Science Societies

Organic matter chemistry controls CO2 flush

February 2, 2020



Graduate student growing plants in the greenhouse.

For producers interested in monitoring biological soil health, a good indicator of general microbial activity is the CO_2 flush, which is the amount of CO_2 released after rewetting dried soils. While relatively inexpensive, rapid, and easy for laboratories to collect, CO_2 flush data is challenging to interpret because multiple factors may affect its magnitude. In particular, the amount and chemical composition of soluble organic matter may affect measurements.

In an article recently published in the *Soil Science Society of America Journal*, researchers report on using ultrahigh resolution electrospray ionization Fourier transform ion cyclotron resonance mass spectrometry to monitor chemical changes in soluble soil organic matter during the 48-hour period after rewetting of dried soil from a greenhouse experiment. Soluble soil organic matter, the most available pool to microbes, consists of thousands of different molecules, for which chemical formulas were assigned.

The largest fraction was chemically similar to lignin, suggesting that the soluble organic matter in rewetted soil was derived from soil organic matter rather than from dead microbial cells. Nitrogen-containing molecules were about 7% of the total, and this fraction was depleted to near zero by 48 hours.

The rate of CO_2 release was influenced more by the nitrogen-containing fraction than the total amount of soluble organic matter, supporting the use of the CO_2 flush as an indicator of soil nitrogen availability.

Dig Deeper

Laffely, A., Erich, M.S., and Ohno, T. (2020). Dissolved organic carbon chemical composition controls the rate of CO_2 release from rewetted soil. *Soil Science Society of America Journal, 84*. **https://doi.org/10.1002/saj2.20035**

More science articles

Back to issue

Back to home

Text © . The authors. CC BY-NC-ND 4.0. Except where otherwise noted, images are subject to copyright. Any reuse without express permission from the copyright owner is prohibited.