Increasing bioactivity and bioaccessibility of isoflavones using Combined bioprocessing of soybean extract

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Soy isoflavones are considered important sources of bioactive compounds, but they are poorly absorbable, due to their large hydrophilic structures. Some biotransformation strategies have been used to convert the glycosidic form into aglycones, making them available for absorption. Objectives: This study evaluated the potential of enzymatic and/or microbial fermentation bioprocesses in soymilk extract before and after gastrointestinal in vitro digestion. Methods: Commercial ?-glucosidase and a mix of commercial probiotics containing Lactobacillus acidophilus, L. casei, Lactococcus lactis, Bifidobacterium bifidum e B. lactis were used to biotransform soymilk extract. Isoflavone profile was quantified by HPLC-DAD, total phenolic content by Folin–Ciocalteu test, and antioxidant capacity by ORAC and FRAP. Results: Soymilk enzymatically treated (ET) followed by microbial fermentation (ET+F) resulted in the conversion of glycosylated isoflavones (6-fold lower than the control for daidzin and 2-fold for genistin) to aglycones (18-fold greater than the control for daidzein and genistein), besides to increase the total phenolic content (3.48 for control and 4.48 mg/ml ET+F) and to improve antioxidant capacity represented by the ORAC (120 for control and 151 mg/ml ET+F) and by the FRAP (285 for control and 317 µl/ml for ET+F) before in vitro digestion. Further, the digested ET+F samples resulted in a higher content of genistein (2-fold higher than control) and also an increase in the total phenolic content (2.81 for control and 4.03 mg/ml for ET+F) and antioxidant capacity by ORAC were greater compared to undigested samples. Conclusions: Microbial fermentation processing reflected positive effects, but de combination of ET followed by F presented a synergistic effect, suggesting the greater potential for both bioprocesses to contribute to functional, nutritional, and bioactive properties of fermented soy-based products.