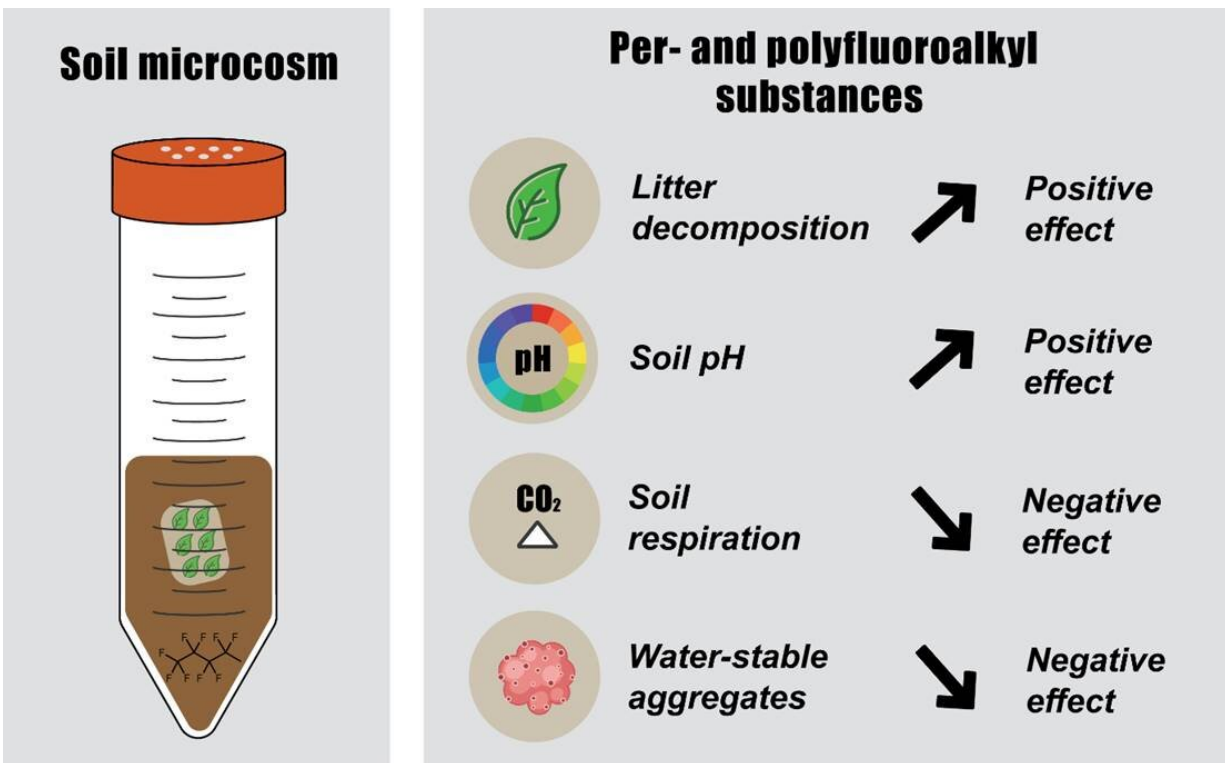


Examining the effects of PFAS 'forever chemicals' on soil structure and function

July 5 2022



In the test soil microcosm, per- and polyfluoroalkyl substances (PFAS) affected soil properties and microbial processes. Credit: Rillig Lab

Soils are impacted globally by several anthropogenic factors, including chemical pollutants. Among those, perfluoroalkyl and polyfluoroalkyl substances (PFAS) are of concern due to their high environmental

persistence, which are therefore also called "forever chemicals" in public discourse. However, their effects on soil structure and function have been largely ignored. A recent study by Dr. Baile Xu and his colleagues at Freie Universität Berlin showed that PFAS impact microbially-driven processes in soil, including soil respiration, litter decomposition, and soil structure, as well as soil pH. These findings of significance in the fields of Soil Science, Environmental Science, Ecology, and Global Changes were released in *Soil Ecology Letters*.

One of the important findings of Dr. Xu's study is that they found that PFAS significantly increased litter decomposition, a keystone ecosystem process in [soil](#), even at 0.5 ng g^{-1} for perfluorobutanesulfonic acid. This result deserves wide attention, since it probably means that PFAS present in soils now might already affect ecosystem processes, given their current environmental levels. Consequently, the associated nutrient cyclings (e.g., C and N) in soil are likely to be impacted.

Another interesting result is that the acidic PFAS significantly increased soil pH, instead of decreasing it. "Given the strong acidity of PFAS, it is unexpected to observe such a phenomenon," says Dr. Xu. They suppose that this was attributed to the direct consequence of increased litter decomposition, but not of PFAS. A stronger correlation of soil pH with litter decomposition than with PFAS concentration partially validated the assumption. Additionally, PFAS also exerted detrimental impacts on [soil respiration](#), microbial population and more importantly, soil water-stable aggregates.

"As these basic but vital processes and properties are affected by PFAS presence, we have to highlight the possibility of PFAS as persistent chemicals being a potential environmental change factor," says Dr. Xu. He also mentions that this study is actually a very beginning to investigate the potential impact of this "forever chemical" on our terrestrial ecosystem functioning. "We hope that our interesting findings

can inspire more studies to consider the impact of PFAS on soil ecosystem functions in the context of global patterns of contamination," he says.

More information: Baile Xu et al, Effects of perfluoroalkyl and polyfluoroalkyl substances (PFAS) on soil structure and function, *Soil Ecology Letters* (2022). [DOI: 10.1007/s42832-022-0143-5](https://doi.org/10.1007/s42832-022-0143-5)

Provided by Higher Education Press

Citation: Examining the effects of PFAS 'forever chemicals' on soil structure and function (2022, July 5) retrieved 10 April 2024 from <https://phys.org/news/2022-07-effects-pfas-chemicals-soil-function.html>

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