HP-22: Synergistic effect of mint infusion on the survival and antioxidant activity of *Lactiplantibacillus plantarum* strains in simulated gastrointestinal conditions

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Subject description: Exploring the synergistic potential of medicinal plant-mediated enhancement for probiotic viability and antioxidant activity.

Objectives: This study aims to evaluate the viability and antioxidant capacity of two strains of *Lactiplantibacillus plantarum* (S10 and BCX1) during a simulated oral-gastrointestinal digestion process. Moreover, the combined effect of these strains with a medicinal plant (mint infusion), acting as a prebiotic matrix, on their viability and antioxidant efficacy is investigated.

Methods: The digestion of the samples (probiotic, probiotic-mint) was carried out in solutions simulated to those of digestion (solution equivalent to salivary fluid, gastric fluid and intestinal fluid). Viability of probiotic bacteria was determined using the standard plate count method after each digestion phase, and the antioxidant activity was assessed post each stage through DPPH, TAC, TPC, and TFC assays.

Results and discussion: The *in vitro* findings showed that our probiotic strains are resistant to simulated digestion conditions. In contrast, the added plant matrix used (mint infusion) has markedly improved the antioxidant activity and the survival rate to around 50% of the strains with a loss of phenolic and flavonoid compounds of the matrix during passage through the different digestion compartments. This decline could be because the probiotic cells were utilizing these compounds as a source of nutrition. On the other hand, the rise in antioxidant activity corresponds to the recognized antioxidant properties of various plants, such as mint. The natural components of mint, like polyphenols and flavonoids, are likely contributors to this stronger antioxidant effect.

Conclusion: The study implies the potential of this specific medicinal plant, to act as an effective vehicle for enhancing probiotic viability and augmenting antioxidant activity, thereby opening up new avenues for functional food development.

Keywords: Survival, antioxidant activity, *Lactiplantibacillus plantarum*, digestion, mint infusion.