

# Proximate and Mineral Compositions of *Bryophyllum pinnatum* Leaves

B. U. Nwali, A. N. C Okaka, C. E. Offor, P. M. Aja\* and U. E. Nwachi

Department of Biochemistry, Ebonyi State University Abakaliki, P.M.B. 053 Abakaliki, Ebonyi State Nigeria

## Address for Correspondence

Department of  
Biochemistry, Ebonyi  
State University  
Abakaliki, P.M.B. 053  
Abakaliki, Ebonyi State  
Nigeria

### E-mail:

[ovumte@yahoo.com](mailto:ovumte@yahoo.com)

## ABSTRACT

The proximate and mineral compositions of *Bryophyllum pinnatum* leaves were evaluated in both dry and fresh samples to determine the ash, carbohydrate, fat and oil, crude fibre, protein, moisture and mineral contents using the standard method of Association of Analytical Chemist (AOAC) and Atomic Absorption Spectrophotometric (AAS) method. The result showed that *Bryophyllum pinnatum* contain ( $1.21 \pm 0.07$  and  $0.8 \pm 0.03\%$ ) ash, ( $72.92 \pm 1.08$  and  $4.46 \pm 0.52\%$ ) carbohydrate, ( $1.38 \pm 0.06$  and  $1.15 \pm 0.05\%$ ) fat, ( $6.02 \pm 1.06$  and  $0.95 \pm 0.06\%$ ) fibre, ( $5.38 \pm 0.10$  and  $1.61 \pm 0.02\%$ ) protein, and ( $13.01 \pm 1.03$  and  $91.03 \pm 0.55\%$ ) moisture in dry and fresh samples respectively. The result also revealed that potassium ( $3.49 \pm 0.01$  and  $3.74 \pm 0.04\%$ ) and calcium ( $4.99 \pm 0.01$  and  $6.82 \pm 0.04\%$ ) were the major minerals present in the samples. This indicated that *Bryophyllum pinnatum* leaf is a good source of human nutrition and should be included as dietary supplement.

**Keywords:** *Bryophyllum pinnatum*, Carbohydrate, Protein and Minerals.

## INTRODUCTION

*Bryophyllum pinnatum*, a medical plant is used to cure diseases and heal injuries<sup>26</sup>. *Bryophyllum Pinnatum* belongs to the family of *Grassulaceae* an erect, succulent, perennial shrub that grows about 1.5m height and reproduced from seeds and also vegetatively from leaf bubbls<sup>2</sup>. It is an introduced ornamental plant that is now growing as weed around plantation crops<sup>10</sup>. *Bryophyllum pinnatum* is used in traditional

way for treatment of earache, burns, abscesses, ulcer, insect bites, diarrhea and lithiasis<sup>23</sup>. In South Eastern Nigeria, this herb is used to facilitate the dropping of the placenta of a newly born baby<sup>10</sup>. The plant leaf is mildly exposed to heat and the juice extracted and applied to the baby's placenta on daily basis. The crushed leaves as well as the extracted juice are mixed with palm oil

and rubbed on abscesses<sup>2</sup>. It is usually applied externally.

*Bryophyllum pinnatum* is widely distributed especially in philipines and it is known as “miracle leaf”<sup>11</sup>. The bufadienolides which are active components of *Bryophyllum pinnatum* possess anti-bacterial, anti-humorous and insecticidal actions<sup>16</sup>. In Nigeria like any other developing nation, only few of these herbs have their bioactive compounds identified. On the other hand, some plants with good bioactive properties have useful minerals and food value for human and animal consumption.

This study was designed to investigate the proximate and mineral compositions of *Bryophyllum pinnatum* leaves on dry and fresh samples.

## MATERIALS AND METHODS

The leaves of *Bryophyllum pinnatum* were collected from Abakaliki near Grace Court Hotels in Ebonyi State, Nigeria. The leaves of *Bryophyllum pinnatum* were identified by a taxonomist Prof. J.C. Okafor in the department of Applied Biology, Ebonyi State University, Abakaliki, Nigeria. The leaves were destalked, washed and dried at room temperature. The dried and fresh leaves were pulverized with electric blender. They pulverized samples were labeled, stored in containers and kept in refrigerator ready for analysis. Proximate and mineral analyses were carried out on dried and wet samples of *Bryophyllum pinnatum*.

### Proximate Analysis

Proximate analysis was carried out according to the standard method of Association of Official Analytical Chemist (AOAC, 2005) to determine the carbohydrate, protein, ash, crude fibre, moisture, and fat and oil contents.

### Selected minerals

Cu, Fe, Mg, Ca, Zn, Na, K, Ni, Cd and Pd were determined using Atomic Absorption Spectrophotometer (AAS) based on Association of Official Analytical Chemist<sup>4</sup>.

## RESULT

The result of proximate composition of *Bryophyllum pinnatum* leaves revealed that carbohydrate values were the highest and ash had the least values in both samples as shown in table 1 below. Table 1: Proximate Composition of *Bryophyllum pinnatum* Leaves in both dry and Fresh Samples. (See Table 1)

The results of the mineral contents of *B. pinnatum* leaves showed that calcium level in the samples were the highest while Pb and Zn levels were shown to be the least as shown in table 2 below. Table 2: Mineral Compositions of *Bryophyllum pinnatum* Leaves in both dry and fresh Samples. (See Table 2)

## DISCUSSION

The result of proximate compositions obtained in table 1 showed that *Bryophyllum pinnatum* leaves have appreciable level of carbohydrates and proteins, fat and oil, crude fibre, ash contents in dry sample than fresh samples. This confirms *Bryophyllum pinnatum* as a good source of these nutrients and possible dietary value. The mineral contents of *Bryophyllum pinnatum* leaves were also investigated in both dry and wet samples. The result showed that Ca, K, Mg, Na, Zn, Cd, Ni, Pb and Fe were present in both samples. Calcium was the most abundant mineral in *Bryophyllum pinnatum* as obtained in table 2. Normal extra cellular calcium concentrations are necessary for blood coagulation and for integrity, intracellular cement substances<sup>19</sup>. Thus, the potential of *Bryophyllum pinnatum* to stop bleeding and

its use in treating wounds could be as a result of its high calcium content<sup>23</sup>. Also a high potassium content obtained in result in table 2 also which showed that *B. pinnatum* plays a vital role in normal cell function including neuro-transmission, muscle contraction, and maintaining acid-base balance<sup>26</sup>. Lower sodium content of *Bryophyllum pinnatum* might be an added advantage due to the direct relationship of sodium intake with hypertension on human<sup>9</sup>. The presence of zinc in the samples could mean that the plant can play valuable roles in the management of diabetes, which results from insulin malfunction<sup>19</sup>. This study, therefore, revealed high levels of proximate and mineral compositions in the dry sample than fresh sample except in moisture content where high level was recorded in fresh sample. This might be as a result of the effect of drying in dried sample.

## CONCLUSION

The result of this study showed that *Bryophyllum pinnatum* is a good source of carbohydrate, crude fibre, protein, calcium and potassium in both dry and fresh leaves of the plant.

## REFERENCES

- Adewunmi, A. O., and Sotowra, E. A., (1980). Preliminary screening of some plant extracts for mulluscidal activity; *Science Bulletin*; 10:39-57.
- Agoha, R.C. (1974). Medicinal Plant of Nig eria. Offset Drakkerji. Faculfcitder Wiskunde in Naturwetenschappen, the Netherlands. *Science Bulletin*; 4: 33-41
- Alexander, G., (1993). Basic Biochemistry Methods, Second Edition Wiley Liss, Inc New York, 101:58-1012.
- AOAC, (1980). Official method of Analysis, Thirteenth Edition, Washington DC. Association of Official Analytical Chemists.
- Ayodele, A.E., (2001). Method in plant analysis. *Journal of science*; 10:134-136.
- Chandler, R. F., (1985). *Canadian Pharmaceuticals. Science Journal*:118:420-424.
- Charles, A., and Guy, I., (1999). Food Biochemistry First Edition, Aspen Publication, 113 – 114.
- Chopra, R. N., Nayar, S. L., and Chopra I.C. (1956). Glossary of Indian Medicinal Plants. *Council of Scientific and Industrial; Res, New Delhi*, 1:330.
- Dahl, L. K., (1972). Salt and Hypertension. *Journal of Nutrition*; 25:231-238.
- Dalziel, J. M. (1995). The useful plant of West Tropical Africa. *Journal Science*; 28: 53- 415.
- Duster, P. J., (1986). Heat and flowers: Bryophyllum poisoning of cattle. *Journals of Veterinary Medicine*; 7: 222 -7
- Essien. E. U., Izunwanne, B.C., Aremu; G. Y., and Eka, O.U., (1994). Plant foods for Human Nutrition. *Science Bulletin*; 45: 47-50.
- Hunt, S., Gruff, I. L., and Holbrook, (1980). Nutrition, principles and Chemical practice. *John Eiley and Sons*. New York Publishers. 49-52, 459-462.
- Ihekoronye, A.I., and Ngoddy, P. O., (1985). Integrated Food Science and Technology for the Tropics Macmillan Education Ltd.
- Irvin, E. L., (1977). Toxic Constituents of plant food Stuffs, Second Edition. Academic press, New York, Publishers. 178-181.
- Iwu, M. M., (1993). Hand book of Africa Medicinal Plant 3<sup>rd</sup> edition, CRK Press in corporate, Florida 255-257.
- Nwanu, J., and Akah, P. A., (1986). Ethno pharmacology. *Journal of Ethno Pharmacology*; 18: 103-107.
- Ofokansi, K. C., Esimone, C. O., and Anele, C. K. (2005). Evaluation of the Invitro combined anti bacteria effects of the leaf Extracts of *Bryophyllum Pinnatum*. *Production Research* 9:23-27.
- Okaka, J.C., and Okaka, A. N. C. (2001). Food composition spoilage and shelf life extension Ocjare Academic Publisher, Enugu, Nigeria. 54-56.
- Okaka, J.C., Akobundu, E. N. T, and Okaka, A. N. C (2006). Food for Human Nutri-

- tion, an Integrated Approach. Ocjare Academic Publisher, Enugu, Nigeria. 135-153.
21. Okwu, D. E., (2001). Evaluation of the Chemistry Composition of Indigenous Spices and Flavouring Agents. *Journal of Science*; 7: 455-459.
  22. Okwu, D. E., (2004). Phytochemicals and Mineral content of Indigenous Spices of Southeastern Nigeria. *Journal of Science* 6: 30-37.
  23. Okwu, D. E and Josiah, C. (2006). Evaluation of the Chemical Composition of *Bryophyllum Pinnatum* journal of *Biotechnology*.
  24. Onwuka, G. I., (2005). Food analysis and Instrumentation Theory and practice. First Edition, Naphthali prints, plants, Lagos. 114-169.
  25. Richard, J. H., Hamilton, S., (1977). Lipid Analysis a practical Approach Oxford University Press, New York.
  26. Treas, G.E. and Evans, W. C., (1989). Pharmacology. Second Edition. 168.

**Table 1.** Proximate chemical composition of *Bryophyllum pinnatum* leaves in both dry and wet samples

Name of Nutrient	Dry sample	Wet sample
Ash content	1.21 ± 0.07	0.80 ± 0.03(%)
Fat and Oil	1.28 ± 0.06	1.15± 0.05(%)
Protein	5.38 ± 0.10	1.61 ± 0.02(%)
Crude Fibre	6.02± 1.06	0.95 ± 0.06(%)
Carbohydrate	72.92 ± 1.08	4.46 ± 0.52(%)

Data are mean ± standard deviation of triplicate determination on both dry and fresh sample.

**Table 2.** Mineral composition of *Bryophyllum pinnatum* leaves in both dry and wet samples

Minerals	Dry sample	Wet sample
Iron	0.18± 0.01	0.12 ± 0.01
Zinc	0.26 ± 0.01	0.22 ± 0.02
Copper	0.03 ± 0.01	0.02 ± 0.01
Magnesium	0.42 ± 0.01	0.25 ± 0.01
Sodium	0.32 ± 0.02	0.06 ± 0.01
Potassium	3.49± 0.01	3.74 ± 0.04
Calcium	4.99 ± 0.01	6.82 ± 0.03
Nickel	0.08± 0.01	0.05 ± 0.01
Cadmium	0.23± 0.01	0.34 ± 0.01
Lead	0.03 ± 0.01	0.34 ± 0.01

Data are mean ± standard deviation of triplicate determination on both dry and fresh samples.