

WSU Plant Pathology Seminar

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Chitosan as an antimicrobial agent for management of bacterial and fungal pathogens



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Abstract: Invertebrates and fungi can be formidable pests and pathogens of plants (Nazarov et al., 2020), yet they also contain a key compound for controlling fungal and bacterial foes. While chitin primarily serves a structural role in invertebrates and fungi (Moussian, 2019), chitosan, its bioactive derivative, plays diverse functional roles in plants (Ke et al., 2021). Among its most notable properties are its potent antibacterial and antifungal activities. While such a compound may seem akin to “snake oil,” and indeed the exact mechanisms of many of its roles in plant health are not yet well understood, extensive research has demonstrated its efficacy in controlling major plant pathogens. Case studies highlight its effectiveness against the gram-positive bacterium *Streptomyces scabies* (Beauséjour et al., 2003), the gram-negative bacterium *Pseudomonas syringae* (Mansilla et al., 2013), and fungus *Botrytis cinerea* (Lopes et al., 2014). These studies encompass examples of efficacy beyond the bench, in both the greenhouse and field setting, which support the practical applicability of chitosan. In addition, chitosan has been recognized as an organic input by the National Organic Program (National Organic Program, 2007) and classified as a minimum risk pesticide by the Environmental Protection Agency (US EPA, 2022). Given its broad-spectrum efficacy, organic status, and safety, chitosan presents a promising biopesticidal approach for managing plant diseases, particularly in regions where transgenic approaches are legally restricted or not widely accepted by consumers.

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Short biography of Jessica Schallon

Jessica Schallon is a PhD student in the Department of Plant Pathology at Washington State University, where she is advised by Dr. Weidong Chen and co-advised by Dr. George Vandemark. Her research focuses on identifying and characterizing specific *Ascochyta rabiei* genes responsible for virulence on *Cicer arietinum* (chickpea). Motivated by the impact of famine on families and societies, she aims to continue working with staple crops and corresponding pathogens following completion of her current program. Besides her research, she is actively involved in the graduate women in STEM program and serves as the faculty liaison for the Graduate and Professional Student Organization. Outside academia, she is fond of spoiling her rescue cat and community gardening.

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