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LACTOBACILLUS CASEI COULD BE A BIO-THERAPEUTIC FOR ENTERIC BACTERIAL INFECTIONS

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As a major source of microbes and their numerous beneficial effects, the gut microflora/microbiome is intimately linked to human health, immunity and diseases. The key intestinal microbial byproducts, commonly known as metabolites, are crucial to the maintenance of a balanced gut ecosystem and healthy gut microbial community. More specifically, the presence or absence of several genes and their expression levels, in the presence or absence of stimuli or stress, regulate the production and concentration/number of various metabolites. These are essential for host defense and immunity and protecting from various diseases or pre-condition of diseases including inflammation, cancer, oxidation, atherosclerosis, and out competition of enteric bacterial pathogens. In a recent study, we found that in the presence of the prebiotic-like component peanut flour, *Lactobacillus casei* (LC) produced 100 times more linoleic acid (LA) than under normal conditions and was able to outcompete several enteric bacterial pathogens. Based on this evidence, we have overexpressed the linoleate isomerase (myosin cross-reactive antigen, *mcra*) gene in a natural, sustainable, bacteriophage-resistant LC strain (LC^{+mcra}) to enhance the production of conjugated linoleic acids (CLA) and verify the ability of this genetically engineered strain LC+mcra to inhibit growth, colonization, and infection of host cells by human enteric foodborne bacterial pathogens. We found that LC^{+mcra} excluded the Salmonella and EHEC in co-culture condition and altered the host cell-pathogens (both) interactions. The genetically modified mutant also altered the virulence properties of both bacterial pathogens significantly. This study showed that LC^{+mcra} could be a non-traditional bio-therapeutic for preventing the colonization of *Salmonella* and EHEC.

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