

WATER MANAGEMENT AND CORRECTIVE/PREVENTIVE ACTIONS

Water Quality

- Agricultural water must be sourced from a location in a way that complies with prevailing regulations.
- Agricultural water quality must meet all applicable federal and state laws and meet any additional regulations relating to its intended use.
- A review or new assessment must be conducted any time there is a change made to the system or a situation occurs that could introduce an opportunity for contamination.
- Water quality becomes even more critical for water that comes into direct contact with the edible part of the plant, especially close to harvest.
- It is currently recommended that water used for foliage applications always be from a pathogen free source. If this is not possible, it is strongly recommended that a potable water source be used for foliage applications within 2 weeks of harvest.
- Spray irrigation poses the most risk if water is of questionable quality due to coverage of foliage which may be harvested. Spray or over head irrigation water must be from a good water source that does not contain pathogens above an acceptable level.
- If you are using a water source which may not be potable, drip or trickle irrigation methods may reduce the risk of contamination because the water is less likely to come into direct contact with the edible portion of the product.
- If you suspect chemical contamination of your water source, please consult your local authority and/or EPA for testing requirements.

Example corrective actions and preventive measures for your water management plan may include²:

- Construct barriers (e.g., fences, ditches, storage pits).
- Control run-off with sod strips, grass waterways, vegetative buffers, etc. Run-off structures, waterways, diversion berms and buffer areas may be able to divert run-off away from surface water sources or a well.
- Level ground to prevent runoff.
- Spread manure during dry weather or incorporate it within 24 hours of spreading.
- The storage or application of noncomposted manure may also contribute to microbial contamination of water source³. Leave a manure-free protective strip at least 33ft (10 m) around surface water sources².
- Ensure all equipment is well-maintained (e.g. so there are no fluid leaks).
- Do not clean, maintain or drain farm equipment where the water source may become contaminated.
- Ensure proper operation of sewer/septic system.
- Install aeration or filtration systems.
- Irrigate in the morning to increase rapid drying and reduce pathogen survival with ultra violet/sun light. Allow as long a period as possible between irrigating and harvesting.
- Test water for chemicals if you know of a particular problem (e.g., agricultural chemical spill where you know what chemical was spilled).
- Test water for Generic Escherichia coli (E. coli), E. coli 0157-H7, Enterohemorrhagic E. coli (EHEC) and Salmonella spp using an accredited lab. Percolation into shallow ground water or inadequately-protected wells has been shown to be involved in outbreaks of E. coli O157:H7³.
- Does not irrigate if you suspect contamination

- Be sure that well casings extend more than 12 inches above the land surface, and that flood water does not reach the well³.
- Observe local rain patterns to determine its effect on run-off from adjacent farms or animal feeding operations to your water source³.
- Animal production nearby may pose risks due to the high volume of animal waste or the possibility of animal grazing near the water source. The use of fences or gates may be able to keep animals out.
- Wild animals can pose the same contamination risks as domestic or farm animals. A large wild animal population may also necessitate fences or gates, or selection of an alternate water source during specific periods³.

When test results are obtained there will be certain acceptance criteria which determine if the water is adequate for its intended use. The following are recommended best practice acceptance criteria:

- E. coli 0157-H7, Enterohemorrhagic E. coli (EHEC) and Salmonella spp results must be negative²² (0 per 100 mL of water).
- Generic E. coli results must lie between ≤ 126 MPN (or CFU)/100mL and ≤ 235 MPN/100mL for any single sample where edible portions of the crop ARE contacted by water²².
- If testing has been performed for fecal coliforms then the limit is less than 2.2 fecal coliforms/100 mL of water. The Environmental Protection Agency (EPA) established this standard for reclaimed water (treated effluent) used on nonprocessed fresh produce. This 2.2 fecal coliforms/100 mL limit is considered free of pathogens for nonpotable agricultural purposes by the EPA. If higher densities of fecal coliforms are detected, it is suggested that growers do not use overhead irrigation⁴.
- It is recommended that you check your local/state guidelines before interpreting any results. The laboratory who undertook the test, local EPA office and your local Agricultural Extension agent may also be able to help.

Please Note: The above limits outlined are for use for agricultural irrigation water. If you are using your well water source for drinking also then the limits should meet EPA drinking water standards.

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Various water acceptance criteria for irrigation (from actual GAPs manuals)

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| LGMA       | < 126 MPN/100ml (geometric mean of 5 samples) AND <576 MPN/100ml (all single samples)                                                                                                                                                                                                                                                                                                                                                           |
| Tomato     | The water test meets <u>EPA recreational water standards for E. coli; i.e., 40 CFR Part 131.41(c)</u> (E. coli < 126/100 ml MPN)                                                                                                                                                                                                                                                                                                                |
| Avocado    | wells at least once per year, total coliform/generic E coli, Cannot exceed 1000* MPN (or CFU)/100 mL (source: WHO, World Health Organization)                                                                                                                                                                                                                                                                                                   |
| Strawberry | $\leq 126$ MPN or CFU/100 mL <i>E. coli</i> . When multiple samples (at least 5 samples) are taken, no one sample may exceed 235 MPN/100ml. Drinking and hand-wash water <1 MPN or CFU/100 ml of fecal coliforms/ <i>E. coli</i> . <b>WELL DISINFESTATION:</b> If the laboratory analysis shows the water is not free of bacterial contamination (e.g., fecal coliforms <2.2 MPN or CFU/100 ml), the disinfection procedure should be repeated. |
| Potable    | drinking water standards = 40 CFR Part 141.63 Basically fecal coliform/ <i>E. coli</i> free                                                                                                                                                                                                                                                                                                                                                     |