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From Dog to Dog: Potential Probiotic and Immunomodulatory Strains Isolated from Canine Milk

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Abstract : Objectives: This study aimed to characterize potential probiotic strains isolated from canine breast milk for use in dogs with enteropathies. Methodology: Six canine breast milk strains, one canine colostrum strain, and one control porcine breast milk strain were characterized. According to its functional properties of resistance to acids, different concentrations of bile salts, and pancreatin, its presumptive properties of safety and inhibitory effect on pathogens, non-cytotoxic characteristics, and adhesion to the intestine. The immunomodulatory effect of formulations with better probiotic characterization in vitro and in vivo was also analyzed. Results: Two strains characterized as potential probiotics were obtained, which corresponded to the canine strains (TUCO-16 and TUCO-17), presenting resistance to acidic pH, bile salts, and pancreatin, as well as an inhibitory effect on pathogenic Escherichia coli, Salmonella sp., and Clostridium perfringens. Strains TUCO-16 and TUCO-17 induced a significant increase in the expression of TNF-α and IL-8 in canine macrophages, respectively. Expression analyses of pattern recognition receptors in DH82 cells suggest that TUCO-16 and TUCO-17 might increase the TLR2 expression marker, and porcine strain (TUCO-4) increases the NOD2 expression marker. Based on the count obtained and the encapsulation yield, the best formulations correspond to FOS-Inulin for the TUCO-17 and TUCO-4 strains; Maltodextrin-Inulin for TUCO-16. All the strains are non-cytotoxic. The strain that showed the highest adhesion to intestinal epithelial cells was TUCO-17 with the FOS-Inulin formulation. On the other hand, the probiotics decreased the expression of pro-inflammatory markers in vivo, both in the intestine and in the spleen of mice. Conclusion: The combination of these three strains under study (TUCO-16, TUCO-17, and TUCO-4) would cover the probiotic properties in formulation and immunomodulation of all the markers under study.

Keywords : probiotics, gastrointestinal infec, dog, probiotic formulation, immunomodulatory probiotics
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