

Chemical Composition Of Carica Papaya Flower (Paw-Paw)

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Abstract: Fresh sample of *Carica papaya* flower were analysed for the phytochemical composition, proximate, vitamins and mineral composition. Phytochemical screening revealed the presence saponins, alkaloids, tannins and flavonoids at low quantities 0.07%, 0.05%, 0.002% and 2.8% respectively. Mineral analysis revealed presence of K (62.7mg/100g) as well as Na, Ca, Mg, and P 1.27mg/100g, 15.04mg/100g, 3.14mg/100g and 54.8mg/100g respectively. The micro nutrient such as Z, Fe, Cd, Pd, C and Cobalt were not detectable. Proximate analysis of the fresh flower sample showed CHO (17.8%), moisture (81.25%), ash content (0.14%), crude fibre (0.25%), crude protein (0.42%) and crude (0.12%). Result showed that the plant flowers contain the vitamins (mg/100g) thiamine (B1) 0.15, riboflavin (B2) 0.02, niacin (B3) 0.1 and ascorbic acid (C) 28.7. All these results indicate that the flower of *Carica papaya* contains nutrients and minerals useful in nutrition and some phytochemical that explained the astringent actions of the plant encountered in the numerous therapeutic uses.

Keywords: *Carica papaya*, vitamins, phytochemical composition, mineral composition, therapeutic

I. INTRODUCTION

Carica papaya Linnaeus, (pawpaw), belongs to the family of Caricaceae. Papaya is not a tree but an herbaceous succulent plants that posses self supporting stems. (7). Papaya is a large perennial herb with a rapid growth rate. The plants are usually short-lived, but can produce fruit for more than 20years. The papaya has a rather complicated means of reproduction. The plants are male, hermaphrodite, or female (3).The male trees are uncommon, but sometimes occur when home owners collect their own seeds. Hermaphrodite trees (flowers with male and female parts) are the commercial standard, producing a pear shaped fruit. These plants are self

pollinated (12). *Carica papaya* plants produce natural compounds (annonaceous acetogenins) in leaf bark and twig tissues that possess both highly anti-tumour and pesticidal properties. It was suggested that a potentially lucrative industry based simply on production of plant biomass could develop for production of anti-cancer drugs, pending Food and Drug Agency approval, and natural (botanical) pesticides (14). The high level of natural self-defence compounds in the tree makes it highly resistant to insect and disease infestation (18). *Carica papaya* L. leaf tea or extract has a reputation as a tumour-destroying agent. (23) The papaya fruit, as well as all other parts of the plant, contain a milky juice in which an active principle known as papain is present. Aside from its value as a remedy in dyspepsia and kindred ailments, it has been utilized for the clarification of beer. The juice has been in use on meat to make it tender, (24). The seed is used for intestinal worms when chewed. The root is chewed and the juice swallowed for cough, bronchitis, and other respiratory diseases. The unripe fruit is used as a remedy for ulcer and impotence, (9). Fresh, green pawpaw leaf is an antiseptic, whilst the brown, dried pawpaw leaf is the best as a tonic and blood purifier. (2). Chewing the seeds of ripe pawpaw fruit also helps to clear nasal congestion, (9). The *carica papaya* has a therapeutic value due to its antiseptic quality. The tea, prepared with the green papaya leaf, promotes digestion and aids the in treatment of ailments such as chronic indigestion, overweight and obesity, arteriosclerosis, high blood pressure and weakening of the heart (13). The objective of this study is to determined the chemical composition of *Carica papaya* flower from the same plant as a basis to advising the traditional medicine practitioners, herb users, herb sellers, health institutions and farmers on the health and economic importance of *Carica papaya*

II. MATERIALS AND METHODS

SOURCE OF PLANT MATERIALS

The papaya flowers were collected as fresh samples in Umuchichi Community in Osisioma Ngwa L.G.A, Abia State, Nigeria.

SAMPLE PREPARATION

The leaves were washed, cut into small pieces and sun dried for four days. The samples were ground into powder and stored each in an air tight bottle prior to use for analysis.

PHYTOCHEMICAL ANALYSIS

The analysis for tannin, saponins, tannins, flavonoids, steroid, terpernoids and alkaloids were carried out according to standard methods, (21).

PROXIMATE ANALYSIS

Proximate analysis of papaya flower is the determination of the major component of food which includes: moisture, crude fat, ash, protein, carbohydrate and crude fiber and food energy (21).

MINERAL ANALYSIS

Minerals were determined by digesting the ash with 3M Hydrochloric acid using the atomic absorption spectrophotometer for Calcium, Magnesium, Manganese, zinc, copper, cadmium, cobalt, lead, Iron and the flame photometer for potassium and sodium (8).

VITAMIN ANALYSIS

The composition of the water-insoluble vitamins, riboflavin and thiamine, were determined by the method of (20), while ascorbic acid content was determined by the method of (1)

III. RESULTS AND DISCUSSION

Parameters	%/SEM
Moisture	81.25±0.404
Ash	0.14±0.012
Crude fiber	0.25±0.011
Crude protein	0.42±0.005
Carbohydrate	0.12±0.011
Crude fat	17.82±0.004

Table 1: The chemical composition of carica papaya flower
Results are mean of three determinations ± SEM

Parameters	Mg/100g/SEM
Mg	3.14±0.046
Ca	15.04±0.034
P	54.8±0.404

Na	1.27±0.132
K	62.7±1.385
Zn	BDL
C	BDL
Fe	BDL
Cd	BDL
Co	BDL
Pd	BDL

Table 2: The minarel composition of carica papaya flower
BDL: Below detection level

Parameters	%/SEM
Saponins	0.07±0.011
Alkaloids	0.05±0.011
Tannins	0.002±0.000
Flavonoids	2.80±0.000
Steroid	Null
Terpernoids	Null

Table 3: The phytochemical screening of carica papaya flower
Results are mean of three determinations ± SEM

Parameters	Mg/100g/ SEM
Niacin	0.10±0.005
Riboflavin	0.02±0.001
Thiamine	0.15±0.011
Ascorbic acid	28.7±1.443

Table 4: The vitamin composition of Carica papaya flower
Results are mean of three (3) determinations ± SEM

IV. DISCUSSION

The proximate analysis shows that the moisture content of carica papaya flower is very high; indicating that the flower cannot be stored for a period of time due to spoilage and it will be susceptible to microbial growth. Low CHO values obtained in the study confirmed that the flower is not a good source of CHO and sugar. Low ash content in the flower indicates that the total inorganic matter is low. The protein of the study is also negligible which implies that it is not a good source of protein.

The phytochemical analysis of the flower showed that the flower contain saponins, tannins, alkaloids and flavonoids. The presence of saponins support the fact that paw-paw flower has cytotoxic effect such as permenlization of the intestine as saponins are cytotoxic (16). It also gives the flower the bitter taste. Saponins have relationship with sex hormone like oxytocin. Oxytocin is a sex hormone involved in controlling the onset of labour in women and subsequent release of milk (17). Another important action of saponins is their expectorant action through stimulation of a reflex of the upper digestive tract (5). Alkaloids are the most efficient therapeutically significant plant substance. Pure isolated alkaloids and the synthetic derivatives are used as basic medical agents because of their antispasmodic and bacterial properties (22). They show marked physiological effect when administered to animals. The presence of alkaloids in the flower shows that these plants can be effective anti-malaria, since alkaloids consist of quinine, which is anti-malaria (19). Deficiency of ascorbic acid is associated with pain in the joint and defect in

skeleton calcification, anemia, and manifestation of scurvy hemorrhage from mucous membrane of the mouth and gastrointestinal tract (11). The function of vitamin C accounts for its demand for normal wound healing. There is also an interesting ability of ascorbic acid as antioxidant, to prevent or at least minimize the formation of carcinogenic substances from dietary materials (11). As a result of the presence of ascorbic acid in *Carica papaya* flowers indicates the usefulness in the coagulation of blood, the proper functioning of the heart and nervous system and the normal contraction of muscles,. Magnesium, assist in assimilation of Phosphorus. Lack of Mg can be responsible for tetany, tuberculosis, diabetes, cancer and nervous disease (4). Potassium which is of highest value is necessary for muscular weakness which is associated with malaria and slow down sclerosis of the vascular system. It contributes to flight against bacteria and cleanses the digestive system. Sodium takes part in the metabolism of water, promotes digestion, assimilation, osmosis, cleanses the digestive tract, combat stomach acidity and alkalize the blood (4). In general, these results suggest the validity of the therapeutic effect of aqueous extract of flower of *carica papaya*.

V. CONCLUSION

This study has shown the phytochemicals, proximate composition, vitamins and mineral composition of *Carica papaya* flower. This partly shows the use of this plant in herbal medicine, as a rich source of phytochemicals, coupled with the presence of the essential minerals and vitamins. *Carica papaya* flower can be seen as a potential source of food and drug item. The presence of alkaloid in it explains the reason why is been used as an anti-malaria agent. The flower of *carica papaya* is equally used as an anti-anemic agent and also used as a body cleaner (2)

REFERENCES

- [1] AOAC, (1980). Official methods of analysis. 13th Ed. Washington D.C.
- [2] Atta, K. Bonsu (1999). "The Power of Garlic". Cardiovascular disease prevention Association, Buea, Cameroon. p.72.
- [3] Bruce, S. and Peter, C. A. (2008). Handbook of environmental physiology of fruit crops. 1st Ed. p.217.
- [4] Claude, B. and Paule, S. (1979). The manual of natural living. 1st Ed. Biddles Ltd, pp.98-101.
- [5] David, H. (1983). The new holistic herbal. 3rd Ed. Findhorn press, U.S.A. pp: 241.
- [6] Desmond, R. Layne (1995)"Pawpaw": New crop factsheet. Department of Horticulture, Poole Agriculture Centre, Clemson University, Clemson, Sc. 29634-0375.
- [7] Dick Gross (2003). "Papaya": A tantalising taste of the Tropics. Maricopa County Master Gardener Volunteer information, University of Arizona Cooperative Extension. www.papaya Maricopa-hort@ag.arizo.edu.
- [8] Egan, H., Kirk, R.S., & Sawyer, R., (1981). Pearsons chemical analysis of foods. 8th Ed. Churchill Livingstone, N. Y.
- [9] Elizabeth Kafaru, (1994). Immense help from nature,s workshop. 1st Ed. Elikaf Health Services Ltd. Ikeja, Lagos. Pp:207-209.
- [10] Gbolahan, D. (2001). Lesson note on medical importance of trace elements. Centre for Natural Health Studies, Surulere, Lagos, Nigeria..
- [11] Hunt, S., Goff, J. L., and Holbrook, J. (1980). Nutrition Principles and Chemical Practices. John Wiley and Sons, New York, pp: 49-52.
- [12] Jari, S. (2009). Papayas are yummy easy to grow. University of Hawaii- Manoa College of Tropical Agric. & Human Resources.
- [13] Mantok, C. (2005). Multiple Usage of Green Papaya in Healing at Tao Garden. Tao Garden Health spa & Resort.Thailand.www.tao-garden.com
- [14] McLanghlin, J. L., Ratanyake, S. Rupprecht, J. K. and, Potter, W. M. (1992). Evaluation of various parts of the pawpaw tree, *Asimina triloba* (Annonaceae), as commercial source of the pesticidal annonaceous acetogenins. J. Econ. Entomol. 85: 2353-2356.
- [15] Njoku, P. C., and Akumefula M. I., (2007). Phytochemical and nutrient evaluation of *Spondias mombin* leaves. Pak. J. Nutr. 6(6): 613-615.
- [16] Okwu, D. E. and Ekeke, O. (2003). Phytochemical screening and mineral composition of chewing sticks in South Eastern Nigeria, Global. J. Pure Appl. Sci., 9: 235-238.
- [17] Okwu, D. E., and Okwu, M.E., (2004). Chemical composition of *Spondia mombin* plants. J. Sustain Agric. Environ. 6: 140-147.
- [18] Peter, R. N. (1991). Pawpaw (*Asimina*). In: J. N. Moore and J. R. Ballington (eds). Genetic resources of temperate fruit and nut trees. Acta Hort. 290:567-600.
- [19] Robinson, T., (1985).The organic constituents of higher plants. "Their Chemistry and Interrelationships. 3rd Ed. Corcleus Press. North Amherst mass. 6: 430-435.
- [20] Scalar, (2000). In: Segregated flow analyzer for analytical process Laboratories Netherland, pp:45,55 and 61.
- [21] Sofowara, A., (1993). Medicinal plants and traditional medicine in Africa, Spectrum Books, Nigeria. 2nd Ed. Pp: 10-158.
- [22] Stray, F., (1998). The natural guide to medicinal herbs and plants. Tiger Books International, London, pp: 12-16.
- [23] Walter Last (2008). Cancer remedies. www.health-science-spirit.com/cancer6-remedies.
- [24] Wilson Popenoe, (1974). "Papaya"- Manual of tropical and subtropical fruits. Hafner Press. Facsimile of the 1920 Ed. Pp: 225-240.