Nature's International Certification Services (NICS)

224 E. State Highway 56
Viroqua, WI 54665
Phone: (608) 637-7080
Fax: (608) 637-7460
Email: nics@naturesinternational.com
naturesinternational.com

Oklahoma Department of Agriculture, Food and Forestry Organic Certification

2800 N. Lincoln Blvd.
Oklahoma City, OK 73152
Phone: (405) 522-5924
Email: jeff.stearns@ag.ok.gov
ag.ok.gov/divisions/food-safety

Oregon Tilth Certified Organic

PO Box 368
301 S.W. 4th St., Ste. 110
Corvallis, OR 97333
Phone: (503) 378-0690
Phone: (877) 378-0690 (toll free)
Email: organic@tilth.org
tilth.org

Organic Crop Improvement Association (OCIA)

1340 North Cotner Blvd.
Lincoln, NE 68505
Phone: (402) 477-2323
Fax: (402) 477-4325
Email: info@ocia.org
ocia.org

Ohio Ecological Food and Farm Association

41 Croswell Rd.
Columbus, OH 43214
Phone: (614) 262-2022
Email: organic@oeffa.org
oeffa.org

Pro-Cert Organic Systems, Ltd.

2311 Elm Tree Rd.
Cambray, ON K0M 1E0
Phone: (705) 374-5602
Fax: (705) 374-5604
Email: ifoebo@pro-cert.org
pro-cert.org

Quality Assurance International

4370 La Jolla Village Dr., Ste. 300
San Diego, CA 92122
Phone: (858) 791-3531
Email: info@qai-inc.com
qai-inc.com

Quality Certification Services (QCS)

5700 SW 34th St., Ste. 349
Gainesville, FL 32608
Phone: (352) 377-0133
Email: qcs@qcsinfo.org
qcsinfo.org

Produce Food Safety

Reviewed by Phil Tocco, Londa Nwadike, and Ben Phillips – Sept 2021

Produce food safety aims to reduce the risk of produce contamination by human pathogens or other contaminants during field production and postharvest handling. Good Agricultural Practices (GAPs) present a set of guidelines and practices that can prevent or reduce the risk of produce contamination by a foodborne pathogen, or other contaminant, in the field and during postharvest handling. To reduce the risk of contamination by a foodborne pathogen, vegetable growers should adopt GAPs, paying particular attention to water management, waste (manure), worker sanitation/hygiene, and wildlife. All growers should utilize Good Agricultural Practices, but only certain buyers require GAPs certification and paying for a third party audit.

Growers of a certain size who grow, harvest, pack or hold certain produce types must adopt particular GAPs to be in compliance with current Federal produce safety guidelines under the Food Safety Modernization Act Produce Safety Rule (FSMA PSR). The law codifies many GAP standards and follows the same general outline of hazards seen in GAPs. Rules regarding water used in the growing, harvest, packing and storage of fresh produce are under currently under review and will be enforced in the future. The Purdue Extension Publication, *Food Safety for Fruit and Vegetable Farms: Good Agricultural Practices for Fruit and Vegetable Farms*, gives an introduction to produce food safety, and is available at edustore.purdue.edu.

Water Management

Water can be a major source of contamination in crop production. It is important to make sure that water coming in contact with the crop is of adequate quality for its intended use. Growers should monitor the quality (presence of bacteria) of irrigation and process (postharvest) water through testing.

Water should be tested for generic *E. coli* at least annually, or as required by law or individual food safety programs. In general, current guidelines allow an average of no more than 126 colony forming units of generic *E. coli* per 100 milliliters (CFU/100 ml) of water intended for **pre**-harvest uses. Water exceeding these parameters may require a corrective action, such as water treatment, inspection and repair of the water system, or extending the time between the last irrigation and harvest. *E. coli* should be below detectable limits (typically reported as ≤ 0 CFU/ml) for postharvest uses (product cleaning, product cooling, etc.). Water quality laboratories who use the approved FDA methods for testing have been identified across the United States on a map which can be accessed at go.uvm.edu/waterlabmap.

Growers covered by the Produce Safety Rule may also be required to meet certain water testing requirements and criteria. For more water sampling information and a summary of Produce Safety Rule water testing criteria, growers should consult Purdue Extension Publication, *On-farm Food Safety for Produce Growers: Microbial Water Quality Testing,* edustore.purdue.edu.

Irrigation Water

Pathogens can be introduced into irrigation water through manure runoff from animal production facilities, sewage runoff from treatment facilities or septic systems, or directly from wildlife. Extreme rainfall, manure spills, or human waste can increase the probability of contamination occurring.

Ground water is the least likely water source to be contaminated. Well water, when used directly, bears a relatively low contamination risk, provided that the wells are properly constructed and maintained. Wellheads should be protected from contamination by elevating the wellhead above ground level and using backflow prevention devices.

Surface water (such as ponds, creeks, and rivers) carries the highest risk for contamination. Microbe levels in surface water may change rapidly. Also, surface water cannot be protected from contamination by wildlife, runoff, or other potential sources of contamination. The following measures may reduce the risk of microbial contamination in surface water:

1. Construct ponds well away from apparent sources of contamination such as livestock facilities and pastures, composting pads, and sewage systems.
2. Fence ponds to prevent wildlife and domestic animals from entering and contaminating the water and surroundings.
3. Redirect runoff to flow away from the pond by building a bank or channel.
4. Establish vegetation buffer zones around ponds to filter runoff before it gets into the pond.
5. If irrigating from a creek or river, consider using a settling pond. This will allow large particles that may contain bacteria to settle at the bottom.
6. Communicate with neighboring livestock producers and work collaboratively to maximize the distance between livestock and water used for irrigation, spraying, or other crop production practices.
7. Sediment and high microbial contamination loads may be washed in by heavy rain. Remember to use caution if using the water source after a heavy rain event.

Water application methods (drip, overhead, or furrow irrigation), timing (how close to harvest), and vegetable types (above, below, or on the soil) are also factors to consider. These factors are often interrelated and have to be considered in a combination.

Process Water

Water is used in many processing (or postharvest) operations, including washing, cooling, top-icing, and transferring product with flumes. Contaminated process water has the potential to introduce and spread contamination throughout an entire harvest lot. Process water that is not of adequate microbial quality can easily transfer pathogens from contaminated to noncontaminated produce.

To prevent cross-contamination, sanitizers may be added to process waters. Sanitizers added to process water do not "clean" the product as such. They merely sanitize the water and prevent contamination from one piece of produce from spreading to other pieces of produce.

There are a number of chemical and nonchemical (called pesticide devices by FDA) sanitizers, such as chlorine, chlorine dioxide, peracetic acid, hydrogen peroxide, ozone, and UV light. The treatment chosen depends on various factors, such as the type of produce, type of postharvest operation, market requirements, etc. Seek sound technical advice before investing in a sanitizing system. Any chemical treatment used should be labeled for its intended use. See table below for a list of EPA-registered products for use in produce wash water. Growers who use sanitizers should be prepared to monitor water pH, turbidity, temperature, and other factors that affect sanitizer performance. More information about chlorine-based monitoring systems is available in *Oxidation-Reduction Potential (ORP) for Water Disinfection Monitoring, Control and Documentation*, University of California publication 8149, available from anrcatalog.ucanr.edu.

Waste (manure)

Growers should use caution when using animal-derived soil amendments. Biological soil amendments of animal origin (BSAAO), those soil amendments such as manure, bone meal, or feather meal, that are animal-derived may contain human pathogens. Growers who use raw manure should insure a lengthy interval between application and harvest. It is

generally recommended that growers use a 90-day interval between manure application and harvest for above ground crops and a 120-day interval for crops where the edible portion is in contact with the soil. Manure is considered raw (or untreated) unless it has been properly composted or has undergone a validated process to reduce microbe levels. Composting must be done in accordance with specifications set forth in the National Organic Program or materials are considered untreated. BSAAO that has been properly composted and then protected from contamination is less likely to contain human pathogens and may be applied to fields at any time without application-to-harvest intervals. When using products containing BSAAO, growers should consult the manufacturer to determine if the product has been properly treated.

Workers

Growers should monitor workers for signs of illness. Individuals who are sick should not handle produce and should be assigned to other tasks. Workers should wash hands frequently, before beginning work and before returning to work following any breaks. Growers should have policies compelling workers to wear clean clothes at the beginning of the workday and should prohibit the wearing of jewelry (except for a simple wedding band) or sequined clothing while working with, or around, produce. All workers should receive sanitation and hygiene training.

Wildlife

Excessive wildlife activity in production areas has the potential to introduce human pathogens into crops. Growers should monitor fields for signs of wildlife activity. Interventions should be used when wildlife populations rise to levels that introduce excessive risk to crops. A number of products are available for deterring wildlife from fields. Netting and fencing may be used to exclude animals. Live traps may be used to relocate animals (check with local and state regulations prior to attempting). Reflective tape and noise-making devices may be used to frighten wildlife. Vertebrate pest are highly adaptable, and as a result, growers will very likely need to employ several tactics in combination to manage populations.

Produce Safety Rule and On Farm Readiness Review

The Food Safety Modernization Act (FSMA) Produce Safety Rule became law in January 2016. The rule codifies food safety standards for vegetable growers. Depending on farm size, growers will have varying amounts of time to implement the rule on individual farms. Not all vegetable growers are covered by the rule and some growers may have qualified exemptions. The U.S. Food and Drug Administration (FDA) has developed a flowchart to help growers determine whether or not they are covered by the rule. The flowchart is available at fda.gov/media/94332/download.

Informational videos dealing with FSMA Produce Rule coverage and other very useful compliance information may be accessed at the Food Safety Resource Clearinghouse at foodsafetyclearinghouse.org.

Among other requirements, one person from each farm that is covered by the Produce Safety Rule must receive an approved training. Produce Safety Alliance (PSA) grower trainings meet the Produce Safety Rule training requirement. A directory of certified trainers is available on the PSA website at resources.producesafetyalliance.cornell.edu/directory.

The On Farm Readiness Review is a tool developed by the National Association of State Departments of Agriculture (NASDA) to help growers assess their level of compliance with the Produce Safety Rule. The review is voluntary, completely confidential, and is conducted by a team of qualified individuals. Growers who wish to request an On Farm Readiness Review should contact the lead agency for Produce Safety Rule implementation in their respective states. For example, Indiana growers should contact the Indiana Department of Health at 317-476-0056 or ProduceSafety@ISDH.in.gov to request a review.

Inspection of Covered Produce Farms

Inspection of produce farms covered by the FSMA Produce Safety Rule began in 2019. Farms with annual sales of over $500,000 were initially inspected. During the 2020 growing season, those farms with annual sales of $250,000 - $500,000 (small farms per FDA definition) will also be inspected. Inspections for very small farms, those having annual sales of $25,000 - $250,000 will begin in 2021. Inspections will vary by state and may be conducted by state departments of agriculture, state departments of health, or FDA. All inspections will be conducted using a similar process and will be based on FDA Form 4056, although states may customize this form to some degree. A copy of FDA Form 4056 may be viewed at fda.gov/media/124867/download. Regardless of the agency conducting the inspection, growers will be contacted in advance of the actual inspection in order to arrange a mutually agreed upon inspection time.

GAPs Certifications and 3rd Party Audits

A GAPs certification (also known as a 3rd party certification) is an increasingly common condition of sale for many produce buyers. GAPs certifications are not the same as receiving a certificate for attending a GAPs training or proof of completing a PSA Grower Training. GAPs certifications

require an audit by an independent (3rd) party. The audit will verify that growers have implemented GAPs on their farm and are following their written food safety plan. Steps to obtaining a GAPs certification are:

1. Communicate with your buyer. Growers should make sure that they understand exactly what buyer requirements are and what audits the buyer will accept. There are several different GAPs audit schemes available to growers. Make sure you are using an audit scheme that will be accepted by your buyer.
2. Once an audit scheme is selected, growers should develop a written food safety plan using the audit scheme and audit checklist as a guide.
3. Once the plan is implemented, an auditor is contacted. The auditor will visit the farm and verify that the written plan is being followed.
4. Upon successful completion, and passing of the audit, the grower will receive their certification. These are normally valid for one year.

More information about GAPs, the Produce Safety Rule, and GAPs Certifications is available from:

Purdue University Extension: safeproducein.com

Michigan State University Extension:
canr.msu.edu/agrifood_safety

Kansas State University/ University of Missouri Extension:
ksre.k-state.edu/foodsafety/produce

Iowa State University Extension: safeproduce.cals.iastate.edu

GAPsNET, Cornell University, gaps.cornell.edu

U.S. FDA, fda.gov/food/food-safety-modernization-act-fsma/fsma-rules-guidance-industry

Produce Safety Alliance, producesafetyalliance.cornell.edu