

Effects of Microbial Fermentation on the Antioxidant Potential of Cassava

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This study investigated the effects of microbial fermentation on the antioxidant potential of MU51 cassava products, developed by changing the fermentation lengths as 48 hours and 72 hours. Steps involved were grating cassava into a mash, collecting the mash into sacks, simultaneous dewatering and fermenting the mash. The fermented wet cakes obtained were further de-watered by oven-drying process to make fermented dry products. Oven-dried raw cassava and two fermented dry products were grated and powder obtained from each sample was extracted in ethanol: water (4:1 volume/volume) solvent mixture. Solutions were filtered and the extracts were dried. The antioxidant potential of extracts was assessed using Phosphomolybdenum Reduction assay. Reagent solution containing $(\text{NH}_4)_2\text{MoO}_4$, Na_3PO_4 and H_2SO_4 was mixed with the extracts. Tubes containing the mixtures were incubated for 60 minutes at 37°C and the absorbance of Phosphomolybdenum complexes were measured at 695 nm, using Ultraviolet/Visible spectrophotometer. Total antioxidant potentials of the extracts were expressed as ascorbic acid equivalents g L^{-1} by reference to the ascorbic acid standard calibration curve. The antioxidant potential of oven-dried raw cassava was $(2.30-2.42) \times 10^{-4}$ ascorbic acid equivalents g L^{-1} , that of 48 hours fermented dry product was $(3.38-3.56) \times 10^{-4}$ ascorbic acid equivalents g L^{-1} and it increased to $(3.92-4.20) \times 10^{-4}$ ascorbic acid equivalents g L^{-1} , for 72 hours fermented dry product. Analysis of variance technique showed that antioxidant potentials were significantly different ($p < 0.05$) among samples. Literature survey revealed that the ability of fermentation to improve antioxidant potential is due to the increase in the amounts of phenolic compounds and flavonoids, which are results of microbial hydrolysis reactions. Fermentation induces structural breakdown of plant cell walls, leading to liberation of antioxidant compounds. Fermentation significantly enhances the antioxidant potential of cassava.

Keywords: Fermentation, Cassava, Antioxidant potential, Ascorbic acid.