Journal of Scientific and Innovative Research 2018; 7(3): 75-77
Available online at: www.jsirjournal.com

Research Article

ISSN 2320-4818
JSIR 2018; 7(3): 75-77

Received: 28-08-2018
Accepted: 17-09-2018

Makanjuola Olakunle Moses
Department of Food Technology, The Federal Polytechnic, P.M.B 50 Ilaro, Ogun State, Nigeria

Makanjuola John Olanrewaju
Department of Science Laboratory, The Federal Polytechnic, P.M.B 50 Ilaro, Ogun State, Nigeria

Correspondence:
Makanjuola Olakunle Moses
Department of Food Technology, The Federal Polytechnic, P.M.B 50 Ilaro, Ogun State, Nigeria
Email: kunle.makanjuola@yahoo.com

Proximate and selected Mineral Composition of Ripe Pawpaw *(Carica papaya)* Seeds and Skin

Makanjuola Olakunle Moses, Makanjuola John Olanrewaju

Abstract

The proximate and selected mineral composition of seeds and skin of ripe matured pawpaw *(Carica papaya)* were evaluated using standard methods. Ripe matured pawpaw fruits were washed, peeled, cut and the seeds and skin collected, air dried for 14 days at room temperature. The proximate composition determined using AOAC (2000) method revealed 11.02% and 10.22% moisture contents for both seeds and skins. Crude protein of 27.42% for seeds and 14.36% for skin were also obtained. Pawpaw seed contained 27.62% oil while the skin had 2.54% oil. Ash content of 5.22% (seeds), 11.03% (skin) were obtained respectively for the two samples. 8.02% of crude fibre was present in the seeds while 35.23% ash was present in the skin. The carbohydrate contents for both seeds and skin were 19.71% and 37.33% respectively. The selected minerals revealed 6.43mg/100g and 16.23mg/100g Calcium, 720.83mg/100g and 504.33mg/100g Potassium, 4.21mg/100g and 2.73mg/100g Iron while 6.42mg/100g and 1.94mg/100g Zinc were present in papaya seeds and skin respectively. However, it is evident that papaya seeds and skin, which are often discarded, contained essential nutrients that are useful for both humans and animal.

Keywords: *Proximate composition, Minerals, Carica papaya, Seeds, Skin.*

INTRODUCTION

Pawpaw *(Carica papaya)* is a member of *Caricaceae* family. It is a widely grown perennial, tropical tree and important fruit cultivated throughout the tropical and sub tropical region of the world. Papaya is short lived fast growing, woody, large, perennial herb, up to 10m in height with self-supporting stems [1]. Papaya normally grows as single stemmed plant but may become multi-stemmed when damaged. Ripe papaya is consumed as a fruit and also used for processing. At un-ripe stage, the fruit is consumed as cooked vegetable, used as ingredient in papaya salad and cooked dished as well.

According to Food and Agricultural Organization [2], Nigeria is the largest producer globally. The fruit is an excellent source of calcium and other minerals, which are widely used in diet Serrano and [3]. Papaya is rich sources of three powerful anti-oxidants: Vitamin C, Vitamin A and Vitamin E and also contain a digestive enzyme called papain that is effectively used for the treatment of trauma, allergies and spot injuries. Papaya seed has contributed to numerous health effect so also papaya skin posses various wound healing properties. The seeds and skin pulp contains varieties of pyhtochemicals including natural phenol and flavonoids which have anti oxidant properties. They have in content also, thiamin, niacin and riboflavin [4]. The fruit contains both macro and micronutrients which are Na, K, Ca, Mg, P, Fe, Cu, Zn and Mn.

Djilas *et al*. (2009) [5] reported that the agro industrial by-product is good sources of bio active compounds and exploitation of these abundantly can be used in pharmaceutical and food processing, and that they are sources of minerals, fibre and phenolic compounds that have anti-viral, anti-bacteria and cardio protective properties. Several studies have been conducted to evaluate the medicinal potential of different parts of papaya plant such as leaves, shoots, roots and latex [6, 7,8]. According to [7], intake of two tablespoons of pulverized papaya seed mixed with hot water twice per day is used in the traditional management of diabetes and obesity. Papaya fruit is rich in carbohydrate (42.28% starch and 15.5% sugar in pulp), but is deficient in protein and fat and fat [9, 10]. Papaya has several traditional medicinal applications in human and animals and the fruit is consumed for different digestive conditions, as diuretic and antiseptic. However, there is dearth of information on the seeds and skin of ripe papaya, their disposal which causes environmental and ecological problems related to the proliferation of insects, rodents and economic burden. Therefore, this present work is to evaluate the proximate and mineral composition of papaya seeds and skin with a view of knowing their importance in human nutrition and needs.

MATERIALS AND METHODS

Source of Materials

Matured ripe pawpaw (Papaya) fruits were bought from Sayedero, a local market in Ilaro, Yewa South Local Government Area of Ogun State, South West, Nigeria. They were put into cellophane bags and transported to the laboratory of department of Food Technology, Federal Polytechnic, Ilaro, Ogun State for subsequence processing and analyses. All chemicals and reagents used were of analytical grades.

Sample Preparation

The pawpaw fruits were washed with clean potable water and then peeled using stainless steel knives. The peeled pawpaw fruits were cut longitudinally and the seeds and the skin separated, air dried on aluminum foil for fourteen (14) days at room temperature. The samples were blended using warring blender to homogenous state before analyses.

Proximate Analysis

The proximate composition of both the papaya seeds and skin were carried out according to the method of [11].

Mineral Analysis

The selected mineral analyses were determined using the method of AOAC (2000). Calcium, Potassium, Iron and Zinc were determined by Atomic Absorption Spectrophotometry Method. 1.0g of each sample (Pawpaw seeds and pawpaw peel) was first digested with 20ml of acid mixture (650ml Conc.HN03, 80ml Perchloric acid, 20ml H2S04) by weighing the sample into a digestion flask, followed by the addition of the 20ml acid mixture. The digestion flasks containing the sample plus the digestion acid mixture were heated until a clear digest was obtained. The digest was later diluted with distilled water to 500ml mark. Aliquot of the clear digests were used for atomic absorption spectrophotometry using filter that matched the different elements. The concentration of each element was determined with their calibration curves prepared with their standard solutions. The percentage values were calculated by multiplying their concentration by 100.

RESULTS AND DISCUSSION

RESULTS

Table 1: Proximate Composition of Pawpaw (Papaya) Seeds and Skin in Percentage

Samples	Pawpaw Seeds	Pawpaw Skin
Moisture Content	11.02±0.025	10.22±0.020
Protein Content	27.41±0.029	13.64±0.036
Fat Content	28.61±0.029	2.54±0.036
Crude Ash Content	5.21±0.289	11.03±0.029
Crude Fibre Content	8.02±0.026	25.23±0.029
Percentage Carbohydrate	19.70±0.093	37.33±0.006

Values are means ± standard deviation of triplicate determinations

Table 2: Selected Mineral Present in Pawpaw (Papaya) Seeds and Skin in Percentage

Samples	Pawpaw Seeds	Pawpaw Skin
Calcium (Ca) Mg/100g	6.43±0.029	16.22±0.025
Potassium (K) Mg/100g	720.83±0.289	504.33±0.289
Iron (Fe) Mg/100g	4.20±0.012	2.73±0.029
Zinc (Zn) Mg/100g	6.41±0.029	1.94±0.036

Values are mean ± standard deviation of triplicate determinations

DISCUSSION

The proximate composition of pawpaw *(Carica papaya)* seeds and skin are as shown in Table 1. The moisture content of seed was 11.02% while that of skin was 10.22% respectively. Low moisture contents generally are an indication of high shelf life especially for foods that are properly packaged against external condition. The protein contents for both papaya seeds and skin were 27.42% and 13.64% respectively indicating a higher protein presence in papaya seeds. Protein is an essential component of diet needed for the survival of both animal and human of which basic function is to supply adequate amount required [12]. The protein content of seeds (27.42%) is higher than those reported by [13] on the change in nutrient content of popcorn and groundnut composite flours subjected to solid substrate fermentation and also by [14] on the chemical composition of the seeds and oils of sesame grown in Congo-Brazzaville. According to [15], fibre helps in the maintenance of human health and has been known to reduce cholesterol level in the body. High fibre foods expands the inside wall of the colon, causing the passage of waste, thus making it an effective anti-constipation. Fibre also reduces the risk of various cancer, bowel diseases and improves general health and well-being of individuals. Table 1 revealed fibre content of 25.23% for papaya seeds and this was higher than 11.88% reported by [16] in a similar work. 8.02% crude fibre content was obtained for *Carica papaya* seeds. According to [17], ash of food samples gives an idea of the organic content from where the mineral contents could be obtained. Papaya skin exhibited high amount of ash (11.03%) than that of seed (5.22%). The ash content of papaya skin obtained in this work is higher than that of 6.51% reported by reported by [18] and 7.86% reported by [17] in a similar work. The seed however is low in ash content (5.22%). Fat contents of 28.62% and 2.54% were obtained for the seeds and skin indicating papaya seeds as a good source of oil which can serve as energy source. However, low fat content in papaya skin can be recommended as part of weight reducing diet. The carbohydrate contents of both the seeds and the skin were 19.71% and 37.33% respectively. The value (37.33%) obtained from skin is higher than those reported (26.00%) by [19], suggesting that papaya skin can be considered as a potential of carbohydrate for energy.

The results of selected mineral contents of both the seeds and skin of ripe papaya fruits are as shown in Table 2. From the table, 6.41mg/100g and 16.22mg/100g calcium were present in the seeds and skin of ripe papaya fruits. Calcium keeps the bone and teeth strong. Cells also uses calcium to activate certain enzymes and helps to transport ion across the cellular membrane, while also playing a key role in maintaining the regular heart beat. The potassium level was high both in the papaya seeds and skin (720.83mg/100g in seed and 504.33mg/100g in skin). These values are higher than those reported by [20] in a similar work. Potassium has been found to be an important mineral to both cellular and electrical function in the body. Iron is said to be an important element necessary in the diet of pregnant women, nursing mothers, infants, convulsing patients and elderly people to prevent anemia and other related diseases [21]. Iron content of 4.21mg/100g and 2.73mg/100g were obtained for both papaya seeds and skin respectively. Zinc is a trace element which is required for healthy immune system. Zinc is higher in papaya seeds (6.42mg/g) and low in the skin (1.94mg/100g). The values obtained in this present work is in agreement with those reported [22] in a similar work.

CONCLUSION

It is evident from this present work that by-products of papaya i.e seeds and skin which are often disposed off causing environmental and ecological problems related to proliferation of insects, rodents as well as economic burden contained essential nutrients that are useful to human and animals for life sustenance. The seeds in most cases serves as carminative, counter-irritant, as paste in the treatment of ringworm, and psoriasis as well as anti-fertility agent in malic.

Acknowledgment

The authors wish to acknowledge the technical assistance provided by Miss Poopoola Mary Omotayo in the preparation of this work.

REFERENCES

1. Chan-Prove P, Rose PO, Hane P, Macleod N, Kernot I, Evan D, *et al*. Agriclink series; Your growing guide to better farming. Pawpaw information kit. Queensland Horticulture Institute and Department of Primary Industries Qld, Nambour, 2010
2. FAO. FAOSTAT: Core Production Data. Food and Agricultural Organization of the United Nation.
3. Serrano AC, Cattaneo LF. Cultivo do Mo maaro no Brazil. Revista Brasiteria de Fruti. Cultural. 2010; 32:z3.
4. Annuar NS, Zahari SS, Taib IA, Rahaman MT. Effect of green and ripe Carica papaya extracts on wound healing and during pregnancy. Food and Chemical Toxicology. 2008; 46:2384-2389.
5. Djilas S, Brunnet CJ, Celko Vic G. By-products of fruits processing as a source of phytochemicals. Clinical Industry and Chemical Engineering Quarterly. 2009; 15(4):191-202.
6. Canini A, Alesiani D, D'Areangelo G, Tagliateste P. Gas chromatography-masspectrometry analsis of phenolic compounds from *Carica papaya* leaf. Journal of Food Composition and Analsis. 2007; 20(7):584-590
7. Adeneye, Olagunju A. Preliminary hypoglycemic and hypolipidemic activities of the aqueous seed of *Carica papaya*. Linn. In Wister Rats. Biology and Medicine, 2009.
8. Otsuki N, Dang NH, Kumagai E, Kondo A, Iwata S, Morimoto C. Aqueous extract of Carica papaya exhibits anti-tumor activity and immunomodulatory effect. Journal Ethnopharmacol 2010; 127:760-767.
9. Bari L, Hassan P, Absar N, Hague E, Khuda M, Pervin NM, *et al*. Nutritional analysis of two local varieties of papaya *(Carica papaya)* at different maturation stages. Biology/Science, 2006.
10. Oloyede OI. Chemical profile of unripe pulp of *Carica papaya.* Pakistan Journal of Nutrition 2005; 4:379-381.
11. AOAC. Official Methods of Analysis, Association of Official Analytical Chemists. 15th Edition, Arlinton, V.A. USA, 2000.
12. Pugalenthi M, Vadived V, Gurumoorthi P, Janardhanan. Comparative nutritional evaluation of little known legumes; Tamarindusindica, Erthrina indica and Sesbaniab ispinosa. Tropical, Sub-tropical Agro-ecosystem 2004; 4:107-123.
13. Ojokoh AO, Lawal RT. Change in nutrient content of popcorn and groundnut Composite flour subjected to solid substrate fermentation. International Journal of Tropical Medicine and Public Health 2003; 1(1):50-53.
14. Nzikou JM, Matu L, Bouangakalou G, Ndangwu CB, Pam-boutobi NPG, Kimbonjulia A, *et al*. Chemical composition of the seed and oil of sesame.(*Sesamum indicuml)* grown in Congo- Brazzaville. Advance Journal of Food Science and Technology. 2009; 1(1):6-11.
15. Eromosele IC & Eromosele CO. Studies on the chemical composition and physiochemical properties of seeds of some wild plant. (Netherland). Plant Food for Human Nutrition. 1993; 43:251-258.
16. Adebisi GA, Olagunju EO. Nutrition of the seed of Fluted Pumpkin. *(Telfairia occidentalis).* Journal of New Trend in Science and Technology Application 2011; 1(1):7-18.
17. Bello MO, Falade OS, Adewusi SRA, Alawore NO. Studies on the chemical composition and anti-nutrients of some lesser known Nigerian Fruits. African Journal of Biotechnology 2008; 7(21):3972-3979.
18. Aranwande JO, Borokini FB. Comparative study on chemical composition and functional properties of three Nigerian legumes (Jack beans, Pigeon pea and Cowpea). Journal of Emerging Trend in Engineering and Applied Science 2010; 1(1):89-95.
19. FAO. Food and Agriculture Organization. Food composition table for the near East nuts and seeds. FAO Food and Nutrition Paper. 1982; 26-85.
20. Anwar F, Rehana N, Bhanger MI, Ashfat S, Farah NI, Felix A. Physicochemical characteristics of citrus seeds as seed oils from Pakistan. Journal of American oil Chemist Society 2008; 7(2):112-119.
21. Oluyemi EA, Akinlua AA, Adenuga AA, Adebayo MB. Mineral contents of some commonly consumed Nigerian foods. Science Focus 2006; 11(1):153-157.
22. Brown KH, Guptill KS, Esrey SA Oni GA. Evaluation of a face- to- face weaning food intervention in Kwara State, Nigeria: Knowledge trial and adoption of a home prepared weaning food. Social Science Medicine 1993; 36:665-672.