

Mineral And Phytochemical Content In Leaves Of Talinum Triagulare (Water Leaf) Subjected To Different Processing Methods

I Tesleem, A Folusho, O Gani, M Rasak

Citation

I Tesleem, A Folusho, O Gani, M Rasak. *Mineral And Phytochemical Content In Leaves Of Talinum Triagulare (Water Leaf) Subjected To Different Processing Methods*. The Internet Journal of Nutrition and Wellness. 2008 Volume 7 Number 2.

Abstract

The mineral and phytochemical content of vegetables cannot be overemphasized. The effect of processing methods on the mineral and phytochemical content in leaves of *Talinum triagulare* was studied to determine which of the methods will minimize nutrient loss. *Talinum triagulare* was researched using different methods; sun drying, steam blanching and combination of these methods for its mineral and phytochemical content. The minerals analyzed were magnesium, potassium, sodium, calcium and iron while the phytochemicals were saponin, oxalate, alkaloid, tannin and phytate. The results showed that sundried sample produces more value of the mineral content over steam blanched and the combined methods sample which means that sundrying method was the best. The phytochemical analysis showed that in sun dried samples, saponin was 2.200 (mg/g), phytate has 0.434 (mg/g) while in steam blanched sample alkaloid has the highest value of 5.200 (mg/g) oxalate has 3.600 (mg/g). The combined sample has the highest value of alkaloid 5.120 (mg/g). The three processing methods showed varied values which could not ascertain one method as been better or good in retaining the phytochemical content of the vegetables

INTRODUCTION

Fresh vegetables are important sources of nourishment and a vital ingredient in healthy and balanced diets. Fresh vegetables are highly recommended in any diet virtually without quantitative restriction and the roles of vegetables in maintenance of good health are well known (Osugwe, 2008). Green leafy vegetables form an indispensable constituent of diet in Africa generally and west Africa in particular. Generally they are consumed as cooked compliments to the major staples like cassava, cocoyam, guinea corn, maize, millet, rice and plantain (Oguntona, 1998) they are noted to occupy an important place among the food crops as they provide adequate amount of vitamins and minerals for human. Vegetables are important as food both from economic and nutritional stand point. Their nutritive significance is their richness in minerals and vitamins which is essential for the maintenance of human health (Bolaji et al; 2008). The importance and awareness of nutrition as a public health issue has resulted in the increase demand of knowledge of the biochemical nutrients of foods. They are good sources of carotene, ascorbic acid, riboflavin, folic acid and minerals like calcium, iron, and phosphorus (Fasuyi, 2006). Vegetables also contain phytochemicals which are nutritionally and medicinally useful but at times

reduce the bioavailability of nutrients in human system (Fasuyi, 2006)

Vegetables are eaten raw or processed. Any method selected for processing vegetables should be such that does not adversely affect the colour, texture, flavour, and nutritional values especially the vitamins and minerals (Edeoga et al; 2006) The processing method used for vegetables therefore depends on the end product desired and storage facilities available (Crues, 1985). Water leaf (*Talinum triagulare*) is a highly perishable vegetable. It needs special processing methods to prevent decomposition. These processing methods either change the nature and constituents of the vegetable positively or negatively. This work is aimed to evaluate the minerals and phytochemicals in water leaf (*Talinum triagulare*) as affected by commonly practiced food processing methods of sun drying steam blanching and combination of the two methods.

MATERIALS AND METHODS

Collection of plant materials: Fresh leaves of water leaf (*Talinum triagulare*) were harvested from a nearby farm within the Rufus Giwa Polytechnic, Owo, Ondo State.

Preparation of plant materials: The fresh leaves of water leaf

Mineral And Phytochemical Content In Leaves Of *Talinum Triagulare* (Water Leaf) Subjected To Different Processing Methods

(*Talinum triagulare*) were thoroughly cleansed. 50g of the fresh leaves of the vegetable was weighted in three places. The first part was sun dried for five days, the second part was steam blanched while the third part was steam blanched and sun dried for 3 days.

Determination of minerals and phytochemicals: The mineral content of samples were analysed by AOAC method (1990) using the Atomic absorption spectrophotometer. The method of Brunner (1984) was used for Saponin determination. Tannin was determined by method of Wang and Hang (1993). The method of Maga (1982) was used for phytate determination while the method of Association of official Analytical chemists AOAC (1990) was used for oxalate and alkaloid.

RESULTS AND DISCUSSION

Table 1 showed the percentage mineral content of the water leaf (*Talinum triagulare*) subjected to three different processing methods. The result showed that the values of the minerals (sodium, Potassium, calcium, magnesium and iron) were highest in the sundried samples. The method has 0.0492%, 0.0463%, 0.0479%, 0.0246% and 0.0035% for Na, K, Ca, Mg and Fe respectively. The combined methods have 0.0483%, 0.0418%, 0.0472%, 0.0192% 0.0034% for Na, K, Ca, Mg and Fe respectively. It could be deduced that the sun drying method and the combined methods show the best means of retaining the mineral content of water leaf if there is need to use these processing methods. Since sodium and potassium are important intercellular and extra cellular cation. The Na and K ratio are important in determine the health status of an individual. A ratio of less than 1 has been recommended to prevent high blood pressure (FND, 2002).

Figure 1

Table 1: Mineral Content Of Water Leaf () Subjected To Different Precessing Methods

Sample	MINERAL CONTENT IN (%)				
	Sodium (NA)	Potassium (K)	Calcium (Ca)	Magnesium (mg)	Iron (fe)
Sun dried	0.0492	0.0468	0.0479	0.2046	0.0035
Steam Blanched	0.0474	0.0456	0.0466	0.1797	0.0033
Combined methods	0.0483	0.0418	0.0472	0.1921	0.0034

The processing methods produce Na and K ratio less than 1 which is in accordance with the recommended ratio. The

result of this work showed that sun drying is the best method among these methods when high level of these minerals are desirable which conforms with the work of Akubgwe et al (2008) on other vegetable.

Calcium is a mineral important in teeth, bone and muscle metabolism (Turan, 2003) According to shills and Yong (1988), a good food calcium content is greater than 1 and poor if less than 0.5. From the result, the vegetable was rated a poor calcium food. This implies that the processing methods did not improve the food values of the plant. The processing methods used for vegetables therefore depend on the end product desired and storage facilities available (Cruess, 1985). Magnesium is an important mineral element in connection with circulatory disease such as heat disease (Akubgwu et al; 2008) while iron is an essential trace element for heamoglobin formation, normal function for central nervous system and energy metabolism (Ishidu et al; 2000) there was a great reduction in these two mineral elements in the water leaf.

Table 2 showed the phytochemical content of the water leaf subjected to different processing methods. The sun dried vegetable has 2.200 (mg/g) Saponin, 0.432 (mg/g) phytate, 2.775 (mg/g) Oxalate, and 4.800 (mg/g) alkaloid. Steam blanched sample has 1.400 (mg/g), 0.406 (mg/g), 3.600 (mg/g) and 5.200 (mg/g) Saponin, phytate, oxalate, and alkaloid respectively while in the combined methods sample, Saponin was 1.780 (mg/g). Phytate was 0.497 (mg/g), oxalate was 3.160 (mg/g) and alkaloid 5.20 (mg/g).

Figure 2

Table 2: Phytochemical content of water leaf (subjected to different precessing methods

Sample	PHYTOCHEMICAL CONTENT IN (mg/g)				
	Saponim	Phytate	Oxalate	Alkaloid	Tannins
Sun dried	2.200	0.432	2.750	4.800	0.234
Steam Blanched	1.400	0.436	3.600	5.200	0.223
Combined methods	1.780	0.497	3.160	5.120	0.978

Dupont et al (2000), reported similar variation in the phytochemical content of lettuce subjected to a variety of processing methods. The presence of these phytochemicals has been attributed to the bioactive principles responsible for ethnopharmalogical activities of most medicinal plant (Edeoga et al; 2005). This dictates why efforts have been

expanded in studies aimed at elucidating their levels in medicinal plant (Edeoga et al; 2006). Aletor (1993) also showed similar result with his researches in other vegetables. The medicinal values of plants and vegetables are dictated by their phytochemicals and other chemical constituents (Fallah, et al 2005)

The presence of minerals and phytochemicals in waterleaf explain the nutritional and the medicinal use of the vegetable. All the processing methods showed a considerable reduction in the minerals and phytochemical content of the vegetable but sun drying is the most preferred processing method to retain the best of the minerals and phytochemicals screened for over steam blanching and the combination of these methods.

CORRESPONDENCE TO

IBRAHIM Tesleem A. Department of Food Science and Technology, RUFUS GIWA POLYTECHNIC P. M. B 1019, OWO, ONDO STATE, NIGERIA Telephone number: 2348035774200 e-mail: tessieuptown@yahoo.ca

References

- r-0. Akuhugwo I. E. Obasi N. A. Chinyere C. O. and Ugbogu A. E. (2008) mineral and phytochemical contents in leaves of *Amaranthus Hybridus* (L) and *Solanum nigrum* (L) subjected to different processing methods. *African journal of Biochemistry Research*, Vol 2 (3) pp 040-044.
- r-1. Aletor V. A. (1993) Allelochemical in plant food and feeding stuffs. *Nutritional, biochemical and physiopathological. Aspects in animal production veterinary and human toxicology* vol. 35 vol. pp 57-67
- r-2. AOAC (1990) *Official methods of Analysis* (15th Ed) Association of official Analytical chemist. Washington D. C. pp 375 – 379.
- r-3. Bolaji P. T., Komolafe G. O. and Alli E (2008) Drying characteristics of selected local vegetable. *Nigerian Food Journal*, vol. 26 No 1 pp. 138 – 143.
- r-4. Brunner J. H (1984) Direct Spectrophotometric determination of Saponin *Anal. Chem.* 34 pp 1314 – 1326.
- r-5. Dupont M. S, Mondin Z, and Williamson G (2000) Effect of variety processing and storage on the flavonoid glycoside content and composition of lettuce and endive *J. Agric Food chem.* 48 (a) 3957 – 3964.
- r-6. Edeoga H. O. Okwe D. E. and Mbaboe B. O. (2005) phytochemical constituents of some Nigerian Medicinal plant. *Agric J. Biotechnol.* 4(7): 685 – 688.
- r-7. Edeoga H. O, Omosun G, Ushe L G (2006) chemical composition of *Hyptiss suaveolens* and *Ocimum gratissimum* hybrid form Nigeria *Afri J. biotechnol.* 5 (10): 892 – 893.
- r-8. Fasuyi A. O. (2006) Nutritional potential of some tropical vegetable meals. *Chemical characterization and functional properties African Biotechnology* 5 (1) 49-53
- r-9. FND (2007) *Food and Nutrition Board: Dietary reference intake for energy, carbohydrate, fibre, fat, fatty acids, cholesterol, protein and Amino acid (micro-nutrient)* Institute of medicine National Academy of Science. The National Academic press, Washington. D. C. pp 107 – 967.
- r-10. Fallah HSM, Alavian H. R, Heydari M. R, Abolmadli K (2005). The efficacy, of liv52 on liver cirrhotic patients: a randomized double blind placebo – controlled first approach *phytomedicine* 12 619 – 624.
- r-11. Ishida H, Suzuno H, Sugiyana N, Innami S, Todoro T, Mackawa A (2000). Nutritional evaluation of chemical components of leaves stalks and stems of sweet potatoes (*Ipomea botatas*) *Food chem.* 68:359 – 367.
- r-12. Mega J. A. (1982) *Phytate: its chemistry, occurrence, food interaction, nutritional significance and methods of analysis.* *J Agric food chem.* 30:1-9
- r-13. Oguntona T. (1998) *Green leaf vegetables in quality of plant foods* editors Osagie A U and Eka O. U publisher: Post Harvest research unit, University of Benin, Benin City pp 120-130.
- r-14. Osuagwu G. G. (2008) proximate and Vitamin content of for Nigerian *Pterocarpus* Species, *Nigerian Food Journal*, Volume 26 No 1 pp 21 – 26.
- r-15. Shills MEG and Young V. R (1988) *Modern Nutrition in health and diseases in: Nutrition* Nieman D. C. Buthepodorth D. E and Nieman C. N. (eds) WMC Brown Publishers, Dubuque, U. S. A. pp 276 – 282.
- r-16. Turan M, Kordali S. Zengin H, Dorsun A, Sezen Y (2003). Macro and micro mineral content of some wild edible leaves consumed in eastern Anatolia. *Acta Agriculture scandinavica, section B, Plant soil science* 53: 129 – 137.
- r-17. Wang C. K. and Hwano L. S. (1993) Analysis of the phenolic compounds in betel liquid *J. Agric chem.* 31, pp 623 – 632.

Author Information

Ibrahim Tesleem

Department of Food Science and Technology, Rufus Giwa Polytechnic

Adetuyi Folusho

Department of Food Science and Technology, Rufus Giwa Polytechnic

Ogundahunsi Gani

Department of Food Science and Technology, Rufus Giwa Polytechnic

Mustapha Rasak

Department of Food Science and Technology, Rufus Giwa Polytechnic