

P15 & FP – Effects of Probiotics and Prebiotics on Human Health

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Abstract: The last few years witnessed a major scientific breakthrough with the emergence of gut microbiota as a key player in host health maintenance and disease pathogenesis. It is well established that a stable and diverse gut microbiota is essential to various host physiologic functions such as immunoregulation, pathogen prevention, and metabolism. Beyond that, it is becoming clearer that an imbalance in the microbial community contributes to the pathogenesis of both intestinal and extra-intestinal disorders. Thus, approaches aiming to restore or prevent gut dysbiosis represent a new strategy to improve treatment efficacy and disease prevention. In this regard, we aimed to evaluate the probiotic potential of newly isolated *Lactobacillus* and *Bifidobacterium* strains and to assess the possibility to combine them with plant based carbohydrate prebiotics to support their growth and efficacy. The probiotic properties of *Lactobacillus acidophilus* LA, *Lactobacillus fermentum* LF, *Lactobacillus plantarum* LP, *Lactobacillus reuteri* LR, *Lactobacillus rhamnosus* LRh, *Bifidobacterium animalis subsp. lactis* BL and *Bifidobacterium longum* BLg strains were characterized in vitro by determining their tolerance to low pH and to bile salts, antibiotic sensitivity, antimicrobial activity and by considering their ability to modulate the inflammatory status of HT-29 cells. Moreover, carbohydrates were extracted and purified from plants using several extraction methods, and then their degree of polymerization (DP) was determined. Finally, their ability to support the growth of the probiotics strains was assessed. The bacterial strains, *Lactobacillus plantarum* LP, *Lactobacillus rhamnosus* LRh and *Bifidobacterium animalis subsp. lactis* BL showed good survival at low PH and were sensitive to all common antibiotics treatment. They were able to antagonize the growth of various pathogens with strong potential against *Pseudomonas aeruginosa* and *Escherichia coli* by secreting high amounts of acidic metabolites such as lactic acid. These strains were also able to modulate the release inflammatory cytokines such as IL-4, IL-10 and TNF- α and to increase the antioxidant potential in HT-29 cell line. Besides inulin and fructooligosaccharides (FOS) were extracted and purified at good yields by application of ultrasound-assisted method. In vitro fermentation revealed that mixtures of fructooligosaccharides of short degree of polymerization (DP<10) were highly fermented by these strains, while limited growth was observed on inulin with greater degree of polymerization (10 <DP> 60).

These results suggest that these new strains show a good probiotic potential and their ability to grow on plant based carbohydrate source support the possibility of a pre/probiotics combination for an enhanced therapeutic efficacy.

References

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