I found the recent article in Microbe (April 2015, p. 178) in the Small Things Considered section (“Microbe, Enzyme or Mineral? a Riddle in the Soil”) interesting and appreciated the focus on extracellular enzymes in soils. However, the presentation leaves the reader with the impression that the paper reviewed (J. Blankinship et al., Soil Biol. Biochem. 71:68 –75, 2014), is the only research done on the topic and that this is new research; specifically, “the first study that rigorously attempts….”

I would point out that Douglas McLaren at UC Berkley was the first to fully investigate this topic starting in the 1950s with gamma irradiation (the same method used by Blankinship et al.) and did research on extracellular enzyme stabilization in the soil matrix for more than 15 years. A seminal paper on this was McLaren et al. (1962) that utilized gamma irradiation. There have been others, such as Jeff Ladd and Ralph Foster in Australia, who used fluorescence and microscopy to visualize extracellular enzymes in soils at nanometer scales. John Skujinš at Utah State worked through the 1970s and 1980s on extracellular enzymes in soils and published a comprehensive book on this topic in the 1970s. M A Tabatabai was the first to use chloroform fumigation as a sterilizing agent in relation to soil enzymes (the same method used by Blankinship et al.) and spent his whole career working on extracellular enzymes. Tom Speir in New Zealand and later from my lab, we used microwave irradiation to study stabilized enzymes. Besides the numerous research papers, a number of books have chapters that review the research and theory of extracellular enzymes in soils. Some of the key papers and books on this topic are listed below.


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