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Beer's industry by-product may protect Lactobacillus paracasei subsp. paracasei F19 from in vitro gastrointestinal stress throughout storage of probiotic blackberry fermented milk

Carolina Battistini
University of São Paulo, Brazil

Barley has been related to promotion of probiotic growth and increased resistance of certain strains to gastrointestinal stress simulated in vitro, mainly due to the presence of potential prebiotics compounds. The current study evaluated the addition of Brewer's Spent Grain (BSG) flour in probiotic blackberry fermented milk (FM) regarding the viability of the microorganisms throughout storage and their resistance to gastrointestinal stress simulated in vitro. The strains studied were Streptococcus thermophillus TH-4 and Lactobacillus paracasei subsp. paracasei F19. Four formulations were evaluated: FM1 (TH-4); FM2 (TH-4 + BSG); FM3 (TH-4 + F19); FM4 (TH-4 + F19 + BSG). The FM were submitted to an in vitro assay simulating the passage through the gastrointestinal tract, and the viability of the microorganisms was determined before and after the in vitro assay on selective agar. The viability of F19 and TH-4 remained above, respectively, 8.6 and 8.2 log CFU·mL-1 during the 28 days of storage. Regarding the resistance to gastrointestinal stress simulated in vitro, without BSG (FM3) the resistance of F19 significantly decreased between days 1 and 28 ($p \leq 0.05$); meanwhile, in the presence of BSG (FM4), the survival of F19 kept stable throughout storage ($p \geq 0.05$). On the other hand, TH-4 showed no survival after the simulation. Therefore, BSG showed a tendency on stabilizing the resistance of F19 against gastrointestinal stress simulated in vitro, and all FM have potential as probiotic foods since probiotic counts were always above 1010 CFU in a daily portion of 100 mL.