



Episode Sixteen - Pre-harvest and harvest practices

Welcome to episode 16 of Food Safety Bites Brought to you by the University of Wisconsin Madison, and funded by the USDA Food Safety Outreach Program, this is your host Harriet Behar. This episode is **pre-harvest and harvest practices**. In these podcast episodes, I will identify issues, and provide suggestions for how to reduce various fresh produce contamination risks and keep your customers safe. We will not talk in detail about what is required for a GAP audit or a FSMA inspection. If you want more information on those, please see the links on the website where you found these podcasts.

When planning your crops each spring, give some thought to areas of your fields that might present a risk during the growing season. Are there areas where you know you have deer pressure, or fields that are typically overhead irrigated with surface waters. Is there a field that adjoins a livestock feedlot or has weak fences next to a pasture that your neighbor has told you he will fix when he can find some time to do it? Rotating crops helps to break weed, pest and disease cycles, and so you might be constrained in choosing where to plant crops in order to maintain a good crop rotation, but being aware of the risks, as early as possible in the season, can help you in decision making throughout the season to prevent contamination on the riskiest crops, from a variety of sources.

While the crops are growing, be aware of any wild or domestic animal movements and do what you can to deter them. Do your water testing to be aware of any contamination levels, so you can use sources of least risk when possible and take steps to reduce risk by using drip irrigation for example. If you have any trellised crops, watch to see if birds might be roosting and use plastic spikes, decoy owls, moving scarecrows or noise to keep them from pooping on the crops below, especially within the weeks before and during the harvest. Evaluate the areas around your fields that provide harborage or food that is a result of your farm's activities or storage. Do what you can to remove these attractive sites to lessen rodents, woodchucks, raccoons and more from using these areas who can then move easily into your fields for dinner.

Worker management- Have enough restroom facilities or a vehicle for employees to travel to one when out in the field and make sure workers wash hands right before starting harvest. If there is a field porta pottie, there should be a system in place to make sure it is clean and well stocked with toilet paper and all of the items needed for the hand wash station. As I have said before, there should not be any urinating or defecating at edges of the field.

If workers will be taking eating or smoking breaks, these should be in a designated area outside of the field. A hand wash station should be present to make it easy for them to wash their hands before returning to the field and handling produce. Workers should wear clean clothing every day. If workers are using gloves for harvesting, they should be removed when eating, smoking or using the restroom. Clothing in the field will get dirty. If the same workers are harvesting and doing post-harvest handling, provide them aprons to wear over their field clothing or have them switch footwear in pack shed. This signals to them that the pack shed area has higher cleanliness standards than the field.



Monitoring before harvest-On harvest day, or the evening before, someone should review the area closely where the crops will be harvested. They should be knowledgeable in assessing if there has been any animal feeding, which can usually mean there has been some fecal matter left behind as well. They can carry flags, mylar tape or some other marker to alert harvest workers to avoid harvesting crops within 3 to 6 feet from that fecal matter, depending on the risk to that crop. Be aware of extreme weather events, such as rain and wind that could have moved the poop into a larger area. Assess the risks and increase your typical no harvest buffer around manure areas in these situations. You do not need to carefully inspect every row for hours, but generally take a look and see if there are signs of animals, and take actions if signs are spotted. If there is a tiny amount of mouse poop your action will be different than if there is a cow pie from your neighbor's cow that got out, or a herd of deer that enjoyed your beets. Listen to the episode on wildlife for more information on no-harvest buffers and deterring wildlife.

Transportation from the field to packing area- All wagon beds, pickup beds, or carts should be clean when transporting clean tubs out to the field and consider systems like the double tub method. If you have containers that nest, consider using one container in direct contact with the ground, and a second one inside it for the produce. As the containers are filled, bring the full produce tub back to the clean wagon or truck, and bring an empty clean tub back to the field to put into the one you left on the ground. These produce tubs with a clean bottom, are less likely to contaminate produce below when they are stacked on the wagon.

Leave as much of the soil out in the field as you can and you will have less to clean at the pack shed later. You can also use tarps to cover transport surfaces that are difficult to clean. Use common sense and don't use the same wagon that just hauled raw manure, for transporting your totes of newly harvested salad greens back to the pack shed. Operate equipment to avoid driving through livestock areas to and from produce areas, since they will pick up manure on the tires.

Lessen field heat in produce- Harvest in the cool of the day, and stage newly harvested produce in the field in the shade whenever possible, to retain produce quality. Since the produce should not be warmer than 10 degrees F than the water used in a dunk tank to cool it, the cooler the produce at harvest the better. Of course, this is not always possible, and therefore having a system of pre-cooling the produce when coming back from the field is a good idea. Use of dunk tanks in the field can be somewhat risky since it will be difficult to change the water when it gets dirty.

When stacking tubs, be aware to put the dirtier types of produce on the bottom, so that dirt does not drop into lower tubs. In the episode on infiltration, I discuss a simple forced air-cooling system that can be used in a cooler to chill down your produce quickly. Cooling in tanks and the use of ice is also discussed in other food safety bites episodes.

When stacking produce in a shed, put these containers on a pallet or other item to keep the bottom of the first tote or container, up off the floor. This keeps the containers and produce from being in contact with the dirt that is on the floor from workers shoes, recently used wash water etc.



Sorting produce- Review the produce in the field and at the pack shed. If you find produce that is damaged or there is obvious fecal matter, cull these immediately to remove these areas of contamination before washing. These should be moved out of the pack shed daily, to lessen the spread of bacteria.

Dropped produce- Be aware that produce that you have dropped unintentionally during harvest should not end up in the picking tub unless that type of produce is grown in or typically harvested onto the ground. If you are picking tomatoes off a trellis and it drops, then it shouldn't get sold and mingled in with the produce you are packing and shipping out. When you drop produce it can get small (or large) injuries that can make it much more susceptible to decay and infiltration in post-harvest washing. It can also pick up contamination from the ground. If you want to save this dropped produce and eat it yourself that is up to you, but do not include this in the produce that you put into commerce and sell to others.

So that's it for this episode of Food Safety Bites, the next episode is tools, transport and storage. This is your host Harriet Behar brought to you by the University of Wisconsin Madison, talk to you next time!