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Microgreens and Produce Safety

Microgreens are a popular and versatile crop, including a wide variety of plants (from mustard to radish) that are cut for sale when they have just developed their first true leaves. These are not to be confused with sprouts, which are harvested with the seed attached and without any leaves. Microgreen production is an expanding sector in Nevada's agricultural economy – more than 50 of the State's 400 produce farms grow microgreens (NDA, 2020).

From 1998 to 2017, there were no known food borne illness outbreaks associated with microgreens in the US, as opposed to over 50 related to sprouts and baby greens and more than 350 related to mature leafy greens during that time frame (CSU Food Science and Nutrition, 2019). However, current research shows a similar background level of bacteria between sprouts and microgreens (Riggio et al, 2019). And as with all produce that

is consumed raw, there are simple measures that farms can put in place to minimize health risks. This fact sheet highlights key guidance, practices and resources for microgreens growers. *Please note that all underlined text indicates a link to further online resources.*



Spicy Micro Mix

Photo credit: Johnny's Selected Seeds

Guidance:

The [Produce Safety Rule](#) offers comprehensive guidance and requirements, considering the evolving science on effective practices as we learn more from outbreaks. The Rule includes specific requirements for sprouts growers; these are not required for microgreens growers but are important to understand. Below is a compilation of key practices for safe microgreens production considering those policies and current research.

Key practices safe microgreen production:

Food safety challenges associated with microgreens production primarily have to do with seed handling, the temperature and humidity of the growing environment, harvest practices and the basic fact that this product is usually consumed raw. Key practices to manage these challenges include the following.

- Seeds for microgreens can be a source of pathogens – handle seeds as carefully as the greens that you will harvest. Examine seed for contamination and spoilage upon receipt. Use clean and sanitized containers for

Pathogens such as bacteria, viruses and parasites can be carried in microgreen seeds and cause food borne illnesses if mixed in with the product and eaten raw.

storing seed if not in original packaging, and evaluate your storage area for cross contaminants (for example, don't store untested fertilizers of animal origin in proximity to microgreen seeds). Follow the general package directions for safe seed storage considering humidity, temperature and light exposure. Source seeds from a partner that has a food safety plan and cleans the seed, or clean/treat the seed yourself. Microgreen seed decontamination is a subject of ongoing discussion among researchers (Riggio et al, 2019).

- Use soils and soil amendments that are sterilized, properly composted or otherwise determined to be free of pathogens – get a certificate or letter from your supplier. If preparing your own compost, maintain a minimum temperature of 131 degrees F for a minimum of 3 consecutive days for a static pile, or 15 days for a turned pile. Or, consider a soil-less growing media.
- Follow [FSMA guidance on agricultural water](#) – water must be tested and have no detectable *E. coli* per 100 ml to ensure it is safe for seed rinsing, soaking, treatment and pre-germination, as well as production irrigation and any post-harvest washing. Note: municipal water is treated and tested; test results are usually available online from the utility. [Find information on how to test agricultural water in Nevada here.](#)
- Incorporating UV lights into indoor microgreen production can help reduce pathogen loads, but they do not eliminate them.
- Establish procedures to clean and sanitize food contact surfaces (tools, harvest containers and equipment) to prevent contamination of seeds and microgreens. Choosing tools carefully reduces the risk of contamination. Harvest knives (photo at left), scissors and pruning shears made of hard, non-porous surfaces can be easily cleaned and sanitized. Mechanized tools, such as the greens harvester pictured below, can increase efficiency but should be carefully evaluated to ensure that all elements can be cleaned and sanitized between harvests, particularly if [GAP certification](#) is of interest.
- Post-harvest washing of microgreens appears to be ineffective and could increase the risk of contamination (due to tissue damage that invites pathogen growth). To date, indications are that it is best not to wash microgreens on the farm.
- Ensure that worker health and hygiene practices are in place to prevent contamination of seeds and microgreens. Key practices include ongoing training, monitoring for illness (do not handle microgreens when ill!), and proper hand washing and glove use.
- Monitor for pests and manage them to prevent contamination of seeds and microgreens. Do a pre-harvest risk assessment (evaluate the crop before harvest) for any signs of contaminants or physical hazards. Remove hazards and any affected microgreens.



Washing harvest knives at DFI



Drill powered greens harvester
Photo credit: Farmer's Friend

- Choose and store packaging safely – covered, off the floor, and at least 18 inches from walls. Safe handling and final packaging of microgreens at the farm limits any potential contamination of your product down the delivery line (such as at a wholesaler or retailer) and can protect your reputation.
- Make sure any pesticides or other chemicals are approved for microgreens and follow the [EPA label instructions](#). Also check to make sure that sanitizers do not leave a residue that could compromise germination, the quality of the crop or public health.
- Include your farm name, address and harvest date on final packaging. Also consider including a *wash before serving* disclaimer. Keep ‘traceability’ records (seed to harvest to delivery) so that you are prepared to handle an illness associated with your product, identify potential causes and limit exposure. [Check out the Desert Farming Initiative’s \(DFI\) Food Safety Plan for sample templates](#).

Assistance:

DFI provides free assistance with produce safety planning and visits farms statewide. DFI also works with the Nevada Department of Agriculture to offer ongoing [Produce Safety Alliance](#) trainings and focused workshops. [Contact us](#) with any questions and check out our [DFI’s food safety web page](#).

Resources and References:

Colorado State University (CSU) Food Science and Nutrition. 2019. Sprouts vs. Microgreens – How Do The Risks Compare? Available at https://rmfoodsafety.org/wp-content/uploads/2019/06/RMFSC-2019_Bunning_.pdf (accessed June 17, 2020).

Nevada Department of Agriculture (NDA). 2020. Nevada Producer Certification Database. Available at <https://nv.certifyag.com/fsmapublic/> (accessed June 17, 2020).

Produce Safety Alliance. 2020. Resources and training for growers available at <https://producesafetyalliance.cornell.edu/> (accessed June 2020).

Riggio GM, Wang Q, Kniel KE, Gibson KE. Microgreens-A review of food safety considerations along the farm to fork continuum. *Int J Food Microbiol.* 2019;290:76-85. doi:10.1016/j.ijfoodmicro.2018.09.027. Available at <https://pubmed.ncbi.nlm.nih.gov/30308448/> (accessed June 2020).



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