

Characterization and specificity of probiotics to prevent *salmonella* infection in mice

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ABSTRACT

Background: Probiotic strains of bacteria can prevent *Salmonella* from causing disease by preventing the pathogen from colonizing the intestines. Two strains of probiotics, *Lactobacillus acidophilus* and *Pediococcus spp*, that were obtained from poultry fecal samples have been shown to be efficacious in poultry. The objective of this study was to determine if these strains of probiotics could prevent salmonellosis in a mouse model.

Methods: First, both strains of probiotics were evaluated for *in vitro* efficacy to inhibit the growth of and interfere with virulence gene regulation in *Salmonella enterica*. For *in vivo* efficacy, mice was used which models Typhoid illness. Mice were divided into 2 groups: Control and treatment, *Lactobacillus* and *Pediococcus* (LP; 10⁸ Log CFU). Two experiments were conducted. In the first experiment, the mice were treated with LP in water for the first two days of the experiment and challenged with *Salmonella* at day three. In the second experiment, the LP treatment was given in the water for 10 days and challenge was performed on day 11. In both experiments, at day 20 post-challenge, all mice were sacrificed, intestinal tracts and organs removed and cultured for *Salmonella*.

Results: The probiotic strains inhibited the growth of *Salmonella* and down-regulation of virulence genes was noted, but dependent on the strain of *Salmonella* being evaluated. For the *in vivo* experiment, the probiotics did not afford the mice protection from infection and increasing the length of time the probiotics were administered did not improve the efficacy of the probiotics.

Conclusions: It appears that these strains of probiotic bacteria are effective against *Salmonella in vitro*. However, these isolates did not afford protection from *Salmonella* infection to mice which may be due to host specificity as these isolates were obtained from poultry.

Keywords: *Salmonella*, Probiotic, *Lactobacillus*, *Pediococcus*, Mice