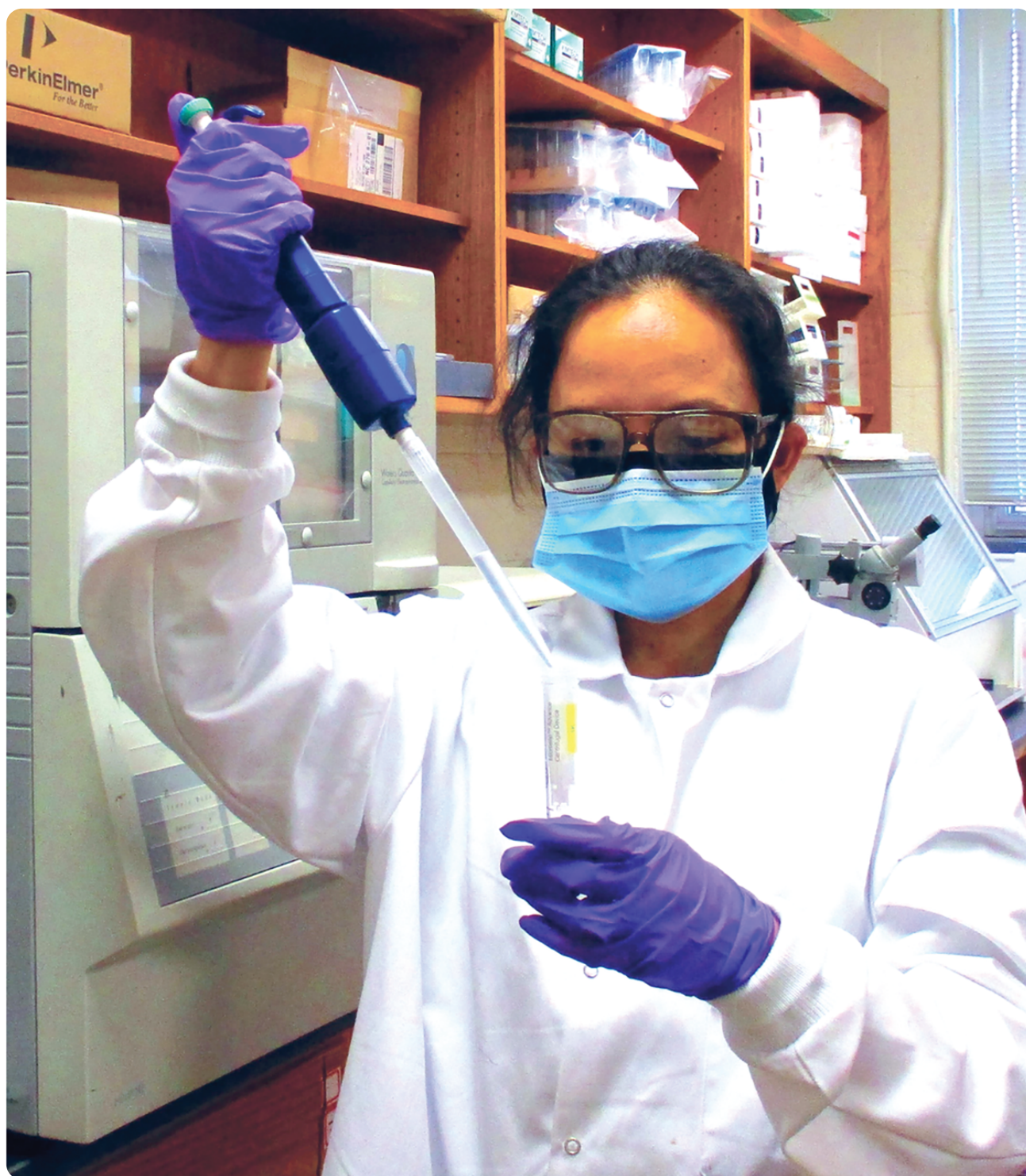# Original and new AVAIL formulations varied in solubilizing phosphate

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*Lead author of the study, Dr. Sarah Doydora, in the process of measuring complexation of dissolved metals by AVAIL using sequential filtration. Photo by Aakriti Sharma.*

In a given year, the intended crops take up less than 40% of commercial phosphate fertilizers applied to soils because of strong phosphate retention by soil solids. Phosphate fertilizer additives such as AVAIL polymers are designed to decrease soil retention, but results from numerous laboratory and field studies are inconsistent.

In a recently published article in the *Soil Science Society of America Journal,* soil chemists presented their findings from laboratory research comparing the effectiveness of various types and levels of AVAIL polymers in dissolving adsorbed and precipitated forms of phosphate, along with insights on chemical mechanisms.

The researchers found that the original AVAIL formulation was more effective in solubilizing phosphate adsorbed on ferrihydrite while a new AVAIL formulation for liquid fertilizers was more effective for phosphate adsorbed on Al hydroxide or in Ca phosphate. Regression models suggested that phosphate solubilization is driven by aqueous metal–polymer complexation and competitive adsorption mechanisms.

Given the ongoing controversy over the effectiveness of AVAIL, the researchers stressed the importance of considering levels of added polymer charge relative to a soil's phosphate adsorption capacity or types of metal phosphate species formed.

### Dig Deeper

Doydora, S., Thompson, M., & Hesterberg, D. (2020). Phosphate solubilization from adsorbents and precipitates by different AVAIL polymers. *Soil Science Society of America Journal.* https://doi.org/10.1002/saj2.20168

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