P-054 - LISTERIA MONOCYTOGENES OUTBREAK STRAIN SHOWS ENHANCED VIRULENCE AFTER GROWTH UNDER COLD-OSMOTIC STRESS AND PASSAGE THROUGH AN IN-VITRO GASTROINTESTINAL MODEL

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Background

Exposure to a single or multiple sublethal stresses, as those impaired by food processing and food matrices, can enhance tolerance of *Listeria monocytogenes* to stresses and increase its survival and pathogenesis. This knowledge is needed for developing efficient control strategies to improve food safety. The aim of this study was to evaluate the effect of growth under stress conditions (osmotic and low temperature) on the subsequent survival of *L. monocytogenes* through the gastro-intestinal (GI) tract and on its virulence potential.

Method

Three *L. monocytogenes* were selected: Lm 2542, from an outbreak associated with cheese in Portugal; Lm 2594, from cheese; and, Scott A, from an outbreak related to pasteurized milk. Each strain was grown at three conditions: (i) BHI at 37ºC (control), cold stress (11 ºC), and cold-osmotic stress (6% (w/v) NaCl, 11 ºC). Subsequently, strains were inoculated into low fat UHT milk (24h, 11°C) and their survival through a simulated GI digestion was evaluated, followed by determination of invasion efficiencies in epithelial cell line Caco-2.

Results & Conclusions

Growth at 37ºC and subsequent passage through the GI tract lead to a 3.5 log reduction in Lm 2542 viable counts (> 1 log cycle reduction than observed for Lm 2594 and Scott A). Growth in cold stress resulted in similar reduction of cell numbers for Lm 2542 and Lm 2594 after the GI tract passage, when compared to growth at 37ºC, but Scott A presented a higher reduction (4 log). However, after growth in cold-osmotic stress, Lm 2542 survival was higher than the observed for Lm 2959 and Scoot A, and > 1 log in comparison to growth at 37ºC. This protective effect was particularly noticeable at the end of the gastric phase. This strain also presented a significantly higher invasion efficiency in Caco-2 cells after growth under cold-osmotic stress and subsequent GI tract passage when compared to growth at 37ºC or under cold stress; the other strains presented no differences in virulence when grown at 37ºC or under stress conditions.
The results obtained indicate that exposure to specific stress conditions may increase not only the resistance to the human GI tract, but also the infectious potential of some *L. monocytogenes* strains. More studies are necessary to a better understanding of the mechanisms that overlap between adaptation to stress and improved virulence related characteristics in these strains.

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