



Episode Eleven - Manure and other fertility inputs

Welcome to episode 11 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 **manure and other fertility inputs**. 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.

Actually, I will talk a little about the Food Safety Modernization act produce safety rule and refer to the FDA's review on this subject. Rather than only discussing just manure, they have setup a category called Biological Soil Amendments of Animal Origin, or BSAAO (*buh-sow*). BSAAO are soil amendments that entirely consist of materials that originated from animals, or have some of these items in a blend, such as manure or fecal matter, non-fecal animal byproducts such as offal from slaughter, animal mortalities, fish emulsion, bone meal, teas made from these items, and treated biosolids originating from sewage sludge. Fecal matter in this category might include manure and bedding or litter from all livestock species, such as cattle, poultry, swine and horses. Raw human fecal matter is not allowed to be used as a soil amendment, since there is a high risk it contains disease causing pathogens.

Manure and the other items in the BSAAO category have been used for millennia to improve fertility and soil texture, fertility and for many other soil building properties, and can continue to be used, with understanding of produce safety issues and measures to mitigate the issues tied to storage and application on the farm. The FSMA produce safety rule does not say you cannot use these items, just that you need to take care and either treat the product or wait long enough between application and harvest.

So, what are the rules and best practices around how to safely use manure and animal-based soil amendments? There are a few options.

Treatment options: First, you can choose to make fully treated soil amendments through composting, chemical or other processes that would adequately reduce the level of microorganisms of concern. Or you can purchase fully treated products that come from a facility that used a valid process like Cowsmo or Sustane or pelletized poultry manure with a certificate of conformance.

If you make your own composted manure using a validated process or purchase it from a company that uses a valid treatment process, you can count it as fully treated and do not need to wait between application and harvest. There are many guides to making fully treated compost if you choose to make your own. If you are organic, you should follow the NOP guidelines, and follow the guidelines carefully for timing and temperature. If your farm needs to comply with the FSMA Produce Safety Rule and you want to make your own treated compost,



you will need to read that section of the rule to follow the guidance laid out there regarding treatment processes allowed under the rule.

Time Delays: Or, if you want to use manure that has not been treated and may have just sat in a pile without active turning and temping, you can use that, but you need to wait between the application and harvest of the product since it is considered raw. Even if the pile sat for 2 years, the manure is considered raw and you need to treat it as raw, since there could still be dangerous pathogens in it since it did not evenly heat with turning. Currently the FDA is doing extensive research on exactly what time frame is needed between the application and incorporation of manure etc. and when produce can safely be harvested from that field, and right now that part of the FSMA Produce Safety Rule is not finalized.

So for now, the FDA is accepting **the timeframe in the organic regulations** between manure application and produce harvest that states that when the produce is grown is in contact with soil particles, such as root crops, or produce that sprawls on the ground or produce where soil could splash up onto it like cantaloupe there must be 120 days between application of raw manure and harvest. For produce that is *not* in contact with soil particles, such as sweet corn growing in a husk, shell peas whose edible portion is in a shell or trellised tomatoes, then 90 days is necessary between raw manure application and harvest of these items. Most often, this means a fall application. Snow peas would need to be harvested after 120 days of a manure application, since both peas and shell are eaten. Time your application of raw, untreated biological soil amendments of animal origin, so you apply those that need a longer time after application to harvest, for the fall or very early spring, and use the treated manure or compost closer to the harvest dates.

As currently written, the process for making **fully treated compost** from manure in the FSMA regulations is the same as in organic standards. There are multiple methods to make fully treated compost described in the FSMA rule and in the NOP guidelines. The most common is a thermophilic process for a set period of days with the pile reaching specific temperatures and being turned, followed by a curing period. Manure can also go through a heat process to kill pathogens. There must be testing and documentation by the manufacturer (either you or a facility) that the treated manure and compost has been heated to a specific level and has undergone one of the specific scientifically validated processes. Information explaining these processes and test limits are present on the website where you found these food safety bites episodes.

There are some considerations to use when making and storing manure and compost. When using treated biological soil amendments, care should be taken to avoid contaminating it with untreated manures or other materials that could contain pathogens. Run-off water could contaminate compost or treated manure, as well as using equipment for both untreated biological amendments and treated biological amendments without complete cleaning and sanitizing between these uses.

Be aware that if your fields are located near livestock living areas including feedlots, manure storage or manure spread on fields near your fresh produce, there could be runoff from rain



events onto your vegetable fields, as well as pathogen laden dust from those manure sources. It has been shown that fecal matter in dust and runoff water has been blamed for several romaine-related E. coli outbreaks in recent years. The dust can become airborne and fecal matter can contaminate irrigation water from ponds or streams which then subsequently contaminates fresh produce in nearby or adjacent fields.

When storing raw manure on your farm, it is a good practice to store it at least 100 yards from the produce growing area and be aware of the steepness and direction of any slopes that could facilitate runoff to travel even further.

Other biological soil amendments of animal origin could also harbor or grow bacteria, including fish emulsion, compost teas and other liquids should have some assurance that they are not contaminated with pathogens, especially if you are foliar applying these to your crops. Applying these items through drip tape where they will not have contact with the crop, provides some assurance of produce safety. When mixing these amendments with water, that water cannot originate from a contaminated source.

Lastly, if using chemical fertility inputs, make sure you are following product application directions and that everyone mixing and applying them is trained and using protective equipment if required.

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