TITLE: PROBIOTIC *IN VITRO* GASTROINTESTINAL TOLERANCE IN FERMENTED MILK WITH FRUIT BY-PRODUCTS

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ABSTRACT:
Probiotics are defined as live microorganisms that are capable to confer health benefit on the host. In order to perform the beneficial effects, probiotics should be viable in food products and also need to survive under unfavorable conditions found in the gastrointestinal (GI) tract. Some ingredients have the ability to improve this resistance, such as fruit by-products which are rich in dietary fiber and bioactive compounds. The aim of this study was to evaluate the effect of guava, orange and passion fruit by-products to rice and oat fermented beverages (RFB and OFB, respectively) and to fermented goat milk (FGM) on the survival of the probiotic during exposure to simulated GI tract conditions. *Lactobacillus casei* Lc-1 and *Streptococcus thermophilus* TA040 were used to produce the fermented beverages. Products without fruit by-products were used as control treatments. The survival of probiotic strain under the GI tract conditions was performed on the 1st, 14th, 28th days of storage. An *in vitro* model of subsequent exposure to gastric (pH 2.0-2.5, using pepsin solution) and enteric phases (enteric 1 - pH 4.3-5.2, and enteric 2 - pH 7.0-7.3, using pancreatin and bile solutions) was used, and the aliquots for plate count were removed prior to the beginning of the assay and at the end of gastric phase (120 min), enteric phase 1 (240 min) and enteric phase 2 (360 min). In general, the presence of fruit by-products led to increased resistance of the probiotic strain in the *in vitro* test for all substrates used. On the 1st day of storage, RFB and FGM treatments containing orange and passion fruit by-products presented population at least 1 log cycle higher than the respective control treatments at the end of the assay. However, OFB with orange by-product showed the highest population at the end of the assay. On the 14th day of storage, only FGM and RFB supplemented with orange by-product were able to increase by one log cycle the surviving population of the strain at the end of the assay in comparison to the control treatments. On the 28th day of storage, the positive effect of fruit by-products towards *L. casei* resistance to GI tract conditions was noted for the treatments containing orange and passion fruit by-products for all types of fermented products. The addition of fruit by-products demonstrated to be an interesting alternative to increase the functional properties of fermented products, leading to a higher appeal of the product towards consumers.

Keywords: functional food, probiotic, fermented products, simulated gastrointestinal resistance.

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