Assessing PFAS Contamination and Managing Risks on Dairy Farms in Maine

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It is hard to escape the news about PFAS in Maine. For dairy farmers, whose land was often used for the approved application of biosolids, the scrutiny and worry can be overwhelming. As we move closer to another cropping season, there are some steps dairy farmers can take to minimize the impact of PFAS-contaminated soils on crops and the milk your cows produce.

The best place to start is to learn more about PFAS in Maine. A group of service providers and crop consultants put together this useful guide:

Guide to Investigating PFAS Risk on Your Farm
extension.umaine.edu/agriculture/guide-to-investigating-pfas-risk-on-your-farm/

Next, it's important to know about forage crop uptake of PFAS. The Maine Center for Disease Control (CDC), Maine Department of Environmental Protection (DEP), Department of Agriculture Conservation and Forestry (DACF), University of Maine Cooperative Extension, and others have been investigating forage crop uptake on several dairy farms in Maine to get a better understanding of the potential for contaminated soils to impact the levels of PFOS in milk (PFOS is most prevalent PFAS chemical found in milk). While this research is preliminary, we have been able to use the information and data to alter the cropping practices on several farms to reduce the level of PFOS to acceptable levels so they can sell milk again.

What has been discovered about forage crop uptake?

1. Perennial forage grasses and legumes tend to have a high potential to uptake PFAS from the soil. Therefore, from a crop management perspective, harvesting grasses and legumes grown in contaminated soil have the highest risk as a contamination source for milk. **Tall Fescue** seems to be a forage crop that accumulates PFOS more than other grasses and **should be avoided if possible.**
2. Corn silage has a lower potential to uptake PFAS and therefore has a lower potential to contaminate milk.
3. Corn grain has an even lower potential, so corn harvested as grain, snaplage, or high moisture ear corn will have much lower levels of PFAS than corn silage. Other grains are also an alternative, although the straw or vegetative parts of the plant will contain significant PFOS.
4. Although not quantified, the potential for soil contamination or dirt in your forages harvested from contaminated fields will increase the risk for contaminated milk. Try to increase mowing height to minimize contamination. If your forage tests have more that 8% ash, you are probably contaminating the feed with soil.
5. There is variation in uptake levels of PFAS into plants, and this is an area that needs further investigation. Hopefully further research will help us understand and be able to provide better recommendations.

Have questions? We can help.

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What should you do as a concerned dairy farmer?

1. Evaluate the potential for contaminated soil on your farm and the acres you lease for forage crop production.
2. Review the history of the fields and look for biosolid applications.
3. Maine DEP is using historical records of licenses and volume of materials to prioritize what fields to sample. The initial evaluation of Tier 1 and 2 sites is complete, with evaluation of Tier III sites underway. https://www.maine.gov/dep/spills/topics/pfas/
4. Maine DEP has a map of the licensed sludge spreading sites. The EGAD Septage and Sludge Sites map* may help you locate what fields and licenses were recorded. Details about particular licenses and amounts spread are available in a DEP spreadsheet that you can download [https://www.maine.gov/dep/spills/topics/pfas/2020-11-12-sludge-bioash-land-application.xlsx].

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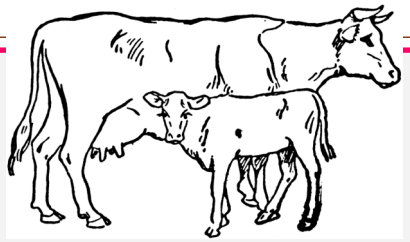
* https://maine.maps.arcgis.com/apps/webappviewer/index.html?

For fields that have a history of biosolid applications, consider the following forage crop production and harvest changes for 2023.

1. Consider testing the suspect field soils for PFAS levels if DEP (or DACF) has not done so already. If the suspect fields are near your well, consider getting that tested, too.
   a. The testing is expensive, and the sample collection process must be done carefully. There are several private consultants that have experience testing for producers in Maine.
   b. DACF can reimburse for testing (when test results are shared). https://www.maine.gov/dacf/ag/pfas/pfas-assistance.shtml
   c. The Maine Organic Farmers and Gardeners Association and Maine Farmland Trust also can cover testing costs (for organic and conventional farms). https://www.mofga.org/pfas/pfas-emergency-relief-fund/
2. If you find or suspect the potential of higher than background levels in the soil and it is currently producing a perennial forage (grass/legume), consider rotating that field into corn silage.
   a. If soils are **highly** contaminated, even corn silage could also result in contaminated milk, so knowing the levels in the field may help you decide to go to suggestion #3. DACF staff can help advise you on understanding levels in soils and the potential risk for contamination.
3. If you feel you have the potential to do so, plant the field to corn, and harvest the crop as either snaplage, high moisture ear corn, or even corn grain. Research has shown that minor amounts of PFAS are taken into the grain portion of the plant. Snaplage can be easily harvested and stored in bunker silos, so the investment in moving to this harvest and storage method would only require the use of a snapper head on your chopper and good bunker silo management.
4. If the suspect field does remain in a perennial forage, make sure you reduce the potential for soil contamination by raising your mower and making sure that rakes, tedders, and pick-up heads are set high to eliminate soil contact.
5. If you are grazing the contaminated fields, do not allow the fields to become over-grazed, as that will also contribute to soil-contaminated ingestion of feed and lead to high levels of PFOS in milk. The general recommendation is to not use contaminated fields for grazing since the transfer from soil to feed to milk will be high.
6. If you use balage as a storage system for your feed, make sure to mark the bales from contaminated fields. You may consider testing those bales before feeding or potential disposal. If you still intend to feed those bales, make sure they only account for a very small percentage of the dairy cow's diet. It doesn't take much contaminated feed to create an unacceptable level in milk. Research shows that PFOS levels go up very quickly after ingesting contaminated feed but decline slowly.
7. If you use bunker silos, and you harvest feed from a contaminated field, it is critical that you put that feed in your bunker evenly, and hopefully as a small layer or percentage of the total feed in the bunker to avoid hitting "slugs" of problematic feed when removing silage. As with round bales of perennial forages, it would be best not to include that feed in the bunker, if possible.



Can I harvest contaminated hay and feed it to my heifers or dry cows?

This is not a solution to the problem and should be avoided. By monitoring fresh heifers at one farm, we found that although the heifers had clean feed for 8-10 months after being fed contaminated feed (both milk when they were calves and forage), their milk contained high levels of PFOS when they first freshened!

The PFAS Response Team will continue to investigate the transfer factors for forage crops this coming season so we can make better forage crop harvest decisions to minimize risk.

There are some safety nets for dairy producers if your milk is considered adulterated with PFOS. USDA FSA's Dairy Indemnity Payment Program (DIPP) is a temporary option, especially if there is a way to depurate your herd. DACF also has financial assistance programs available, as does MOFGA and MFT.

While stressful, we have successfully depurated several dairy herds in Maine this past year. While these contaminants are considered "forever chemicals", they are not forever in your cows, and they can again produce quality milk once they are on non-contaminated feed for an extended period of time.

Please reach out with questions as you plan for this coming season. **Knowing your soil PFOS levels will help decide the best course of action.** Your farm may need to think about forage budgeting and feed requirements to make sure your herd size will fit the available forage you can safely harvest this coming season. Knowing and evaluating all your options is the best path forward.

If you are a **commercial farmer** with questions regarding PFAS testing, income replacement, or farm viability projects or are a **member of the public with questions regarding PFAS and agriculture** in Maine, please contact Maine DACF (207) 287-4514 and leave your name, phone number and a brief message. For more resources from DACF, visit:

https://www.maine.gov/dacf/ag/pfas/index.shtml