Press Release

A scientific study examines the presence of plastic additives in menstrual products

- **Researchers from IDAEA-CSIC detect a wide range of plastic additives in both single-use and reusable menstrual products.**
- **The study indicates that dermal contact may be a relevant exposure pathway to these compounds and recommends further research in this field to better understand their absorption in the human body.**

Single-use and reusable menstrual products / Lara Cioni

Barcelona, October 22, 2025. Researchers from the Institute of Environmental Assessment and Water Research (IDAEA-CSIC) have examined plastic additives present in single-use (such as pads, panty liners, and tampons) and reusable (such as menstrual cups, period underwear, and cloth pads) menstrual products, with the aim of assessing exposure to these contaminants through dermal contact during product use and evaluating the environmental impact once these products become waste or are washed for reuse.

Menstrual products are essential for half of the world's population for several days each month and throughout a long period of their lives. Their continuous use, in direct contact with vaginal and vulvar tissues, which have a higher absorption capacity than the skin, makes these products a potential route of exposure to chemical substances present in their composition. Among them are phthalates, a group of plasticizers that includes some compounds already regulated in the European Union for acting as endocrine disruptors and being linked to reproductive and gynecological disorders and an increased risk of cancer. In this new study, in addition to phthalates, two other families of plasticizers have been investigated for the first time in menstrual products:

organophosphate esters, which can also act as endocrine disruptors, and alternative plasticizers, for which little is still known about their potential toxic properties.

The results of the study, published in the journal *Environmental Science and Technology*, indicate the presence of plastic additives in all 41 menstrual products analyzed. The highest total concentrations were found in reusable pads, followed by single-use pads, panty liners, and period underwear, while the lowest were found in menstrual cups and tampons. Alternative plasticizers were the dominant additives in disposable products, reflecting their widespread use to replace conventional plasticizers that are regulated or considered of concern for human health. However, recent studies suggest that these alternative compounds may also pose toxicological risks.

The researchers emphasize that the presence of these compounds in all the analyzed products is relevant from a human exposure perspective. Preliminary studies with other consumer products have shown that the amount of plasticizers that can transfer to the skin through dermal contact can vary between 6% and 97%, depending on the plasticizer and the material; however, data for menstrual products are still lacking.

“In menstrual products, we have identified substances of concern for human health that had not been studied before. Our results highlight a new route of exposure to toxic compounds that needs to be investigated further to assess potential risks to human health. It is important to continue researching to understand whether dermal exposure poses an additional risk to the already known exposure pathways such as diet, air inhalation, or dust ingestion,” explains **Ethel Eljarrat**, director of IDAEA and author of the study.

“Moreover, it is important to take into account that these products are used during fertile stages of life and that this exposure could be relevant to reproductive health, as exposure to endocrine disruptors may lead to negative effects on reproduction,” adds Eljarrat.

Environmental impact under asessment

The research also focuses on the environmental impact derived from the use and disposal of menstrual products. The detected plastic additives may be released both through the washing of reusable products and the disposal of single-use ones, contributing to their accumulation in wastewater and their release into both aquatic and terrestrial ecosystems.

The results show that single-use products cause a greater environmental impact due to their high consumption and the presence of additives also in their plastic packaging. Reusable products release fewer additives, although they release some of their chemicals into the water during washing. “Among all the analyzed products, menstrual cups are the option with the lowest environmental impact, with an average release of 0.16 milligrams of plasticizers per woman per year, while pads, with an average release of 18.5 milligrams per woman per year, are those causing the highest environmental impact,” notes **Lara Cioni**, IDAEA researcher and first author of the study.

“The chemical content is only one part of the environmental footprint of these products, but it is highly relevant, even though it is often not included in environmental impact assessments. It is essential that the chemical composition of these products becomes

more transparent so that this information can be incorporated into life-cycle analysis and used to properly evaluate the overall impact of menstrual products," adds the researcher.

With this study, the researchers stress the importance of continuing to study the chemical safety of menstrual products, considering both human health and environmental impact. "Our research now focuses on developing methods that allow us to determine the percentage of compound transfer from the product to the skin and absorption through vaginal tissues," says Eljarrat. In fact, **Lara Cioni** is currently investigating, through the *MSCA Postdoctoral Fellowship* funded by the European Union, the presence of another class of chemicals of concern for human health—perfluorinated substances (PFAS)—in these same menstrual products, and how these compounds transfer from the products to the skin.

Cioni L., Calvo J., Eljarrat E. (2025). **Plastic additives in single-use and reusable menstrual products: potential implications for human health and the environment**. *Environmental Science and Technology*. DOI: doi.org/10.1021/acs.est.5c09064

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