2025 ASBC Research Council Funded Project

Research Team: Dr. Joy Waite Cusic, Dr. Chris Curtin
Academic Institution: Oregon State University, Dept. of Food Science & Technology

Project Title: *Non-alcoholic beer: Carbon dioxide/carbonic acid contribution to product safety and stability*

Project Intro:

The non-alcoholic (NA) and low alcoholic (LA) beer category segment is growing and there is interest in expanding packaging and transportation options to create shelf-stable or draft options. By definition, these products lack a key microbial stabilization factor: alcohol. Several publications have indicated that (flat) NA beer can support the growth of Gram-negative foodborne pathogens, specifically *Salmonella* and Shiga toxin producing *E. coli.* Recent work in our lab has demonstrated that fully carbonated (2.7 vol CO2) commercial NA beer (Coors Edge) effectively controls *Salmonella* growth during ambient storage; however, when this same product was partially decarbonated (1.1 vol CO2), *Salmonella* grew rapidly in the product during ambient storage. We hypothesize that the interaction of level of carbonation, pH, and resulting carbonic acid concentration are critical to NA beer safety and microbial stability. There is surprisingly little recent published data on the antimicrobial properties of dissolved carbon dioxide and carbonic acid. Scientific evidence of this phenomenon and identification of critical limits to ensure the microbial safety and stability of these products would support the transition of this product to alternative packaging (i.e., kegs/tap systems) and relieve existing cold-chain requirements.

Project Objectives:

1. Evaluate the interactions of carbonation level, pH, and calculated undissociated carbonic acid in a diverse collection of commercial NA beers (fully carbonated, partially decarbonated, and fully decarbonated) for their impact on Salmonella growth during ambient storage.
2. Evaluate behavior of spoilage bacteria (microbial stability) in NA beer formulation with sufficient carbonation, pH, and undissociated carbonic acid levels to control pathogen growth.