producers meet those same standards. The Produce Safety Rule (PSR) is the portion of FSMA that sets minimum standards for on-farm food safety practices.

The PSR focuses on microbial hazards, such as bacterial, viral, and parasitic human pathogens. Key areas of the regulation include water quality, biological soil amendments of animal origin, sprout production, animals, worker hygiene, training, and sanitation. The PSR went into effect January 26, 2016, and required that the smallest farms comply by January 27, 2020. The PSR allows some farms to qualify for an exemption from some of the requirements. In 2024, Subpart E was updated to require annual agricultural water assessments instead of preharvest water testing. For more information, visit the FDA website ([fda.gov](https://www.fda.gov)) and search for Produce Safety Rule.

One important aspect of the PSR is that it establishes minimum training requirements. At least one supervisor or responsible party must complete food safety training. The Produce Safety Alliance (PSA) Grower Training Course is one way to meet this requirement.

These training courses teach the GAPs and the PSR requirements that growers must follow. For a list of produce safety trainings, visit the Produce Safety Alliance website and navigate to Training > Grower Training Courses > Upcoming Grower Trainings.

Most state departments of agriculture conduct PSR inspections on the FDA's behalf and offer a free and voluntary educational visit called an On-Farm Readiness Review (OFRR) so farms can assess their readiness for a PSR inspection. State contacts to schedule an OFRR can be found on the National Association of State Departments of Agriculture website.

Food Safety Audits Versus PSR Inspections

Food safety audits for produce growers and packers have been around for many years as an industry response to several produce-related foodborne illness outbreaks that began in the 1990s. By comparison, PSR inspections are a relatively new concept. Although the practices required for audits and inspections are both based on general GAPs, the specific practices required and the scope can differ. Notable general differences between the two are shown in table 1.

Table 1. Food Safety Audit and PSR Inspection Differences

Buyer-Requested Food Safety Audit	PSR Inspection
Voluntary way to provide a buyer with the assurance that food safety practices are being followed	Required by law for farms covered by the PSR
Usually conducted by an independent third party (for example, USDA-AMS, Quality Certification Services, or Primus)	Conducted by FDA, Department of Agriculture, or other regulatory authority
Fairly expensive	No charge (unless fined for a violation)
Food safety plan required	No food safety plan required



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