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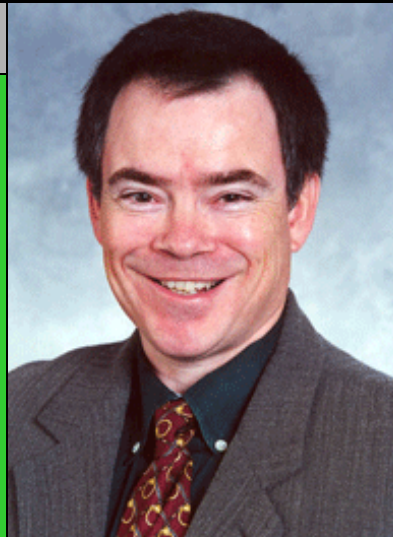


Project Title: *Nanoparticle Systems for Delivery of Biological Antimicrobial Compounds to Limit Microbial Contamination in Industrial Yeast Fermentation*

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Project Outcomes

- *Lactobacillus delbrueckii* subsp *Lactis* ATCC479 exhibited maximal MICs with chitosan (1.87 mg/mL), ϵ -polylysine (0.3125 mg/mL) and nisin (0.05 mg/mL), respectively.
- *L. plantarum* ATCC 8014 had a minimal MICs with CS, ϵ -polylysine and nisin (1.25 mg, 0.156 mg and 0,00156 mg, respectively).
- Nisin significantly reduced most *Lactobacillus* strains by 6 log CFU/mL after 48 hours with the exception of *L. casei* which remained viable.
- From the wide range of the antimicrobials tested against the *Lactobacillus* strains, nisin was the most successful. The nisin alone was effective against most of the *Lactobacillus* strains except *L. casei*.
- EDTA chelator had a synergistic effect on the nisin activity. The EDTA alone was not significantly effective against the *L. casei*. However, the EDTA had a synergistic effect with nisin against the *L. casei* strain in this study (no detectable cells after 24 and 48 hours). The synergistic activity of the EDTA with the nisin might be explained by the action of the EDTA on the cell wall first allowing the nisin to enter the cytoplasmic membrane causing leaks and then cell damage.
- The synergistic effect of nisin with EDTA chelator inhibited nisin-resistant potential contaminant bacteria such as *L. casei*. An MIC of 0.4 mg/mL of nisin combined with the EDTA at an MIC of 1 mg/ml markedly suppressed *L. casei* by 6 log CFU/mL.



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