

A basic GAP program for keeping pecans safe & wholesome

William McGlynn

OSU Department of Horticulture and Landscape Architecture / Robert
M. Kerr Food and Agricultural Products Center



What's the risk?

- ✓ Nuts have traditionally been assumed to be a low food safety risk.

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Georgia company
recalls certain pecan
products due to
possible health risk.

But...

- Outbreaks have led many buyers / brokers to consider requiring producers to have a food safety plan
- Retailers increasingly require processors to have a food safety plan

What do we mean by food safety?

Any food safety plan is fundamentally about minimizing hazards in food products.



How do we define a hazard?

A hazard is anything that introduces a risk of harm to a consumer. Three main types of hazards in foods are:



- ✓ **Chemical**
- ✓ **Physical**
- ✓ **Biological**

Biological Hazards

- ✓ **Biological hazards include bacteria, viruses, fungi, and parasites.**
- ✓ **The main organisms of concern in pecans are bacteria, especially *E. coli O157:H7* and *Salmonella*.**



Methods of contamination

Contamination of pecans can occur before or after harvest by contact with:

- ✓ **Contaminated water.**
- ✓ **Contaminated soil.**
- ✓ **Direct contact with animal manure.**
- ✓ **Contaminated equipment or facilities.**
- ✓ **Contaminated animals (including humans).**

Elements of a Food Safety Plan

- ✓ **GAPs (Good Agricultural Practices).**
 - **Minimizing risks in the orchard.**
- ✓ **GHPs (Good Handling Practices).**
 - **Minimizing risks after harvest.**



Mandatory Elements of a USDA GAP Audit: part I

- **General Questions:**

- ✓ Does the farm have a written food safety plan with documentation of implementation?
- ✓ Does the farm have a traceability program?
- ✓ Does the farm have a recall program?
- ✓ Does the farm have a worker health and hygiene training program?
- ✓ Does the farm have a pesticide / chemical use program?



Mandatory Elements of a USDA GAP Audit: part 2

- **Farm Review:**

- ✓ Water use.
- ✓ Soil amendments.
- ✓ Animals / Wildlife / Livestock.
- ✓ Land use and land history.



Mandatory Elements of a USDA GAP Audit: part 3

- **Field Harvest and Packing Activities:**
 - ✓ Pre-harvest risk assessment.
 - ✓ Field sanitation units (toilets/handwashing stations).
 - ✓ Water use.
 - ✓ Transportation of produce from field to packing shed.
 - ✓ Emergency cleanup procedures.



Mandatory Elements of a USDA GAP Audit: part 4

- **Packing House Facility:**

- ✓ Water use.
- ✓ Treatment of processing water.
- ✓ Sanitation program / general housekeeping.
- ✓ Worker health and hygiene.
- ✓ Storage/packing containers.
- ✓ Pest control.
- ✓ Mechanical packing equipment.
- ✓ Ice and refrigeration.
- ✓ Transportation and loading.



Mandatory Elements of a USDA GAP Audit: part 5

- **Preventive Food Defense Procedures:**
 - ✓ Written food defense plan that describes the following.
 - ✓ Personnel training and control procedures.
 - ✓ Facility security procedures.
 - ✓ Key / Entrance Accountability.
 - ✓ Deliveries policy.
 - ✓ Separation of unlike products.
 - ✓ Allergen control program.





GAPS DURING PRODUCTION IN THE ORCHARD

Keep in mind:

- ✓ **Contamination becomes more critical as harvest time approaches.**
- ✓ **Bacteria that contaminate the nuts may survive in the soil and on the pecans for some time.**



Manage for food safety

- ✓ Aim to maintain good airflow and sunlight penetration.



Food safety in the orchard

Two main sources of contamination:

- ✓ **Animal manure on the ground.**
 - **Research suggests that *E. coli* O157:H7 may survive in untreated manure for several months, maybe longer.**
 - **Consider taking extra precautions for four months (120 days) prior to harvest.**
- ✓ **Water (especially spray water).**

Water Use

- ✓ Irrigation water is not likely to present any hazards, especially if using drip irrigation.
- ✓ Be aware of spray water use, however.



Soil amendments

- ✓ Untreated manure, e.g. from cattle:
 - General guidance is to establish a 120-day interval between the application of fresh manure and harvest.



Animals in the Orchard

- ✓ Plans would be expected to address:
 - Any efforts at animal exclusion
 - Any procedures for removing animal manure prior to harvest and/or identifying and excluding grossly contaminated nuts from harvest



Document land use history

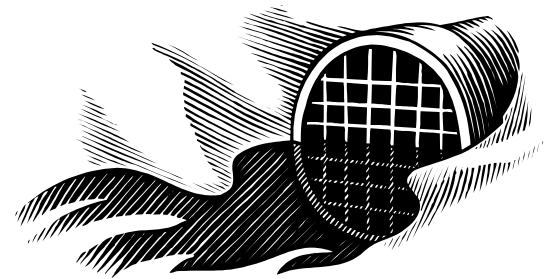
✓ Document history of land prior to pecan production.

✓ Pay particular attention to possible sources of contamination, e.g. confined feeding, oil production, chemical storage, etc.



Consider adjacent land use

- ✓ **Wind-borne contaminants may be an issue.**
- ✓ **Water runoff may also be a source of contamination.**





GAPS DURING HARVEST

Prepare the orchard floor for harvest

- ✓ Try to dry out any wet, muddy areas that may exist.
 - Repair irrigation leaks.
 - Fill in depressions.
- ✓ Trim low-lying branches that may impact equipment moving through the orchard.



Harvest pecans quickly

- ✓ **More time on the ground means a larger window of opportunity for contamination.**



Try not to harvest in wet conditions

- ✓ **Water helps keep bacteria alive and helps them to spread.**



GAPs – During Harvest

- ✓ Develop a cleaning and maintenance schedule for equipment
 - Assign to reliable workers
- ✓ Clean and sanitize storage facilities prior to harvest
- ✓ Clean and sanitize harvest bins and machinery daily or as practical
- ✓ Avoid standing in harvest bins
- ✓ Don't haul pecans in contaminated or dirty bins
- ✓ Be aware of runoff when cleaning equipment.





GHPS AFTER HARVEST

After Harvest: Shellers Typically Employ a Sanitizing Step

- ✓ Specifically required by legislation in Oklahoma.
- ✓ Typically done with hot water commercially.
- ✓ Smaller shellers often use chlorine dip.

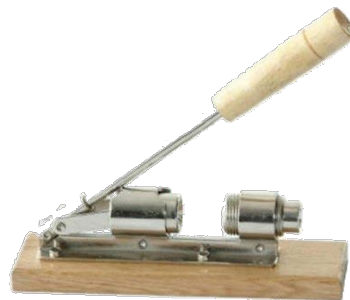


Requirements of sanitizing regulations

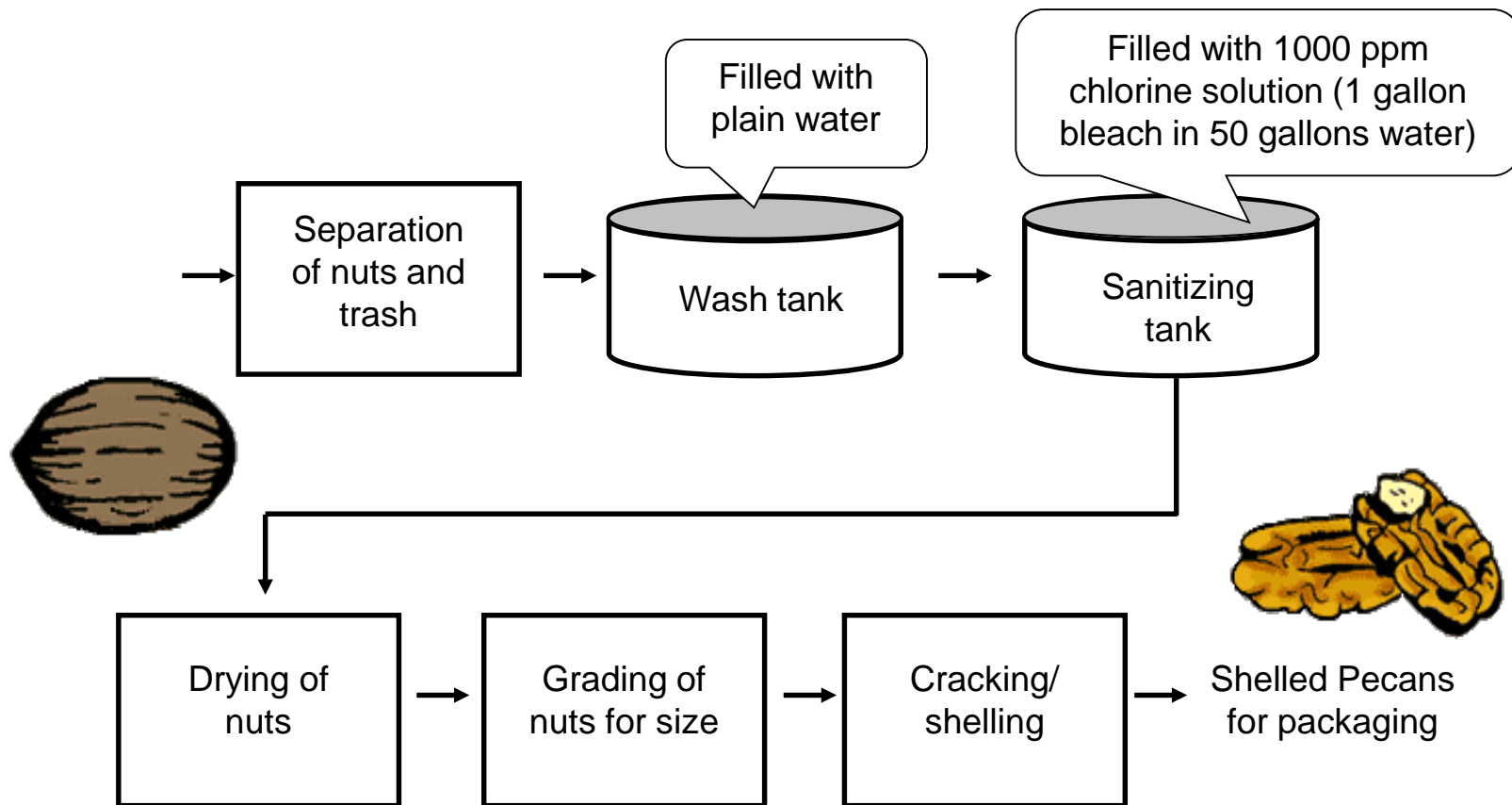
- ✓ **Shellers must employ a sanitizing step for pecans prior to cracking.**
- ✓ **Shellers must apply a sanitizing treatment to all equipment used for handling, storing, and transporting sanitized pecans and/or pecan meats.**
- ✓ **Often the most practical method of accomplishing the required sanitizing steps is with chlorine solutions.**

Custom crackers

- ✓ **Custom crackers are not required to comply with sanitizing regulations.**
- ✓ **Are required to post signs and attach labels declaring their exemption.**
- ✓ **Are required to be comply with other state food manufacturer regulations.**



Sample layout of pecan sanitizing operation



Note: Equipment should be sanitized with 200 ppm chlorine solution (1 tablespoon bleach in 1 gallon water).

Example Dip-type Sanitizer (Viewed from Side)



Example Dip-type Sanitizer (Viewed From Above)



Sanitation and Housekeeping: Things to Do Once a Day

- ✓ **Test the strength of any chlorinated dip or wash water and change or re-chlorinate as needed.**
- **Paper test strips are available to test chlorine concentration.**



Sanitation and Housekeeping: Things to Do Once a Day

- ✓ **Inspect handling/grading/packing lines and remove any dirt and nut debris.**



Sanitation and Housekeeping: Things to Do Once a Day

- ✓ **Remove any culled nuts and other trash from packing area.**



Sanitation and Housekeeping: Other Scheduled Activities

- ✓ Have schedule to clean and sanitize:
 - Handling/packing areas and equipment
 - Floors
 - Drains
 - Waste receptacles
 - Bathrooms

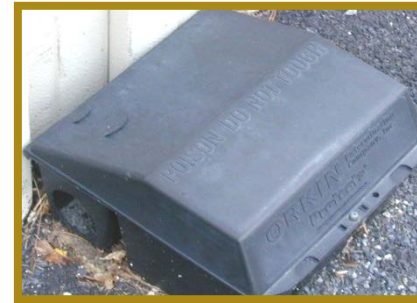
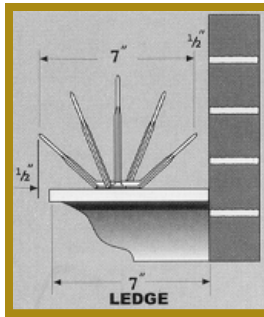


Document Facility Cleaning

- ✓ Clean and sanitize the cleaning/sorting shed, pecan storage areas, bathrooms, and any pecan handling equipment as feasible
- ✓ Inspect and dry-clean equipment and areas that cannot be wet-cleaned.
- ✓ Keep all surfaces which contact pecans as clean as possible.

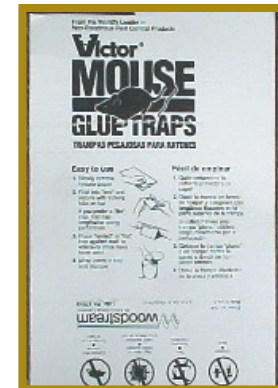


Document pest control efforts



Exclusion

Baiting



Sanitation

Trapping

L. LaBorde, Penn State

Documentation is Essential

- ✓ Any food safety practices implemented should be documented in order to prove good faith efforts and due diligence.
- ✓ Proper documentation is an essential part doing business in today's world.
- ✓ For legal purposes, if there is no record then it never happened. Even the most minimal record of cleaning procedures is better than no record at all.

Recordkeeping

- ✓ In general, records need to be kept to document that certain standards are being met, such as:
 - Agricultural water microbial testing results
 - Composted manure microbial testing results
 - Worker training efforts
 - Building and/or equipment cleaning/sanitizing program
- ✓ Records that are already being kept for other purposes need not be duplicated

FAPC-167
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Fresh Produce Production Food Safety Plan Logs and Worksheets

William McGlynn
FAPC Horticultural Products Processing Specialist

Lynn Brandenberger
Horticulture Food Crops Extension and Research Specialist

The following worksheets are intended to serve as templates to cover most of the documentation and record keeping that will occur as part of a typical fresh produce food safety program. Not every size and type of operation will need to use every sheet, but most operations will want to capture and record most of the information these sheets are designed to document. It is expected these sheets will serve as a foundation and inspiration for further customization. For example, some operations may find it beneficial to create separate log sheets to document the cleaning and sanitation of different types of equipment or different areas within a packing facility. Separate log sheets for different washing or sanitizing tanks may be useful as well. Don't be afraid to experiment to find out what works best for your operation.

Proper record keeping protocols:

- **Always fill in information in real time.** Never fill in information after the fact. When things are busy, it is always tempting to wait to record information after performing an inspection or a test. This is a good way to introduce errors into one's documentation and sends up a red flag to third-party auditors.
- **Never falsify information.** The temptation is obvious, but the fact is inspectors and auditors will almost certainly be much more concerned about falsified information or test results than about missing data.
- **If an error is made in entering information, do not erase or obscure it.** The proper protocol to correct a mistake is to put a single line through the erroneous entry, write in the correct information and initial the change. If for some reason the correction occurs some period of time after the information is originally entered, make a note of the time/date of the correction and the reason for the delayed correction on the page. Remember: **Record it or regret it!**

Acknowledgement: These worksheets were adapted from documents originally developed by Robert B. Gravani, Ph.D., Elizabeth A. Bihn, M.S., and others at the Cornell University Department of Food Science.

A Note on Calibration of Your Thermometer! (See worksheet on page 11)

Melting point of ice method (requires a thermometer that may be calibrated by adjusting a movable back plate on which temperature graduations appear):

1. Place ice in a container and let it melt.
2. Stir to make sure the temperature in the ice/water mixture is uniform throughout the container.
3. When the ice is partially melted and the container is filled with a 50/50 ice and water solution, insert the thermometer and wait until the needle indicator stabilizes. The thermometer should be 32°F (0°C).
4. If the thermometer is not reading 32°F (0°C), it should be adjusted by holding the head of the thermometer firmly and using a small wrench to turn the calibration (hex) nut under the head until the indicator reads 32° (0°C).

An important item to remember as you are calibrating your thermometer using the melting point of ice method is to never add water to ice to create an ice/water mixture because this mixture will not stabilize at 32°F (0°C) for some time, but will instead be at higher temperatures. The calibration will be much more accurate if you allow ice to melt to create an ice/water mixture.

This thermometer calibration information is taken from "Food Store Sanitation," 1998, Sixth Edition, Gravani, Robert B., Rishoi, Don C., Cornell University Food Industry Management Distance Education Program, Lehar-Friedman Books, Chain Store Publishing Corp.

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Traceback establishes a chain of custody

- ✓ Develop lot identification scheme for loads of pecans as they are harvested.
- ✓ Record harvest date, and orchard of origin for each lot.
- ✓ Maintain records of lot numbers for all loads of pecans shipped out.
- ✓ Record the identity of the buyer of each lot.



USDA GAP Certification Options

- ✓ Basic information on USDA GAP/GHP programs:
 - <https://www.ams.usda.gov/services/auditing/gap-ghp>
- ✓ USDA GAP/GHP Audit
 - <https://www.ams.usda.gov/services/auditing/gap-ghp/audit>
- ✓ USDA Harmonized GAP Audit
 - <https://www.ams.usda.gov/services/auditing/gap-ghp/harmonized>



USDA Group GAP Certification

✓ USDA Group GAP

<https://www.ams.usda.gov/services/auditing/groupgap>

- A group certification program.
- Any group is eligible.
 - Must have organized structure for GAP program management and training.
 - Must have ISO 9001 or equivalent Quality Management System (QMS) in place.
 - Must develop SOPs for GAP program.
 - Must develop recordkeeping procedures.
 - Must conduct internal audits.
- No group limit by size or location.
- USDA will audit group records and a randomly-selected subset of group member operations (sq. root of total group rounded to next largest whole number).



Other GAP Audits



- ✓ GFSI – Global Food Safety Initiative

Large retailers expect product suppliers to go beyond the USDA Harmonized. Examples include:

- Primus – <http://www.primus.com>

- Global GAP – <http://www.globalgap.org>

- ✓ These audits schemes are benchmarked to the GFSI.

- ✓ The Certification Bodies that audit the schemes have to be “certified.”



Final Thoughts

- ✓ Food safety concerns aren't going away.
- ✓ Yes, it's extra work, but it's do-able.
- ✓ Having a food safety plan – **and following it** – is becoming a necessary part of being in the food business.
- ✓ If it moves, train it.
- ✓ **DOCUMENT EVERYTHING!**

Additional online resources

- ✓ FAPC 168 -- Developing a Food Safety Plan for Your Fresh Produce Operation:
<http://www.fapc.biz/files/factsheets/fapc168.pdf>
- ✓ FAPC 167 -- Fresh Produce Production Food Safety Plan Logs and Worksheets:
<http://www.fapc.biz/files/factsheets/fapc167.pdf>
- ✓ Guide to Minimize Microbial Hazards for Fresh Fruits and Vegetables:
<http://vm.cfsan.fda.gov/~dms/prodguid.html>
- ✓ Cornell University Good Agricultural Practices Publications:
<http://www.gaps.cornell.edu/pubs.html>

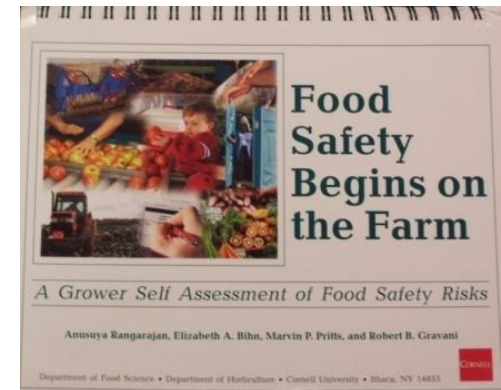
includes:

Food Safety Begins on the Farm

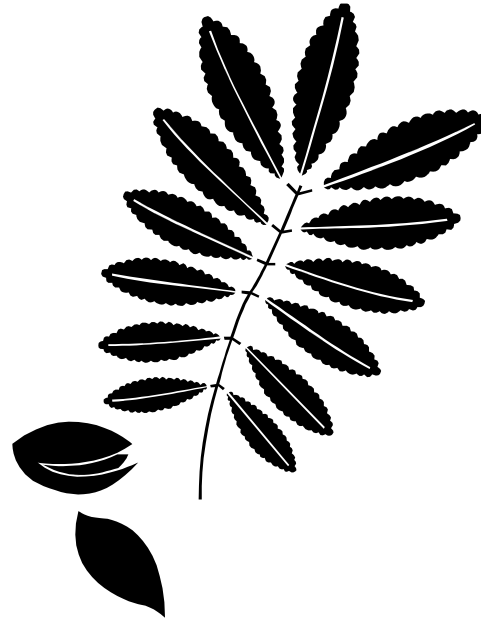
– a grower's guide

Food Safety Begins on the Farm

– a grower's self-assessment



Questions?



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