

# Researchers find indicator of polyfluoroalkyl substances in some period products

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Period products come in a variety of styles—liners, pads, tampons, cups and underwear—to help people feel comfortable during a menstrual bleed. But their labels don't usually list the ingredients, so consumers don't know what's in their product of choice.

Now, researchers have analyzed over 100 [period](#) products for fluorinated compounds, an indicator of potentially harmful per- and polyfluoroalkyl substances, or PFAS. Their results show that while PFAS are absent from many products, they might be accidentally or intentionally added to others.

The researchers present their results at the fall meeting of the [American Chemical Society](#) (ACS).

"Of course, you're concerned for the wearer, but we're also concerned about the [ecological impact](#) because PFAS are 'forever chemicals,'" says Graham Peaslee, Ph.D., the principal investigator of the project. "Once these products are thrown away, they go to landfills and decay, releasing PFAS into groundwater. And we, or later generations, could end up inadvertently ingesting them."

PFAS are a category of over 12,000 compounds that have stick-, stain- and water-resistant properties, which are desirable characteristics for some products. But because these compounds don't break down easily in the environment or our bodies, they are persistent and bioaccumulative—hence the "forever chemical" moniker. Researchers have also linked exposure to PFAS with an increased risk of negative health outcomes, including some cancers and immune suppression.

Currently, there are few regulatory limits on including PFAS in textiles or period products in the U.S. or Europe. And when it comes to personal products like these, people are concerned about what goes into them, says Peaslee, which is why his research team at the University of Notre Dame started testing them for PFAS.

While it's not known how much PFAS could pass from different materials through the skin, the team has found these compounds in firefighting gear, school uniforms and period underwear. And other

researchers have detected PFAS in additional period products, such as tampons and pads.

So, Alyssa Wicks, a graduate student in Peaslee's lab who is presenting at the meeting, wanted to expand the analyses to a larger variety of period products that haven't been widely tested, including the packaging for single-use tampons and pads, as well as reusable options, such as menstrual cups.

"Our first step was a screening that's done quickly and simply," says Wicks. "We determined if these products had organic fluorine as a surrogate for PFAS." She cut out a small portion of each item and analyzed it in less than three minutes, using particle-induced gamma-ray emission spectroscopy.

Some pads and period underwear had multiple layers, which were sampled separately. For instance, some of the tested underwear products had as many as 10 layers, though the average was closer to four. Additionally, the researchers measured total fluorine in the single-use product's wrappers. So far, Wicks has analyzed 123 period products sold in the U.S., 30 of which were different underwear, with this technique. She also plans to analyze similar products sold in Europe.

The results of these analyses suggest that some period products potentially include PFAS, but not all of them. "In general, tampons didn't seem to contain fluorine," says Wicks. "Same with menstrual cups and the layers of pads that come in contact with a person's skin."

Most surprising to the researchers was the presence of total fluorine in the wrappers for numerous pads and some tampons, as well as the outer layers of some of the period underwear. Some of the highest amounts measured were 1,000 to several thousand parts per million total fluorine.

Because of those high concentrations, Wicks hypothesizes that PFAS might be used to keep moisture out of the wrappers so that the items inside remain dry. In addition, she suggests that adding these compounds to the outer layer of the period underwear would keep blood from escaping the inner layers and stop it from spreading onto a person's clothing.

This initial work has allowed the researchers to home in on which period products likely have PFAS in them. Next, the team will analyze the samples that contained measurable amounts of fluorine specifically for 40 individual PFAS compounds.

In the meantime, the team notes it is interesting that some products tested in the study were actually free of fluorine. "It's clear that PFAS are not essential," concludes Peaslee. "Feminine products are essential, but the need for a fluorinated wrapper, or the need for a fluorinated layer, doesn't seem to be, because plenty of them are made without relying on these compounds."

**More information:** Rapid detection and targeted analysis of fluorinated compounds in feminine hygiene products, ACS Fall 2023. [www.acs.org/meetings/acs-meetings/fall-2023.html](http://www.acs.org/meetings/acs-meetings/fall-2023.html)

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