PFAS and the Land Application of Municipal Biosolids

Everything we do comes with some level of risk.

PFAS chemicals are ubiquitous in the environment and are used in many consumer products in our homes and offices, which we regularly consume and/or are exposed to (such as dust).

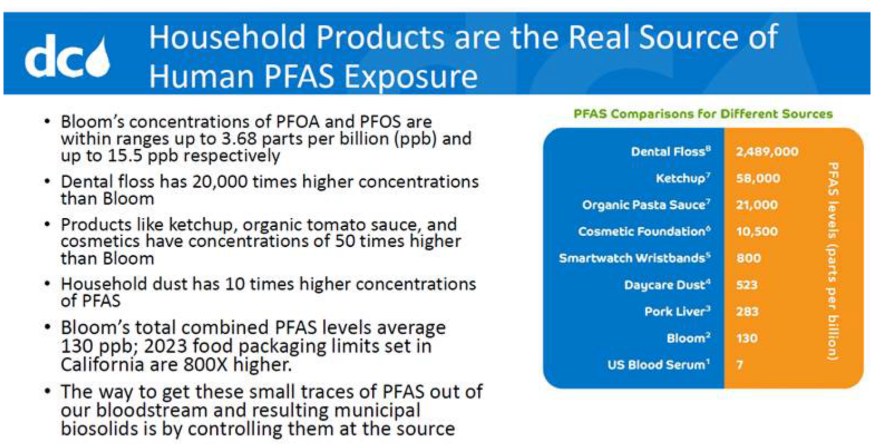
Water and wastewater plants do not use PFAS chemicals. They enter our facilities through source water (water plants) and from societal flows to our wastewater plants. In most cases, the majority of PFAS loadings come from residential/non-industrial flows to our wastewater plants. While sources of PFAS vary, one thing is certain: public water and sewer utilities are passive carriers of PFAS chemicals.

Despite not using PFAS chemicals, water and sewer utilities are working tirelessly to reduce PFAS levels in our drinking water, wastewater, and biosolids.

PFAS chemicals have been around for approximately 80 years but have been on the wane in terms of production and usage during the past twenty years.

Since 2000, federal testing data show that PFOA and PFOS levels in our bodies have dropped 90+ percent. Americans' PFAS body burdens are a very small fraction of what they were just 20 years ago. This impressive PFAS reduction trend should accelerate, given the litigation and regulatory focus on these chemicals over the past several years in particular. The risk we face as a society in general from these chemicals has never been lower and is relentlessly diminishing even further.

Typical consumer products and foods have PFAS levels that are orders of magnitude higher than those in drinking water, wastewater, and even biosolids. The following chart provides information from DC Water comparing their biosolids fertilizer/soil amendment product "Bloom" with PFAS levels in a variety of consumer products and foods.



Biosolids are either landfilled, land-applied, or incinerated. There are advantages and disadvantages to each approach.

The land application of biosolids delivers significant benefits – see below – such that almost 50 percent of the material produced annually in the United States is land applied. The remainder is either incinerated or landfilled.

Contrary to the significant multiple benefits from land applying biosolids – a practice in this country since the colonists arrived at Jamestown, Virginia - there is little benefit to landfilling biosolids (other than as potential daily cover) or incineration. Moreover, there can be significant challenges in trying to landfill low-percent solids biosolid materials. Also, most states do not have landfill capacity to accept biosolids. States are also reluctant to permit new biosolids incinerators.

Because the benefits of land application significantly outweigh any PFAS (or other) risks from biosolids, it remains the best reuse practice for these materials while we all work to relentlessly lower PFAS levels in biosolids.

Long-chain PFAS chemicals (PFOA and PFOS), which are of primary concern to US EPA, are found in municipal biosolids, and when land applied, those long-chain PFAS bind to the surface soils (first few feet). These PFAS chemicals generally do not threaten groundwater used for public water supply.

Because PFAS move with the soil they are bound to, we have excellent tools to manage their movement through our soil loss prevention programs. For example, the use of buffers, slope restrictions, ceiling capacities for PFAS of concern in biosolids, and application loading restrictions all can help to minimize PFAS-related concerns from the land application of biosolids.

Research has also indicated that PFAS from the land application of biosolids do not end up in the fruit/seeds of crops (there is PFAS uptake in stalks and leaves). This is generally good news because human consumption focuses on the fruits/seeds.

Everything we do brings some risk. Our PFAS-related risk as a society has plummeted overall and will continue to decline in the years ahead. Any PFAS-related risks from the land application of biosolids can be managed through best management practices regarding the level of solids-bearing PFAS we apply, using tailored buffers, limiting ceiling concentrations, and, where necessary, application/loading rates.

A summary of the benefits of land applying biosolids follows.

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Benefits of Land Applying Municipal Biosolids

- Biosolids replenish organic matter in soil that has been depleted.
- Biosolids provide nitrogen, phosphorus, and potassium – the key nutrients that plants need to thrive.
- The organic, slow-release nitrogen and phosphorus in biosolids are absorbed more efficiently by crops than chemical fertilizers
- Biosolids provide beneficial trace elements such as calcium, magnesium and iron, typically not found in chemical fertilizers.
- Organic nutrients are less water-soluble and, therefore, less likely than chemical fertilizers to leach.
- Biosolids hold nutrients near the roots, where plants need them.
- Biosolids improve soil structure, including increased porosity.
- Biosolids use sequesters carbon and reduces dependence on chemical fertilizers
- Frees up much-needed space in landfills.
- Provides an opportunity for farmers and cities to work together in a cooperative venture that benefits both groups.
- Supports the financial viability of family farming
- Subsidizes food prices

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