Monitoring of chemicophysical parameters linked to probiotic strains in a functional cereal-based food and acceptability of the product

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Introduction

Chronic diseases are in exponential growth in the world, especially in South countries. Functional foods might be an answer to overcome these international stakes, because they are known for their several beneficial effects on human health. That is why our laboratory developed a probiotic maize-based product, enriched with natural carotenoids and phytosterols, showing a high nutritional interest (Gies et al., 2019, Gies et al., 2020). However, it was relevant to assess the stability of its functional properties along storage and to verify its acceptability by targeted consumers.

Methodology

Two *Lactobacillus* starters were selected for their growth parameters in co-fermentation into this specific matrix. The entire food process was described by Gies et al., (2019). Three products were made: a product containing semi-skimmed powdered milk (BP), a second product without fruit (Control), and a third containing whey protein isolates replacing the milk portion (WPIP). They were compared in terms of probiotic viability, pH, titrable acidity, and total antioxidant capacity by ABTS method linked to total polyphenols content during 28 days storage at 4°C every 7 days. A hedonic sensory analysis was carried out in Argentina to assess the acceptability of these products on 91 people of this South American population.

Results

The ratio of *L. plantarum* and *L. casei* allowed to reach 10^9 CFU/g in the final product without interacting with bioactive compound contents (Gies et al., 2019). Although probiotic viability was kept all over one month of cold storage at 4 °C (Fig. 1), the pH and so the titrable acidity changed among formulations (Fig. 2), influencing the metabolic activity of probiotic strains. Their production of organic acids and bioactive peptides, from precursors added by fruits or protein sources, contributed to heighten total antioxidant capacity of products (Fig. 3). The loss in antioxidant capacity at 14 days might be related to a change in phenolic profiles and/or be associated to the formation of novel compounds like bioactive peptides. The majority of the Argentinian panelists showed a preference for WPIP, in terms of taste and texture, by comparison with BP (Fig. 4).

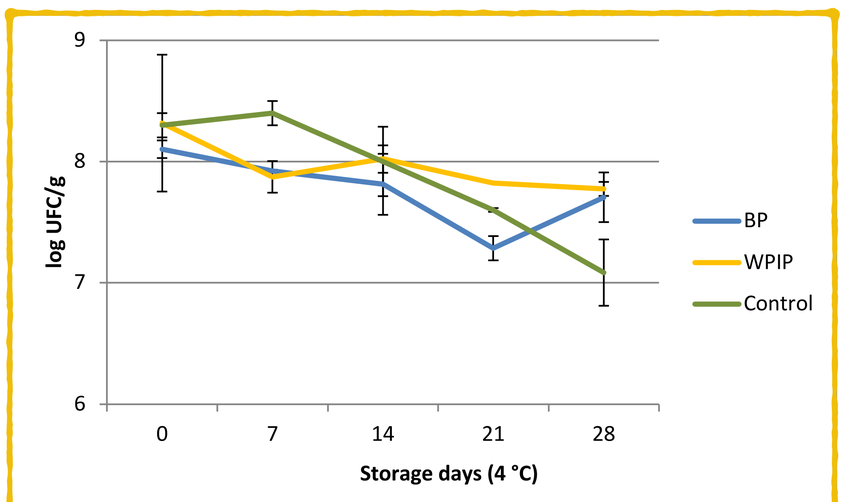
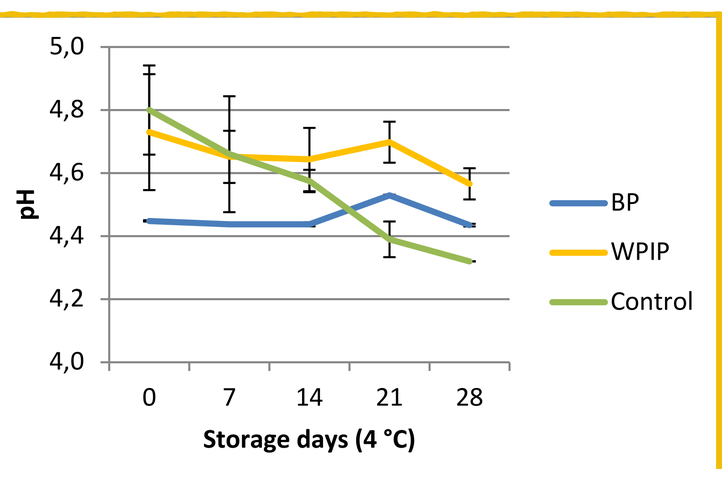


Figure 1: Probiotic viability in formulations of the control, BP and WPIP



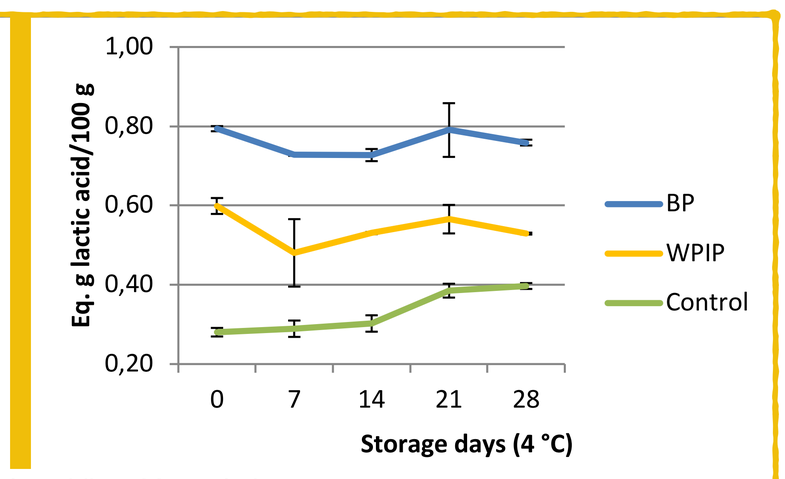


Figure 2: pH and titrable acidity of formulations

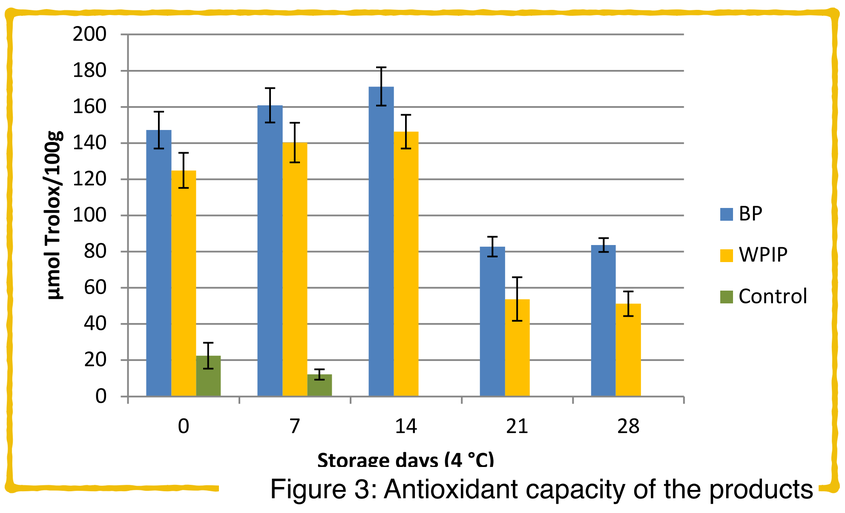


Figure 3: Antioxidant capacity of the products

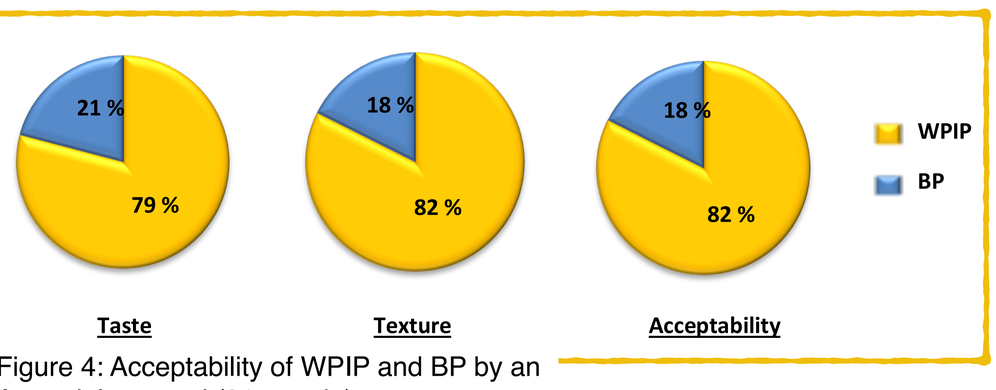


Figure 4: Acceptability of WPIP and BP by an Argentinian panel (91 people)

Perspectives

This functional food is generic and declinable, in relation with local or specific food disorders. It can be consumed by populations as a complementary food to enhance carotenoid blood rate and/or decrease cholesterol blood level. The probiotic and cholesterol-lowering potentials still have to be evaluated *in vivo* to prove their beneficial aspects on human.

References

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