World Soil Day -- December 5

# Digging Deep to Protect a Fundamental Source of Life

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- This #WorldSoilDay, the @United Nations is raising awareness of the role played by soil and water in achieving sustainable and resilient agrifood systems.
- The health of soil is critical in growing crops and cultivating food for humans. Monitoring and testing the soil to ensure it has key nutrients for growth and is not contaminated with chemicals is critical.
- Agilent is proud to collaborate with researchers globally and offer robust methods that provide data on soil contaminants and nutrients at trace levels to allow scientists and regulators to make informed assessments on their use.

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Healthy soils are a critical ecosystem service provider, helping absorb carbon emissions, reverse biodiversity loss, and even utilize water storage and purification. Together, soil and water are the source of over 95 percent of global food supplies[1], but they – and the future of our entire agrifood system – are at risk.

In Europe, over 60% of soils are classified as unhealthy[2] due to unsustainable land management, pollution, and overexploitation. With the 2024 European elections around the corner, attention is turning to whether the EU will achieve its green farming ambitions ahead of this parliamentary change and how this will continue to be advanced.

As contaminants multiply and become subject to increasingly stringent regulation, there is a growing need for analysis that sets new standards in terms of precision and speed. This is precisely where Agilent has invested

[1] https://www.un.org/en/observances/world-soil-day
[2] https://environment.ec.europa.eu/topics/soil-and-land/soil-health

decades of expertise to deliver faster, more reliable, and more cost-effective solutions across the food value chain.

This begins with soil testing – a complex discipline that requires sensitive solutions, optimized for chemical analysis ranging from trace toxic metals to contaminants, including microplastics, per- and poly-fluoroalkyl substances (PFAS), and pesticides.

Agilent provides a comprehensive suite of products and unique capabilities to assist labs with the development and deployment of robust methods to identify, quantify, and profile pollutants in soil. Solutions for analyzing soil, sediment, and solid waste contaminants and their effects on human health and crops, which is critically important for environmental monitoring.

The scope of soil testing can range from the analysis of trace toxic metals to organic contaminants, including polycyclic aromatic hydrocarbons (PAHs), microplastics, nanoparticles, per- and polyfluoroalkyl substances (PFAS), pharmaceuticals, and personal care products as well as many unknown and emerging contaminants.

If we look at PFAS specifically, there is growing evidence that the natural breakdown of PFAS in the environment is very slow, causing build-up in people, animals, and the environment. A report published earlier this year found the global direct healthcare costs associated with treating human exposure to PFAS is €16 trillion annually[3].

Until recently, US regulators were largely focused on tackling PFAS contamination of drinking water. However, PFAS analysis is shifting. A nonprofit Environmental Working Group study estimated PFAS could be contaminating nearly 20 million acres of US cropland[4]. This has led to announcements from the US Environmental Protection Agency of $8 million in new research funding to assess how these “forever chemicals” affect plants and animals across the country. Researchers have said this is an excellent signal to the research community that understanding PFAS’ impact on soil health is increasingly important[5].

Wider across the world, the United Nations has found there are policy gaps when it comes to many countries’ capacity and activities to manage soil pollution. While legislation on this is a priority for most, there is a lack of cohesion to defining soil pollution, with differences across agriculture and industrial processes[6].

While there may still be some policy gaps that need to be addressed, it’s clear that continuous investment in innovation is critical to advancing scientific developments and providing clear technological support to environmental regulations. Agilent is proud to be front and center in developing these much-needed new techniques.

Agilent provides robust methods that deliver unbiased data on PFAS pollutants at trace levels allowing scientists and regulators to make informed assessments of their use. Meanwhile, to enable organizations to stay ahead of regulations, Agilent has also developed complete workflows for extracting, cleaning, screening, quantifying, and reporting PFAS in soils, sediment, and solid matrices. Certain regulatory methods, including ASTM 7968, allow for rapid analysis of PFAS in soils, solids, and sediments by direct injection. The sensitivity of Agilent triple quadrupole LC/MS systems ideally achieves the low detection levels needed for direct injection.

But the challenges don’t end with soil analysis. Much of the food today is provided through complex global food production, processing, and distribution systems. Agilent provides instrumentation, software, services, and support to help testing labs and manufacturers meet evolving food safety testing challenges, including testing for

[3] https://chemsec.org/reports/the-top-12-pfas-producers-in-the-world-and-the-staggering-societal-costs-of-pfas-pollution/
[4] https://www.ewg.org/news-insights/news/2022/04/ewg-forever-chemicals-may-taint-nearly-20-million-cropland-acres
[5] https://insideclimatenews.org/news/30102023/epa-to-fund-studies-of-toxic-forever-chemicals-in-agriculture/
[6] https://www.fao.org/3/cb4894en/online/src/html/chapter-06-7.html

pesticide residues against a growing list of target compounds and meeting stringent regulations that drive lower detection limits.

Agilent's multi-class, multi-residue pesticide testing methods based on LC/MS and GC/MS, are designed to give manufacturers a leg up on routine monitoring, enabling high-throughput, sensitive detection levels, and rapid quantitative analysis for hundreds of pesticides in a single sample. These testing solutions help labs develop and deploy robust methods to identify, quantify, and profile a wide range of pollutants in soil, contributing to the overall understanding and preservation of soil health.

To find out more about soil testing this Dec 5 #WorldSoilDay, visit

https://www.agilent.com/en/solutions/environmental/soil-sediment-solid-waste-testing