

## HARVEST

- ❑ Check that harvesting and hulling equipment is clean and in good repair. High pressure wash and sanitize all equipment prior to harvest.
- ❑ Minimize the amount of soil that is picked up during the harvest operation by proper adjustment of the harvester.

## PRODUCING QUALITY WALNUTS: FOOD SAFETY STARTS ON THE FARM

Walnut growers can minimize the potential for food borne illness outbreaks resulting from crop contamination by following good management practices. Bacteria that cause food borne illnesses such as Salmonella and E coli O157:H7 can be found in animal and human feces. Potential for contamination of walnuts with these organisms is highest during harvest when the nuts are dropped to the ground. This brochure highlights procedures that can be applied to minimize potential for on-farm contamination of walnuts.

## WORKER SAFETY & SANITARY OPERATING PROCEDURES

- ❑ Maintain clean and sanitary toilet facilities for workers in close proximity (with ¼ mile or 5 minutes) to the work site.
- ❑ Review written procedures with workers regarding the use of toilet facilities, hand washing and personal hygiene.

## INDUSTRY REPUTATION

The California walnut industry has a worldwide reputation for producing quality walnuts. Each grower can ensure that this reputation is upheld by doing their part to protect the quality of the food product produced. We can maintain and expand our markets by ensuring that the products we produce maintain quality, reliability and safety. Protect our reputation for product quality by doing your part in assuring the safety of your walnuts.

# Quality Counts

## BEST PRACTICES FOR WALNUT GROWERS

### PREPARED BY:

**Bruce Lampinen**  
UC Davis Department of Plant Sciences

**Duane Lindsay**  
in cooperation with the California Walnut Commission



101 Parkshore Drive, Suite 250 · Folsom, CA 95630  
www.walnuts.org



UNIVERSITY OF CALIFORNIA  
&  
CALIFORNIA WALNUT COMMISSION



## IRRIGATION AND WATER QUALITY CONSIDERATIONS

- ❑ Trace your source of water for both irrigation and spraying and recognize that water may need to be tested and treated for pathogens prior to use.
- ❑ Inspect your water delivery system for potential sources of pathogens. Be aware that shared irrigation pipelines could be a source of contaminated water.
- ❑ Watch for potential water contamination from adjacent land (e.g. nearby landfills, septic tanks, leach fields, dairy operations, etc.).
- ❑ Recycled water (e.g. tertiary treated water) has been used in California for agricultural and landscape irrigation for many years without incident. However, if you use recycled water; obtain, review and maintain copies of monthly reports available from the treatment facility. In particular, look for data on E. coli concentration since this serves as an indicator of fecal contamination. Minimize the chance of recycled water coming into contact with nuts. For example, use drip irrigation and maintain the system properly to minimize puddling due to leaks and/or breaks.
- ❑ If water sources are contaminated, possible mitigation measures include filtration or chlorination of the water source.
- ❑ Be sure crop water needs are being adequately met without over-irrigating by scheduling your irrigation using plant, soil or evapotranspiration based data.

## NUTRIENT APPLICATION

If you use manure, do so with food safety in mind. The improper use of manure is a potential contributory risk factor for contamination of crops with food borne illness causing organisms. The highest risk is for crops where the edible portion of the crop touches the ground. This can potentially occur at harvest in walnut.

### TO MINIMIZE POTENTIAL HAZARDS:

- ❑ Do not apply raw or inadequately composted poultry/ dairy manure or lagoon waste water to the orchard floor during the growing season.
- ❑ Do not apply biosolids and/or sewage sludge at any time.
- ❑ If raw manure is used, apply as early after harvest as possible and disc thoroughly into the top layer of soil.

- ❑ If manure is used, composted manure products that have undergone pathogen reduction are preferable. Ask the compost producer for and maintain records on:

- ▲ The percentage and physical make-up of composted material
- ▲ Documentation showing that:
  - Compost temperature has reached 131° F for fifteen days or longer
  - Compost windrows were turned a minimum of five times during the composting process
  - Microbial test results showing E. coli <1,000 MPN/gram of dry solids and Salmonella < 3 MPN/4 grams of dry solids (MPN = Most Probable Number)

## VERTEBRATE PEST MANAGEMENT

Minimize the chance of contamination by bird, squirrel, or coyote fecal material by maintaining an active vertebrate pest management program in your orchard. As much as possible, exclude domestic and wild animals from orchards. Clean orchard floor of any undesirable residue before starting harvest. Exclude all animals, especially rodents and birds from all hulling facilities.

## GOOD MANUFACTURING PRACTICES IN THE PLANT

- ❑ Plant equipment and design – Plant equipment must be designed for food cleanliness and ease of cleaning. Cleaning and sanitizing frequency must be clearly set and followed.
- ❑ Plant construction – Must facilitate product safety by being properly constructed, maintained and cleanable.
- ❑ Plant grounds – Must be kept free of litter, trash and insect or rodent harborage.
- ❑ Employee personal hygiene training and GMP – Employees must adhere to FDA “Good Manufacturing practices.”
- ❑ Employee hand washing techniques – Toilet facilities with hot and cold running water and outfitted with towels, soap and sanitizer is required. Employees are trained to wash and sanitize their hands after each restroom visit.

- ❑ Product Safety and Protection – All product within the plant confines must be protected from contamination by all potential sources.
- ❑ Product traceability from farm to customer to meet FDA compliance requirements. All product must be numbered by code incoming and the product followed all the way through the processes to the customer. This allows the complete traceability of the product from grower to customer as required by the U.S. Food and Drug Administration. Complete traceability is important for recall purposes. The product must be traceable forward and backward to protect the consuming public from pathogenic organisms and harmful chemicals that find their way into the food supply.
- ❑ Bird, rodent and insect control – Plants must have insect, rodent and bird control programs in order to protect the product from contamination.
- ❑ Sanitation – A Standard Operating Procedure for plant and equipment cleaning must be operational in all food plants.
- ❑ Equipment clean up – All equipment must be cleaned on a regular schedule.
- ❑ Microbiological and Chemical standards – FDA Standards for product must be followed in controlling pathogens.
- ❑ Management responsibility – Management has the burden of making certain that all food laws are abided by in the processing and shipment of food product to the consuming market place.
- ❑ Product Standards and Grades – Specifications and USDA grade standards must be adhered to in order to protect the consumer and customer base from deleterious substances.
- ❑ Sample plan – FDA Bacteriological Analytical Manual sampling must be followed in evaluating product for safety.
- ❑ Fumigation of incoming product – All product incoming must be fumigated to kill field pests.
- ❑ Other – Management has the responsibility to meet or exceed the FDA GMPs.

## HAZARD ANALYSIS AND CRITICAL CONTROL POINT PROGRAM

- ❑ HACCP committee – Each plant must appoint a HACCP Committee.

- ❑ Seven Steps of HACCP – The seven steps of HACCP must be followed to prepare the plant Critical Control Points.
- ❑ Support documentation – All programs must be documented.
- ❑ Plant survey – Plant must be reviewed for potential customer hazards.
- ❑ Plant flow chart development – A plant flow chart must be developed and added to the HACCP program.
- ❑ Critical Control Point Determination – Once determined the CCPs must be adhered to in all instances.
- ❑ Committee meetings and employee training – All employees must be trained on going regarding product safety and HACCP programs.
- ❑ Other – Management has the responsibility to train all employees in every detail of product safety.

## HOMELAND SECURITY PRODUCT SAFETY AND PRODUCT PROTECTION

- ❑ Employee background checks – All employees must be checked for status before hiring.
- ❑ Plant security – Plant must be secure from outside terrorism and in plant terrorism.
- ❑ Cameras and fencing – Plants must be secured by methods available, i.e. training, etc.
- ❑ Hazardous Material isolation – Must be locked in secure areas.
- ❑ Employee training – All employees must be trained in plant security.
- ❑ Management training – All management must be trained in plant security.
- ❑ Product Safety – All food products must be protected from contamination.
- ❑ Product Protection – Product must be stored in a way that protects the product from harm.
- ❑ Truck evaluation – All trucks must be inspected for cleanliness, etc.
- ❑ Warehousing evaluation – All product storage warehouses need to be inspected and prepared for product storage.
- ❑ Other – Management must do all to protect employees, plant and food supply from contamination by any and all sources.