Spring 2026

Biochemistry and Molecular Biology Brown Bag Series

Michael Schmidt, Ph.D.
Associate Professor

"Simple Phenols in Nature: Exploring Biotic and Abiotic Decomposition"

Tuesday, February 17, 2026

11:00 AM

103 Biological Sciences Building

Lab: Michael Schmidt, Ph.D.

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https://science-math.wright.edu/biochemistry-and-molecular-biology

Abstract

Plant secondary metabolites are a diverse class of compounds, ranging from small phenols to complex polymers such as tannins. Smaller phenolic acids can function as substrates for soil microbes and enzymes, influencing carbon cycling and organic matter formation. To evaluate how specific functional groups affect degradation pathways, we examined the breakdown of three model phenols—pyrogallol, gallic acid, and benzoic acid—under biotic and abiotic conditions. Pyrogallol consistently formed a stable quinone in both environments, whereas gallic acid produced carbon dioxide and smaller amounts of quinone during abiotic degradation. Kinetic analyses demonstrated that both pyrogallol and gallic acid are substrates for the soil enzyme manganese peroxidase (MnP), though they differ in reaction rates and end product; pyrogallol degraded faster and yielded more stable quinone. In contrast, benzoic acid showed no reactivity with MnP. These findings highlight how structural variation among small phenols shapes their environmental transformation.