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Differential Effects of Commercially Available Probiotics on *Listeria monocytogenes* Virulence


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Differential Effects of Commercially Available Probiotics on *Listeria monocytogenes* Virulence

Ashley Zani, Eric Newton, Nathan Wallace, and Dr. Yvonne Sun

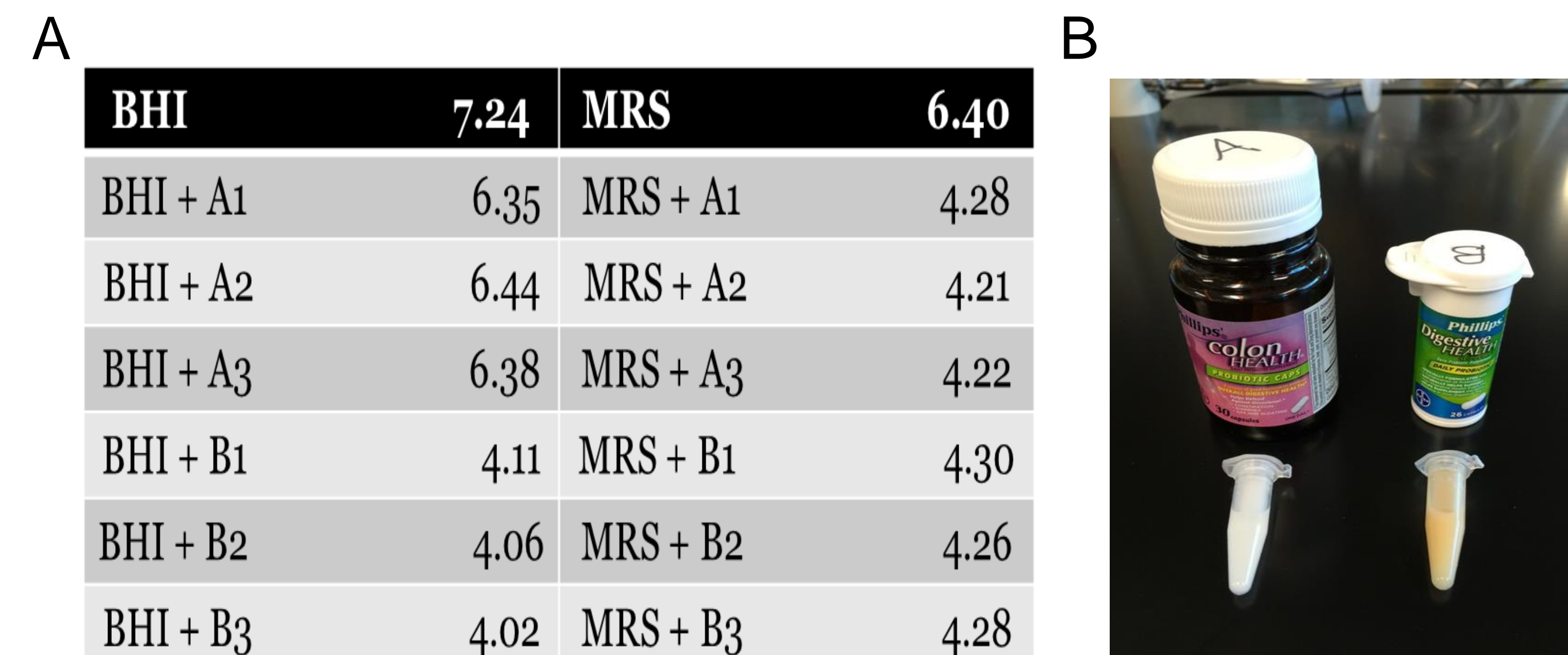
Abstract

Listeria monocytogenes is a foodborne pathogen which localizes in the human gastrointestinal tract and causes lethal infection in immunocompromised individuals. We have evidence that suggests intestinal fermentation acids act as potential signals for *Listeria* virulence regulation. Therefore, we hypothesized that **probiotic bacteria, which generate different fermentation acids, will exhibit different levels of inhibition concerning *Listeria* virulence.**

Background

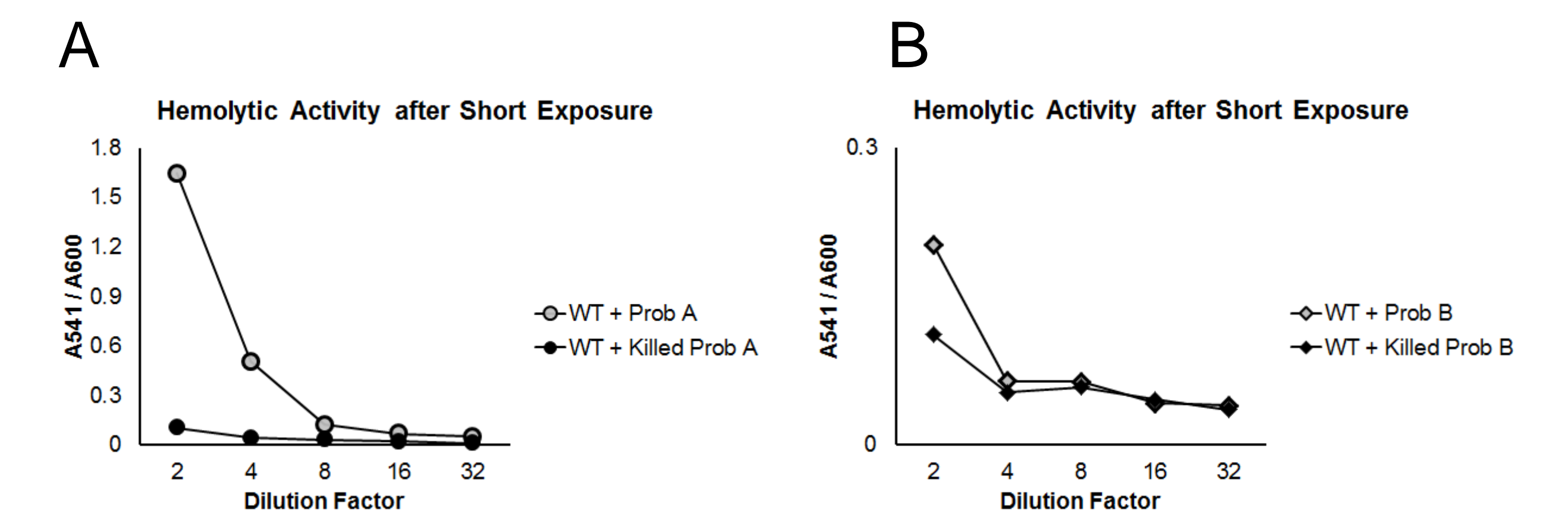
- 1) The gut microbiota provides protection against opportunistic infections.
- 2) Better understanding of how the gut microbiota protects individuals will allow for the development of novel preventative and therapeutic treatments.
- 3) *Listeria* transits through the gastrointestinal tract and is exposed to numerous fermentation acids.
- 4) Once infection begins, *Listeria* produces Listeriolysin O (LLO), a toxin that can be measured as an indicator for virulence activation.

MRS broth supports the growth of both probiotic samples



A: pH differences after overnight growth in two potential media candidates, **B:** photo representation of both probiotics used in the experiment

Exposure of *Listeria* to probiotic supernatant affects toxin production

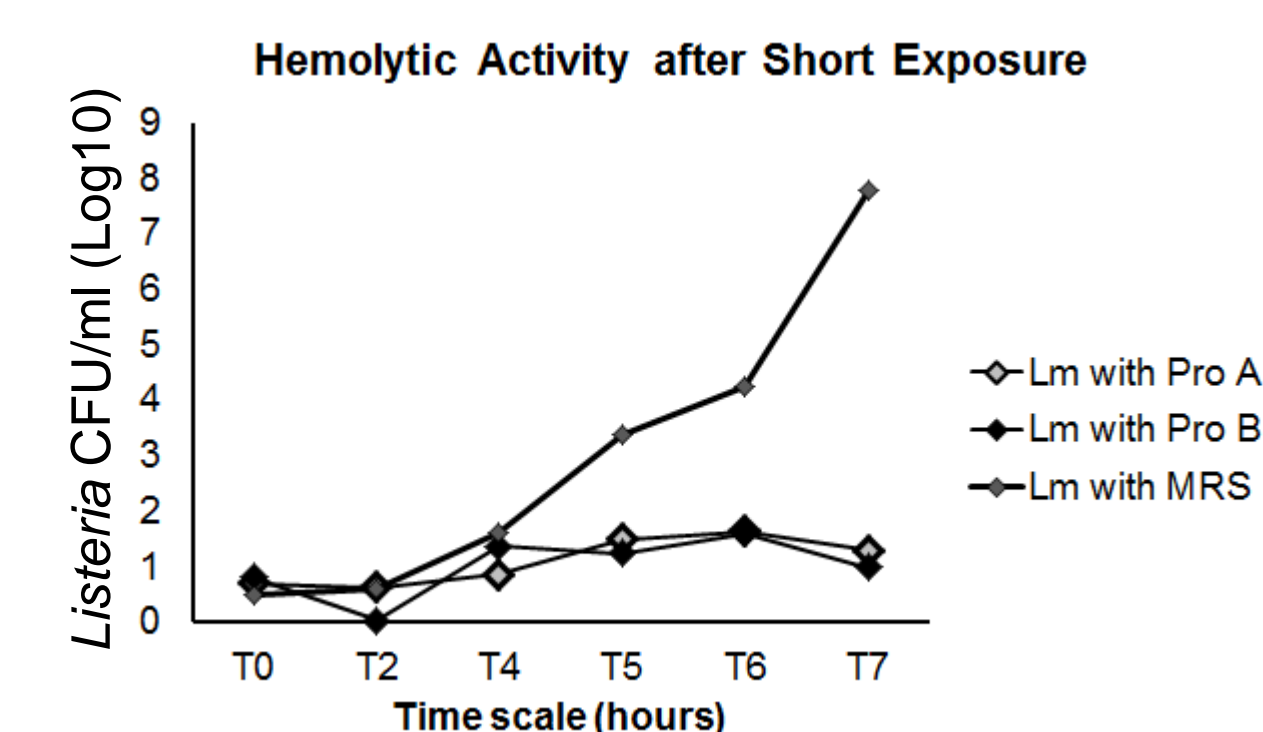


A: Hemolytic assay demonstrates *Listeria* within Probiotic A supernatant, **B:** Hemolytic assay demonstrates *Listeria* within Probiotic B supernatant

Main Findings

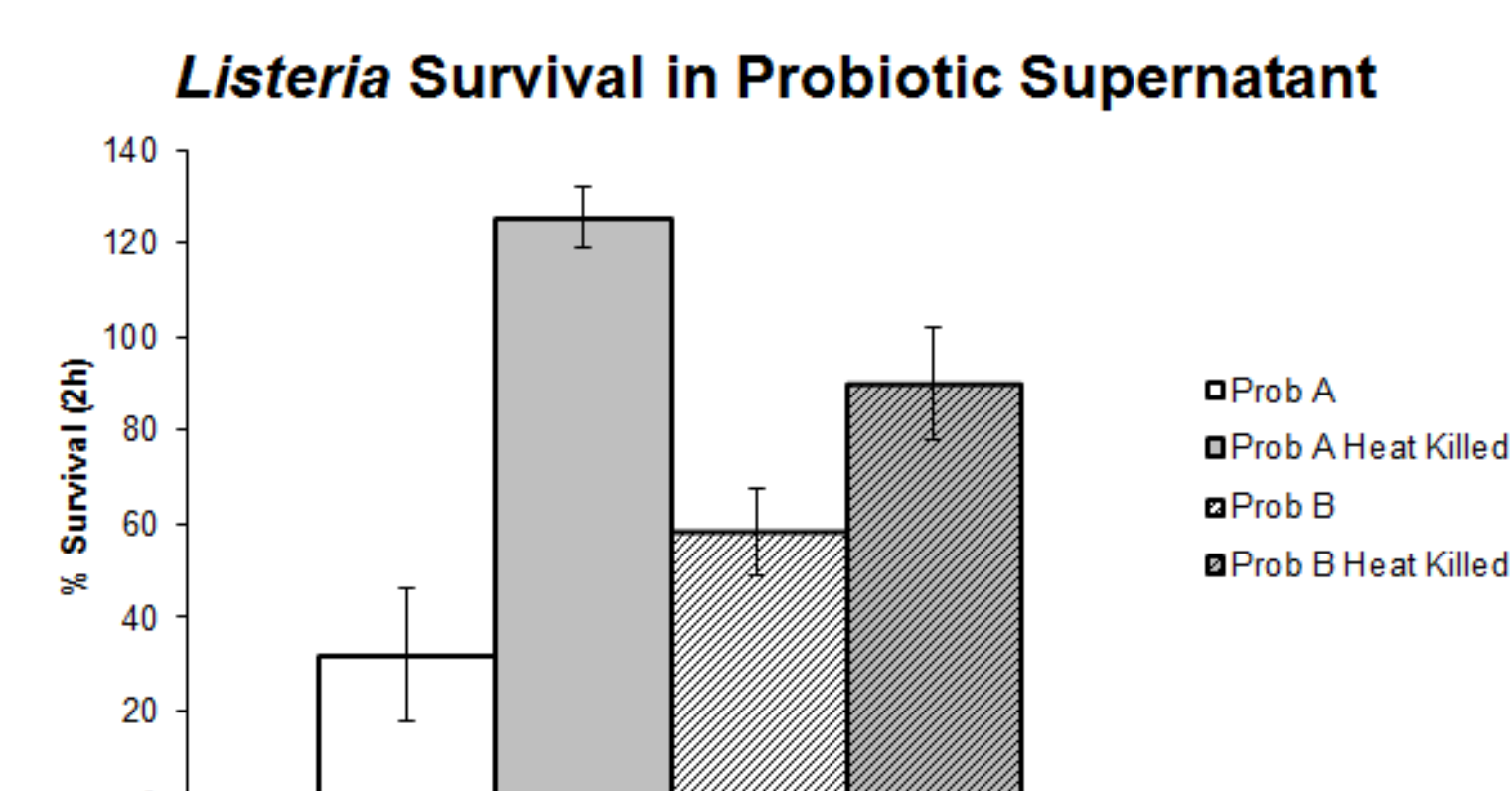
- 1) MRS broth allowed for similar levels of acidification to occur between both probiotic samples compared with BHI.
- 2) Both Probiotics A and B inhibited *Listeria* growth at similar levels.
- 3) *Listeria* survival decreased in probiotic supernatant.
- 4) Probiotics A and B showed different effects on LLO production.

Listeria growth is inhibited when co-cultured with probiotics



Co-culture done over 7 hours. Both probiotics inhibited *Listeria* growth at similar levels.

Probiotic supernatant compromises *Listeria* survival



Listeria was incubated in probiotic supernatant for 2 hours. *Listeria* survival = $(CFU_{t=2} / CFU_{t=0}) * 100\%$

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