PFAS and Montgomery County Agriculture

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What are PFAS and why are we concerned about them?

Per- and poly-fluoroalkyl substances (PFAS) are a large group of synthetic chemicals that are ubiquitous in the environment due to their widespread production and use since the 1940s[1]. Many PFAS do not easily break down and therefore persist in the environment for a long time, earning them the nickname "forever chemicals"[2].

Because of their persistence, many PFAS also accumulate in the human body[2]. There is a growing body of evidence that, at certain levels, some have carcinogenic effects and adverse effects on the immune system, endocrine system, reproductive system, and liver[1,2]. The two most commonly studied PFAS are perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS)[1].

PFAS have been used in a large number of commercial products and industrial processes due to their ability to repel water and oils, chemical and thermal stability, and other properties[1,2]. Commercial products that may contain PFAS include stain-resistant carpets, furniture, food packaging materials, personal care products, non-stick cookware, water-proof clothing, electronics, building materials, fire-fighting foams, and many more[2].

PFAS began receiving attention in the U.S. in the early 2000s, when the Centers for Disease Control (CDC) began testing for four PFAS in human blood (including PFOA and PFOS) as part of the annual National Health and Nutrition Examination (NHNE) Survey[2]. In 2006, U.S. manufacturers began phasing out the use of PFOA and PFOS and by 2015 were no longer using them[3]. Consequently, over the last two decades the NHNE Survey has reported a decrease in the human blood level of the four tracked PFAS[4].

However, some imported products may contain PFOA and PFOS, as do products manufactured in the U.S. after the phase-out and still in circulation[2]. In addition, there are thousands of other PFAS besides PFOA and PFOS that have not been phased out of U.S. manufacturing. Therefore, the NHNE survey continues to find that exposure to PFAS is "universal" in the American population[2].

Where are PFAS found in the environment and what is being done about them?

Because of their widespread use and persistence, PFAS are found in nearly all parts of the environment, even in remote areas of the world[2]. They have frequently been detected in soil, drinking water, groundwater, wildlife, and even Arctic snow[1,2].

Over the last two decades, PFAS have received a great deal of attention in the scientific community and, although not fully regulated yet in the U.S., are increasingly considered by federal and state authorities as contaminants of concern that need to be managed as part of health and environmental programs[2].

Since 2009, the U.S. Environmental Protection Agency (EPA) has issued Health Advisories (HAs) for the levels of certain PFAS in drinking water, which are non-regulatory recommendations intended for drinking water suppliers[5]. The EPA has revised these HAs over time and is currently working to establish National Primary Drinking Water Regulations for PFAS[6].

In September 2020, Maryland Department of the Environment (MDE) began testing drinking water supplies around the state for 18 PFAS as part of the Public Water System Study[6]. Phases 1 and 2 of this study sampled from water treatment plants and untreated groundwater sources that collectively supply drinking water to over 70% of the state's population[6]. In these two phases, PFAS were detected at varying levels in about 75% of the water treatment plant samples and 50% of the underground water samples[1,6]. As a result, the treatment plants with water PFAS levels above the EPA's HA effective at the time were taken offline[1]. MDE also recommended that all treatment plants perform regular PFAS testing[1].

PFAS and biosolids in Montgomery County

Biosolids are the product of treating raw sewage sludge in wastewater treatment plants with high temperatures, lime, and other processes to reduce or eliminate pathogens. Because of their high nutrient content, biosolids are applied to agricultural fields and other lands in the U.S. and globally in order to recycle nutrients and thus reduce reliance on inorganic fertilizers. Although biosolids contain PFAS, the information currently available suggests that their levels are lower, in some cases by orders of magnitude, than those in several common food items and daily use products that people come into direct contact with[7,8,9,10,11,12].

Bloom, the biosolid product generated at the Washington, DC Blue Plains Advanced Wastewater Treatment Plant, is land-applied in some Montgomery County farms, horticultural operations, and other properties. DC Water, the company that produces Bloom, tests its product for a large number of contaminants and reports low PFAS levels as compared to other biosolids tested in the U.S. and other countries[7,8].

In December 2022, the town of Poolesville reported that PFAS were detected in the town's drinking water wells and disconnected the two wells with the highest levels. Believing a possible cause to be the application of biosolids on land overlying the local aquifer, in January 2023 two non-profit groups petitioned the county government to ban the application of biosolids on county agricultural fields, gold courses, and public land.

In January and February 2023, the Office of Agriculture (OAG) met with members of the county agricultural groups, representatives from DC Water, and Dr. Ian Pepper, a University of Arizona researcher. In 2020, Dr. Pepper and his research team conducted an Arizona field study that found the following:

- Agricultural fields that had never received biosolids had soil PFAS levels similar to those that received biosolids for 4–20 years[13].
- There was minimal PFAS migration below a soil depth of six feet[13].
- PFAS levels were higher in irrigation water sources that had never been affected by biosolids than in those that had[13].

These findings lead the researchers to conclude that biosolid applications likely had a minimal effect on the PFAS levels of the studied soils, irrigation water likely contributed to the observed levels, and the risk of groundwater contamination from applying biosolids to agricultural fields is minimal[9]. From Dr. Pepper, the OAG also learned that the only studies that have observed PFAS uptake by plants are those where very high amounts of PFAS were added to pots.

After conducting a large study in 2018, the state of Michigan concluded that biosolids produced at treatment plants receiving industrial discharges have much higher levels of PFAS than non-industrially impacted biosolids[7]. The study also found that agricultural fields that received industrially impacted biosolids had significantly higher PFAS levels in the soil, groundwater, and surface water than those that received non-industrially impacted biosolids[7]. This led the state of Michigan to allow the land-application of non-industrially impacted biosolids.

In Maine and Michigan, some farms have made headlines in recent years after having to cease operations due to high levels of PFAS in the soil, water, animals, and/or crops[14,15,16]. These farms, however, had received either paper mill sludge or biosolids produced at plants that received industrial discharges (i.e. from chrome-plating plants or paper mills) [14,15,16].

In conclusion, the information currently available suggests that biosolids with low PFAS levels, such as Bloom, can be safely applied to agricultural fields. However, out of an abundance of caution the OAG has recommended to county farmers that they voluntarily suspend the application of all biosolids on their fields until enough information is available. At this time, Montgomery County government does not have regulatory authority over the land-application of fertilizers, biosolids, and other nutrient sources on private properties, only Maryland Department of Agriculture does. The OAG will continue to monitor the situation and communicate to the county agricultural groups any important information that it gathers on PFAS and biosolids as they relate to agriculture.

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