

Producing Quality Almonds: Food Safety Starts on the Farm

IRRIGATION AND WATER QUALITY CONSIDERATIONS

- Identify 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.
- Look carefully at your water delivery system for potential sources of pathogens. Shared irrigation pipelines could be a source of contaminated water.
- Be diligent in watching for potential water contamination sources from adjacent properties (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 recycled water is used, 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

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

To minimize potential hazards:

- Do not apply biosolids and/or sewage sludge at any time.
- Do not apply raw or inadequately composted poultry/dairy manure or lagoon waste water to the orchard floor during the growing season.
- If manure is used, composted manure products that have undergone pathogen reduction are preferable. Ask the compost producer for:
 - 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 5 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)*
- If raw manure is used, apply as early after harvest as possible and disc thoroughly into the top layer of soil.

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.

HARVEST

- Routinely maintain all harvesting and hulling equipment to ensure cleanliness. High pressure wash and sanitize all equipment prior to harvest.
- Avoid wet soil surfaces when nuts are shaken or windrowed at harvest to prevent creating an environment conducive to bacterial growth.
- Keep moisture content of nuts in windrows as low as possible.
- Minimize the amount of soil that is picked up during the harvest operation by proper adjustment of the harvester.
- Avoid stockpiling high moisture almonds.

*CIWMB Code of Regulations Title 27



**WORKER SAFETY AND SANITARY
OPERATING PROCEDURES**

- Maintain clean and sanitary restroom facilities for workers in close proximity (within 1/4 mile or 5 minutes) to work site.
- Review written procedures with workers regarding the use of restroom facilities, hand washing and personal hygiene.

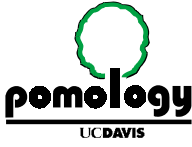
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Industry Reputation

The California Almond industry has an excellent reputation for producing quality almonds. That reputation depends on each grower doing their part to protect the quality of the food product we produce. Our markets depend on our product quality, reliability, and safety. Make sure you do what is necessary to protect our reputation so that we can always be proud of the quality and value our industry provides to the consumer.

**University of California and
Almond Board of California**

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Minimizing the incidence of food borne illnesses resulting from crop contamination is a concern for all almond growers. 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 almonds with these organisms increases during harvest when the



nuts are dropped to the ground. This brochure highlights procedures that can be applied to reduce the potential for on-farm contamination of almonds.

