Bioaccessibility of Phenolic Compounds and Antioxidant Activity of Mango Puree Fermented Using Different Lactic Acid Bacteria

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Abstract

Mangoes are popular fruits, rich in antioxidants and phenolic compounds. Fermentation is an ancient method of preserving fruits and vegetables for the off season. The utilisation of lactic acid bacteria (LAB) in fruit fermentations improves the shelf life and the bioavilability of different phytochemicals. However, information on the bioaccesibility of phenolics after LAB fermentation is scarce. In this study, mangoes (*Mangifera indica* L. cv. Cogshall) from Reunion Island, were processed into a fermented puree using LAB strains *Lactobacillus plantarum 75* (*LAB 75*), *Weissella cibaria 64* (*LAB 64*) and *Leuconostoc pseudomesenteroides 56* (*LAB 56*). Pasteurised fruit purees underwent fermentation separately at 37°C for 48 h using LAB strains, stored for 5 days at 4°C, and then subjected to simulated gastrointestinal digestion. The effect of fermentation and *in vitro* digestion of puree on phenolic constituents, and Ferric Reducing Antioxidant Power (FRAP) was investigated. The FRAP ranged from 2 – 4.1 µmol TEAC 100 g^{-1} DW and was highest in *LAB 75* (4.1 µmol TEAC 100 g^{-1} DW). The bioaccessibility of phenolics in fermented mango puree is influenced by the type of LAB strain causing the fermentation. A strong positive correlation exists between the FRAP capacities and the released phenolic profiles of *LAB 64* and *LAB 75* fermented mango purees. Gallocatechin, protocatechuic acid, syringic acid, chlorogenic acid, ellagic acid, and α-glucosidase inhibitory activities increased in *LAB 64* and *LAB 75* fermented purees compared to *LAB 56,* and non-fermented mango purees. However, the percentage gallic acid recovery (318.41%), protocatechuic acid (28.01%), ellagic (29.96%), ferulic acids (20.73%) and FRAP activity (3.4 µmol TEAC/100g DW) was highest in the dialysis fraction of *LAB 75* fermented puree, hence, *LAB 75* fermented mango puree could deliver a phenolic bioaccessible and functional puree.

Biography: Vimbainashe E Manhivi

Dr Vimbainashe Edina Manhivi is a Post-Doctoral fellow of the Phytochemical Food Network (SARCHI Chair) at Tshwane University of Technology. She holds a Doctor of Food Science and Technology degree from Durban University of Technology and a Master of Science degree in Food Science and Nutrition from the Midlands State University. She has worked on enzymatic modification of food proteins and polysaccharides using phenolic mediators. Her current research focus is on developing functional food products by enhancing the antioxidant activity and improving the phytochemical bioaccessibility. She also works on tailoring postharvest handling of fruits and vegetables to improve shelf life, palatability, and phytochemical content.