

Materials Chemistry Seminar

Friday February 9, 2024
11:30 a.m. ~ BRWN 4102

"Exploring Zein-Tannic Acid Adhesives: A Promising and Nontoxic Alternative for Modern Dental Applications"



Myah Webb

Graduate Student, Purdue University

Abstract:

Modern commercial dental adhesives can take on many forms such as cements, glues, and coatings. These adhesive varieties, typically made with methyl methacrylate, are commonly used in a wide array of oral applications. Methyl methacrylate is a skin, respiratory, and ocular irritant. Despite the apparent toxicity to both patient and practitioner, this compound produces the best adhesion for dental applications. Nontoxic alternatives, while safer, currently cannot outperform, or even match, the current compounds employed today. We have previously shown that a zein-tannic acid adhesive has had great success in saltwater environments while being nontoxic and biobased. Our adhesive's active components consist of zein, a protein derived from corn, and tannic acid, a plant-derived phenolic compound. Due to this formulation's success in an aqueous environment, it is an ideal candidate to apply and optimize in dental applications. We have applied our adhesive formulation in oral conditions, which consist of a pH-restricted and fouled environment covered in biofilms, resulting in more adhesion adversity compared to our prior saltwater applications. Even with these constraining factors, we have seen adhesion that varies as a function of tannic acid and zein concentrations. While still in the early stages of optimization this adhesive shows promise in oral applications.

Bio:

Myah Webb is a second-year graduate student. She received her B.S. in Chemistry from the University of Tennessee, Knoxville. During her summers she worked as a lab technician at Kuraray MonoSol where she optimized new water-soluble polymer materials for home and personal-care applications. Upon her arrival at Purdue in 2022, she joined the Wilker Lab where her current work focuses on biobased, nontoxic adhesives for dental applications. In her free time, Myah enjoys watching hockey, reading books, and taking the occasional hike.