TITLE: Probiotic fermented soy beverage supplemented with acerola by-product increased beneficial bacteria in the TIM-2 *in vitro* model containing microbiota of lean adults

Authors: Antonio Diogo Silva Vieira[1]; Maria Cuevas-Tena[2]; Carlota Bussolo de Souza[3]; Erwin G. Zoetendal[4]; Hauke Smidt[4]; Koen Venema[3]; Susana Marta Isay Saad[1]

[1]School of Pharmaceutical Sciences, University of São Paulo,São Paulo, Brazil. Food Research Center, University of São Paulo, São Paulo, Brazil. Av. Profº Lineu Prestes, 580, 05508-000, Butantã, São Paulo, Brazil
[2]Preventive Medicine and Public Health, Food Science, Toxicology and Forensic Medicine Department, University of Valencia, Valencia, Spain. Av. Vincent Andrés Estellés, s/n, 46100, Buriassot, Valencia, Spain.
[3]Healthy Eating and Food Innovation, Maastricht University campus Venlo, Venlo, The Netherlands. St. Jansweg, 20, 5828 RC, Venlo, The Netherlands.
[4]Laboratory of Microbiology, Wageningen University, Wageningen, The Netherlands.St. Stippeneng 4, 6708, Wageningen, The Netherlands.

Food industry by-products might be good sources of nutrients and bioactive compounds to improve the nutritional and functional properties of food products. Studies have shown that dietary fibres from vegetable by-products present a great potential to promote modulation of the gut microbiota. In view of this, the impact of probiotic fermented soy beverages, supplemented with *Lactobacillus acidophilus* LA-5, *Bifidobacterium longum* BB-46, and acerola by-product on the community of the beneficial genera *Bifidobacterium* and *Lactobacillus* of the intestinal microbiota of lean individuals were evaluated using the *in vitro* intestinal model TIM-2. Three experimental pre-digested meals were tested: Control - dialysate; FSP - probiotic fermented soy beverage; FSS - probiotic fermented soy beverage supplemented with acerola by-product. Simulated Ileal Efflux Media (SIEM) was fed to all TIM-2 units. The PMA-qPCR method was used for the determination of viable bifidobacteria, lactobacilli, and total bacteria communities, at 0 h, 24 h, and 48 h. The total bacteria community varied between 10.80±0.09 log CFU equivalents/mL (FSS at 0 h) and 9.70±0.16 log CFU equivalents/mL (control at 48 h). Significant decreases ($p<0.05$) between 0 h and 48 h for the total bacteria community were observed in the units fed the control and FSS meals. Higher decreases (0.82 log CFU equivalents/mL) were observed for the control, whereas for the FSS it was below 0.5 log CFU equivalents/mL. A significant increase ($p<0.05$) of approximately 1 log CFU equivalent/mL for the community of bifidobacteria and lactobacilli were observed in the FSS-fed units. In contrast, the control showed a high decrease of 1.1 and 1.3 log CFU equivalents/mL, respectively, for bifidobacteria and lactobacilli between 0 h and 48 h. A significant decrease in bifidobacteria and lactobacilli community was also observed for the FSP supplemented units. However, these decreases were below 0.6 log CFU equivalents/mL and 0.8 log CFU equivalents/mL, respectively, for bifidobacteria and lactobacilli. These results show that supplementation with acerola by-product leads to a potentially prebiotic impact displayed by an increase in the beneficial genera *Bifidobacterium* and *Lactobacillus* in the lean gut microbiota.

Keywords: Acerola by-product, fermented soy beverage, gut microbiota, probiotic, prebiotic

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