



## **Episode Eighteen - What is agricultural production water**

Welcome to episode 18 of Food Safety Bites, brought to you the University of Wisconsin Madison, and funded by the USDA Food Safety Outreach Program, this is your host Harriet Behar. This episode is **what is agricultural production water, including water used for irrigation**. 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.

There are basically two categories of water on a produce farm, water used to grow or produce the agricultural products, and water used post-harvest, to transport, cool, and clean produce. There are six food safety bites episodes on water, two on agricultural production water, two on post-harvest handling water, one on testing protocols for both types of water and one on using ice and other aspects of cold-water chilling. As you can hear, water is a big issue and needs specific focus to assess risks and issues tied to each source and use.

**What is agricultural production water-** This is water that comes into direct contact with the produce and is used during the growing process. The water could also be in contact with equipment that moves water in the field that would then have direct contact with produce such as irrigation piping. The most common type of production water would be irrigation water. It is also water used to mix pesticides or fertility inputs for foliar applications that is used during the growing process. In addition to irrigation, overhead sprinklers can be used to cool down crops before harvest in the field or to slow down bolting, like on lettuce. Water mists can be used to protect produce from frost in the spring or fall. These are all examples of production water. The most important distinction between production water and postharvest water is that postharvest water can have some levels of bacterial contamination, since these bacteria might die off in the field, but postharvest water must be free from contamination and drinkable.

**Irrigation** is a significant area where water is used on crops, to provide water as well as water with added fertility inputs. There are many types and sizes of irrigation, overhead sprinkler types can be as large as a center pivot and as small as a garden sprinkler or a garden wand on a hose and everything in-between. Sub irrigation is sometimes used in perennial crops like fruit trees, where pipes are buried under the surface of the soil. Drip irrigation through various types of tape or tubes, trickle irrigation using emitters from the drip irrigation, furrow irrigation, and flood irrigation are all types where the water is applied on the soil surface. Some operations might harvest produce into water tanks out in the field, or into flumes if close enough to their packing operation. These would be discussed in post-harvest handling, even though they may occur in the field.

**Sources of water-** The first issue to consider is the source. Unlike post-harvest uses, water used for agricultural production can have small amounts of detectable E. coli in it and does not need to be potable. In the next episode I will discuss the various strategies for testing agricultural water sources and why. If you use the same water that you use for post-harvest



handling and have a yearly water test showing that it is drinkable, you should not necessarily assume that it will not have picked up bacteria someplace along the line. Testing of production water should occur where the water leaves the system and contacts the produce, not just at the source, since distribution lines can cause contamination

Surface waters such as creeks, streams, ponds, lakes, rivers, canals, drainage and irrigation ditches can all be used to water crops in the field as long as care is taken. These surface waters should be considered unsafe for drinking and not used for washing produce, hands, or equipment that would be in contact with clean produce after harvest. Surface waters are highly variable and some sources such as rivers that run through animal feeding operations, or during flooding or times of runoff might have very high levels of contamination. Even though springs are ground water flowing up from underground aquifers, once it reaches the surface and mingles with surface water, it can no longer be considered free of contaminants. Many states have rules concerning the use of shared water sources such as streams, rivers, lakes and ditches, so be aware of the laws and possible permitting requirements in your state and county before you hook up a pump to use that water.

Water from municipal potable water sources are fine to use, as they have been tested to ensure potability. Remember that piping these potable water sources out to the fields can provide a risk of contamination, so don't assume that if it is drinkable at the shed, it is still drinkable after running through 5000 feet of irrigation pipe to the field.

Well water that is potable or even if it is not potable is also acceptable for agricultural production and uses during the growing of produce, but it must be tested to see how much bacteria is present. Wells can be cracked or well heads missing or compromised, making the well water contaminated with bacteria that can make people sick, so it is important to test all well water used on the farm at least annually.

In some areas of the country, farmers have access to reclaimed and treated water from previous domestic or industrial uses through ponds or ditch systems, these waters are not considered potable and may have issues of heavy metals or other contaminants that require higher scrutiny before use on agricultural fields.

**Risks tied to application methods-** The second issue is the method of application. For irrigation systems buried underneath fruit trees, there is very little risk of that water touching the fruit. Drip irrigation will have less contact with the produce that is above the soil line that produce does not tend to touch soil, like trellised tomatoes, so therefore drip irrigation is a lower risk application method. If the drip tape is underneath a mulch, there is even less contact with the produce and typically splashing is not an issue. Furrow or flood irrigation will have more movement of water as it is moving, causing it to spray into the air and onto the produce as it is applied. Remember drip tape does break - if the water is spraying from the drip hose, then it becomes an overhead spray and might touch the produce directly.

Anytime there are hoses or pipes with standing water, there is a chance that bacteria can accumulate, multiply and/or result in biofilms. There is a food safety bites episode on biofilms



and strategies to prevent them. In the next episode I will discuss how to lessen the risks associated with agricultural water, including periodic testing.

So that's it for this episode of Food Safety Bites, the next episode is managing risk for agricultural production water. This is your host Harriet Behar brought to you by the University of Wisconsin Madison, talk to you next time!