

## Effect of Lactic Acid Fermentation on the Quality and Phytochemical Constituent in Smoothies made from Sweet Potato Cultivars Leaves

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### Abstract

Sweet potato leaves (SPL), like other leafy vegetables, are highly perishable but contain health-promoting compounds which necessitate their choice as food or food ingredient. Processing smoothies is a strategy to improve consumers' access to rich and nutrient-dense foods. Therefore, the effect of fermentation by *Lactiplantibacillus Plantarum* 75 (L75) on the physicochemical (pH, titratable acidity (TA), total soluble solids), lactic acid bacteria survival, ascorbic acid (AA), total phenolic content (TPC), total carotenoids (TCC) antioxidants (FRAP, DPPH, and ABTS), and sensory properties of smoothies from six sweet potato cultivar leaves (SPC) were investigated. Two cultivars each from Orange-fleshed (OFSP): Bophelo (BP), Beauregard (BG); Cream-fleshed (CFSP): Blesbok (BB) and Ndou (ND); Purple-fleshed (PFSP): 08.21 p (21P) and purple-purple (PP) leaves were processed into smoothies and fermented by L75 while the unfermented were used as controls. Fermentation significantly increased the TA, organic acids, amino acids, TCC, TPC, and antioxidant activities with increased fermentation time while the TSS, organic sugars, and pH decreased ( $p \leq 0.05$ ). The AA, TCC, TPC, and FRAP respectively were significantly high at 24 h of fermentation of BP (6.8 mg/100 g; 13.93 mg/100 g; 4350 mg/ 100 g and 14.18  $\mu$ M TEAC/mL) and BG (6.0 mg/100 g; 12.71 mg/100 g; 4435 mg/ 100 g and 13.25  $\mu$ M TEAC/mL) smoothies. 'Blesbok', 'Ndou', '08.21P', and 'Purple-purple' smoothies were significantly high in AA, TCC, TPC, and FRAP respectively at 48 h fermentation. AA, TPC significantly increased with fermentation time but decreased at prolonged conditions in all fermented smoothies while LABs population growth in fermented smoothies was optimum at 48 h of fermentation. Fermentation for 48 h increased the lutein, zeaxanthin,  $\alpha$ -carotenoid, cis- $\beta$ -carotene, and TCC contents in BB, ND, PP, and 21P except for the OFSP cultivars (BP and BG). Panellists preferred the purple-fleshed cultivars to other smoothies. Fermentation of SPC leaves improves the nutrient quality and functional properties of sweet potato leaf smoothies and could serve as a good source of antioxidants.