EFFECT OF SELECTED PROCESSING METHODS ON THE NUTRITIONAL, ANTI-NUTRITIONAL AND SENSORY PROPERTIES OF SPIDER PLANT (GYNANDROPSIS GYNANDRA)

DERRICK BRIAN OCHIENG'

A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER IN FOOD SCIENCE AND TECHNOLOGY, IN THE INSTITUTE OF FOOD BIORESOURCES TECHNOLOGY, DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY

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DECEMBER, 2017

Declaration

I hereby declare that this thesis is my original work and has not been presented for the award of a degree in any other university.

Brian Derrick Ochieng'

F251-01-1682/2015

Sign .....Date 04/12/2017

Supervisor's declaration

We confirm that the work reported in this thesis was carried out by the candidate under our supervision as University supervisors.

Dr. Daniel Njoroge, PhD.

Institute of Food Bioresource Technology

Dedan Kimathi University of Technology

Sign ..... Date 5/12/17

Dr. Eddy Owaga, PhD.

Institute of Food Bioresource Technology

Dedan Kimathi University of Technology

Sign .....Date 5/12/2017

Abstract

Spider plant (*Gynandropsis gynandra*) could be utilized to enhance food and nutrition security, especially in the rural areas, because it is fast growing during wet seasons with high yield and doesn't require much input. Although it is consumed by several communities in Kenya, especially the rural people, there is limited information on the effect of different processing methods on its nutritional and anti-nutritional properties. The main aim of the study was to investigate the effect of different processing methods on the nutritional, anti-nutritional and sensory properties of spider plant. Information from this study has the potential to indicate which selected processing method (fermentation, boiling and drying) would retain most of the inherent nutrients, reduce most of the inherent phytochemicals and enhance the sensory properties of spider plant leaves. Prior to fermentation and drying, blanching was done as a pre-process treatment, at 90 °C for 5 seconds and thereafter immediate cooling. Boiling was done at 95 °C for about 5 minutes, fermentation was done by placing whole spider plant leaves in a mixture of brine and glucose solution of 5% then allowing it to ferment naturally at 40 °C for 48 hours while drying was done by placing whole leaves on a metallic tray covered with aluminium foil at 40 °C for 8 hours. Proximate composition, mineral and, β-carotene content and anti-oxidant activity of the processed spider plant were analysed. Anti-nutritional analysis involved the determination of phytochemicals (alkaloids, tannins, saponins, terpenes, flavonoids, steroids, anthraquinones and cyanogenic glycosides). The sensory properties were determined by measuring the level of acceptability of the inherent food properties. Fresh spider plant leaves were significantly higher in crude ash, crude protein, crude fat, crude fibre and calcium than boiled and fermented treatments. Fermented spider plant leaves had significantly higher iron content compared to boiled and dried leaves. However, dried leaves had significantly higher amounts of sodium, magnesium and β-carotene and most of the phytochemicals and consequently the highest antioxidant activity. Therefore, it can be concluded that drying had better nutritional retention than both boiling and fermentation processes. The sensory acceptability of the boiled and dried leaves received similar ratings but higher than that of the fermented spider plant leaves. From the study, it was shown that drying as a processing technology was the best method since it retained significantly higher amounts of crude fat, sodium, magnesium, calcium and β-carotene compared to fermentation and boiling processes.