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## MICHIGAN

# Study: Potentially harmful 'forever chemicals' found in popular garden fertilizers

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Some common garden fertilizers sold by major retailers have concerning levels of PFAS compounds, so-called "forever chemicals" that last in the environment for decades and potentially harm health, a new study has found.

The fertilizers in question contain biosolids — sewage sludge sold by wastewater treatment plants after it has been dried and treated for biological contaminants. But it's often not treated for per- and polyfluoroalkyl substances — PFAS — compounds used in a host of commercial products for waterproofing and grease resistance, as well as in many industrial applications. The PFAS compounds have been tied to cancer and other health problems.

It's not just a potential problem for those growing their own fruits and vegetables. The PFAS levels found in biosolids coming from wastewater treatment plants around the country point out the degree to which the chemicals continue to flow from industrial waste streams — and the lack of filtration at the factory or the wastewater treatment plant to remove the chemicals. The environmental nonprofits behind the study present Michigan as a model for other states to follow in identifying and requiring treatment from large industrial contributors of PFAS wastewater.

For their research, the Ann Arbor-based environmental nonprofit Ecology Center, along with the Sierra Club, purchased nine garden fertilizers from eight states and the District of Columbia, and sent it to a contracted laboratory for PFAS analysis:

Pro Care All Natural Fertilizer, made up of 85.5% to 91.5% biosolids from an unknown source, purchased at Lowes

Ecocraps Slow Release Fertilizer, made up of 100% biosolids from an unknown source, purchased at Home Depot

Milorganite 6-4-0 Fertilizer, made up of 100% biosolids from the Milwaukee Metropolitan Sewerage District, purchased at Home Depot  
Cured BLOOM Soil Conditioner, made up of 100% biosolids from DC Water's Blue Plains Advanced Water Treatment Plant, purchased at W.S. Jenks & Sons in Washington  
Menards Premium Natural Fertilizer, made up of 100% biosolids from an unknown source  
GreenEdge Slow Release Fertilizer, made up of 100% biosolids from the JEA sewer collection system in Jacksonville, Florida, purchased at Home Depot  
Earthlife Natural Fertilizer, made up of 100% biosolids from the New England Fertilizer Co. of Quincy, Massachusetts; purchased at York Woods Tree & Products, Eliot, Maine  
Synagro Granulite Fertilizer Pellets, made up of 100% biosolids from Sacramento (California) Pelletizer  
TAGRO Mix, made up of 50% biosolids from the Tacoma Central Wastewater Treatment Plant in Washington, purchased at Ace Hardware.

"Eight of the nine products exceeded screening limits for chemicals PFOS or PFOA set in Maine, the U.S. state with the most robust action on PFAS in biosolids," the study states. "The chemicals were measured at levels that would not be acceptable for the state's agricultural soils."

Only Synagro Granulite Fertilizer Pellets met the tough Maine standards for biosolids for both PFOS and PFOA.

Home gardeners, therefore, might be adding another route for harmful PFAS compounds to enter their bodies through the fertilizers they use — often dubbed "natural" — and the fruits and vegetables they grow that absorb those compounds, said Gillian Zaharias Miller, senior scientist with the Ecology Center.

"The bigger message is, as long as we keep using products that use PFAS, like our waterproof clothing, our nonstick cooking utensils, and so many other commercial and industrial applications, we will have all of these chemicals come back to us," she said. "We can't get rid of them."

Though PFOS and PFOA, the most studied and understood of thousands of PFAS compounds, were detected in the blood of more than 99% of Americans sampled, the suspected source of PFAS turning up in biosolids from wastewater treatment plants is from industrial effluent.

There are no federal regulatory standards for PFAS compounds in drinking water or sewer sludge. The U.S. Environmental Protection Agency has begun to consider biosolids standards for PFOS and PFOA, a process that might take years.

Maine's standard — biosolids exceeding 2.5 parts per billion for PFOA or 5.2 parts per billion for PFOS are not allowed on agricultural fields — was developed after high-profile incidents where dairy and beef farms in the state were forced to close when milk from the farms tested with high levels of PFAS compounds. In a 2020 incident, a farm's milk tested had PFOS levels at 153 times Maine's standard for determining that milk is "adulterated" and unfit for sale. The contamination was traced to cows feeding on plants that were grown on fields spread with PFAS-containing biosolids fertilizers.

Eight of the nine garden fertilizers tested by the Ecology Center and Sierra Club had levels of PFOS or PFOA that exceeded the Maine biosolids standard, and three exceeded it for both chemicals:

Cured BLOOM with 23.8 parts per billion PFOA, 22.1 PFOS.

Earthlife Natural Fertilizer with PFOA at 2.75 ppb, PFOS at 17.3 ppb.

TAGRO Mix at 7.51 ppb PFOA, 7.92 ppb PFOS.

None of those fertilizers sampled, however, would exceed Michigan's standards. Michigan in March presented an interim strategy for land application of biosolids containing PFAS. It calls for stepped-up testing of biosolids at wastewater treatment plants, prior to their application to fields.

"The state of Michigan's approach for addressing PFAS in municipal wastewater and associated residuals (biosolids/solids) is to control significant industrial sources of PFAS, specifically PFOS/PFOA, before they are discharged to the" treatment plant, said Scott Dean, spokesman for the Michigan Department of Environment, Great Lakes and Energy.

Under Michigan's plan, biosolids with PFOS levels above 150 parts per billion cannot be applied. Those above 50 parts per billion but less than 150 require investigation of potential sources for the PFAS, and land application rates of no more than 1.5 dry tons per acre. Those above 20 parts per billion but below 50 parts per billion should "consider investigating sources and sampling the (wastewater treatment plant) effluent for PFAS."

Under Michigan's program to identify high PFAS levels at wastewater treatment plants, and determine the industrial sources upstream of those compounds, PFOS exceedances were reduced by 99% at four treatment plants: Ionia, Lapeer, Port Huron and Wixom, and by 92%

to 96% at plants in Kalamazoo, Howell and Bronson. Treatment consists of granular activated charcoal filtration at the source of the PFAS.

"Michigan has paid some attention — more than a lot of states — to PFAS in all kinds of water, including wastewater," Miller said. "Its industrial pretreatment program has had some success in reducing the levels of those (PFAS) compounds in wastewater effluent. It's ignored in most states."

The Sierra Club and Ecology Center are calling for the federal government to "urgently act to end PFAS uses in commerce and releases from industrial sites;" for states to better regulate PFAS; for wastewater treatment plants to investigate sources of PFAS discharges into their systems, as Michigan does, and for agricultural producers to "not apply biosolids to their crop and pasture lands.

"Doing so risks permanently contaminating their soils with PFAS and other long-lasting chemical contaminants," the report states.

Gardeners are advised to check the "guaranteed analysis" on any fertilizers and consider avoiding those using terms like "biosolids," "residuals" or "municipal waste."

A message left with The Fertilizer Institute, an Alexandria, Virginia-based trade group for the fertilizer industry, was not returned Monday.

Linda Birnbaum, a toxicologist and former director of the federal National Institute of Environmental Health Sciences and National Toxicology Program, said the findings of the new study concern her.

"Some of (the PFAS) is going to be taken up by the root of the plant, some of it is going to be on the leaves, some of it is going to wash off and get into groundwater and surface water," she said.

"Until we start reducing the input of these chemicals into the environment, we will continue to have problems."

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