Abstract

The study of nutritional and nutraceutical content of *Gnetum gnemon*(BAGO) leaf extract was determined by conducting its physical properties, nutritional as well as its nutraceutical content. Some tests were performed for physical properties such as boiling point, color, density, odor, pH and solubility. For the nutritional content, ash, carbohydrates, fat, moisture and protein were conducted experimentally. And the alkaloid, leucoanthocyanin, saponin, tannin and vitamin C were conducted in terms of its nutraceutical content.

The extracted bago leaf is dark green in color, 0.9296 g/mL in density pleasant in odor, contain 5.45 pH which is slightly acidic and miscible in both ethanol and water whereas immiscible in toluene which indicates the sample is polar. In nutritional the average ash content contain 3.0276% which is good source of minerals, 32.5884% in carbohydrates which is a good source of energy. Fat is 13.101% which can give energy supply in the body, 69.54% in moisture which implies water and it is important in our body and the protein which is about 17.96%. For further experiment, the nutraceutical content was also determined wherein the result of the alkaloid was present because it formed an orange precipitate for dragendorff’s and white precipitate in mayer’s reagent, and then saponin, another secondary metabolites help lower your cholesterol and reduce your risk of heart disease. For the test of leucoanthocyanin and tannin found negative.

It is recommended to conduct another type of study using the same sample, instead of fresh leaf dried leaf may be used.

Introduction

Nutritional content awareness of every food has important role to our health. It gives us knowledge about the food and can sustain the balance diet needed for our body. This study brings us the knowledge about the nutritional content of the matured and young leaf of bago plant or *Gnetumgnemon*in its scientific name, the people make this plant as a good source of a healthy food. This study offers every household a source of food found in our place or even found anywhere in Northern Samar.

Nutraceutical are products derived from food sources purported to provide extra health benefits, in addition to the basic nutritional value found in foods. Depending on the jurisdiction, products may claim to prevent chronic diseases, improve health, delay the aging process, increase life expectancy, or support the structure or function of the body. Dr. Stephen DeFelice coined the term “Nutraceutical” from “Nutrition” and “Pharmaceutical” in 1989. The term nutraceutical is being commonly used in marketing but has no regulatory definition. An attempt to redefine nutraceuticals and functional foods is made in this article. The proposed definitions can help distinguish between functional foods, nutraceuticals and dietary supplements.

Methodology

This study was conducted at the Biophysical Laboratory complex, College of Science, University of Eastern Philippines, University Town, Northern Samar.

All the reagents were of analytical grade purity.

A. Collection and preparation of samples

The matured and young Bago leaf was collected in Gamay, Northern Samar. The design of this research was experimental. This study focused mainly on determining the physical properties, nutritional content and nutraceuticals of matured and young bago leaf extract.

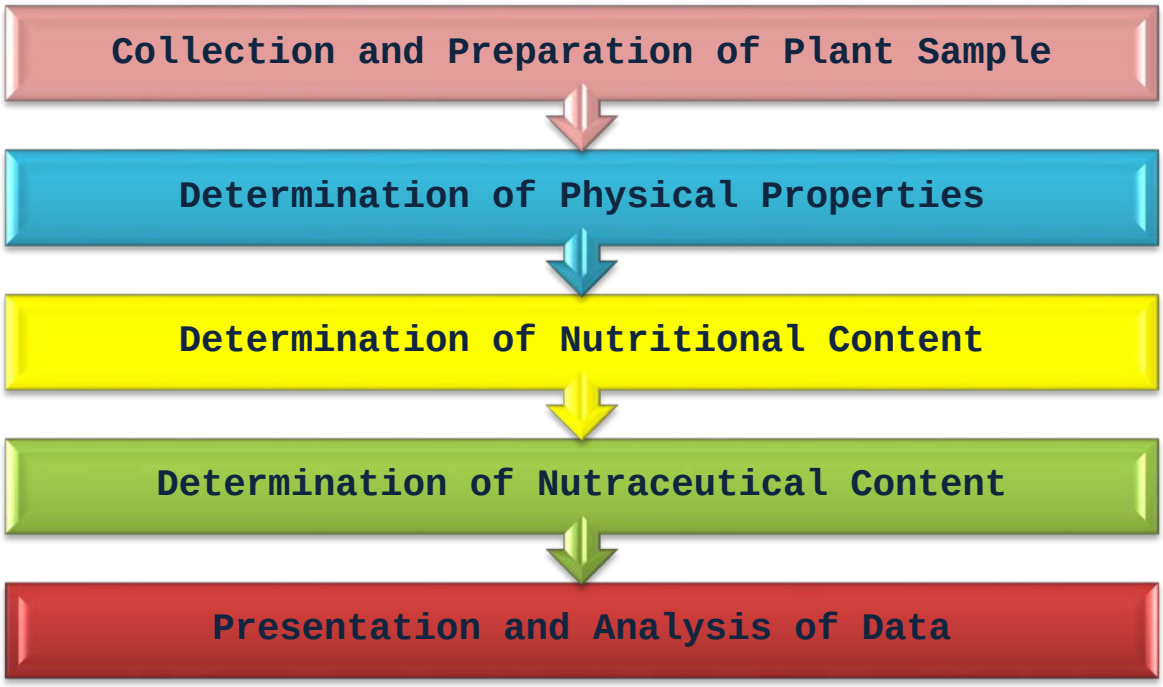
B. Determintion of Physical Properties

The different physical properties of matured and young Bago leaf extract were determined using the standard procedures.

C. Determination of Nutritional content

The nutritional value of matured and young Bago leaf extract was analyzed for chemical composition[ash, fat, carbohydrates, moisture content] using the standard procedures/official method of analysis.

D. **Nutraceutical content** in terms of Alkaloids, saponin, and vitamin C were present while leucoanthocyanine and tannins were negative.



Flow Chart of the Study

Results and Discussions

A series of experimentation was conducted within three trials and were analyzed and interpreted by the researcher according to the statement of the problems of this study.

Physical Properties

The physical properties of the matured and young Bago leaf extract were determined in terms of color, odor, pH, density, solubility and boiling point.

Table 1. Physical Properties of Bago Leaf Extract

Physical Properties		Result
Boiling Point		100.9°C
Color		Dark green
Density		0.9296g/ml
Odor		Pleasant
pH		5.45 pH
Solubility	Ethanol	Miscible
	Toluene	Immiscible
	Water	Miscible

Table 1 showed that the boiling point of the matured and young bago leaf extract is 100.9°C, the color of extract is dark green, and the average density is 0.9296g/ml, likewise the odor is pleasant, the pH is 5.45 which is weakly acidic, and for solubility the matured and young bago leaf extract is miscible in ethanol and water while in toluene solvent is immiscible which indicates that matured and young bago leaf extract is polar because of the rule in solubility which states that “like dissolves like”.

Nutritional Content

The nutritional content of matured and young bago leaf extract was determined in terms of ash content, carbohydrates, fats, moisture, protein.

Table 2. Nutritional Content of Bago Leaf Extract

Nutritional Content in terms of:	Result
Ash	3.0276%
Carbohydrates	32.5884%
Fats	13.101%
Moisture	69.648%
Protein	17.96%

As shown in Table 2, the average of ash content is 3.0276% which is good source of minerals. Carbohydrates is 32.5884% which is a good source of energy. Moisture content is 69.648% which implies more water content and is important in our body. Fats is 13.101% which can give energy supply for the body and the protein which is about 17.96% which implies

the presence of a substance found in food that is needed in our body.

Nutraceutical Content

The nutraceutical content of matured and young bago leaf extract were determined in terms of alkaloid, leucoanthocyanin, saponin, tannin and vitamin C.

Table 3.Nutraceutical Content of Bago Leaf Extract

Nutraceutical Content in terms of:	Results	Interpretation
Alkaloid	Orange precipitate formed for dragendorff's ; White precipitate formed Mayer's	Positive
Confirmatory Test of Alkaloid	Orange precipitate for dragendorff's ; White precipitate formed for Mayer's	Positive
Leucoanthocyanin	No purple color formed	Negative
Saponin	Lower than distilled water	Positive
Confirmatory Test of Saponin	Formed honeycomb	Positive
Tannin	No yellowish precipitate formed	Negative

As shown in Table 3, the result of the analysis made in three trials were that the alkaloid is positive because it formed an orange precipitate for dragendorff's and white precipitate for Mayer's reagent, and so with saponin is positive because the bago leaf extract is lower than distilled water, while the leucoanthocyanin and tannin were negative for the bago leaf extract.

Vitamin C

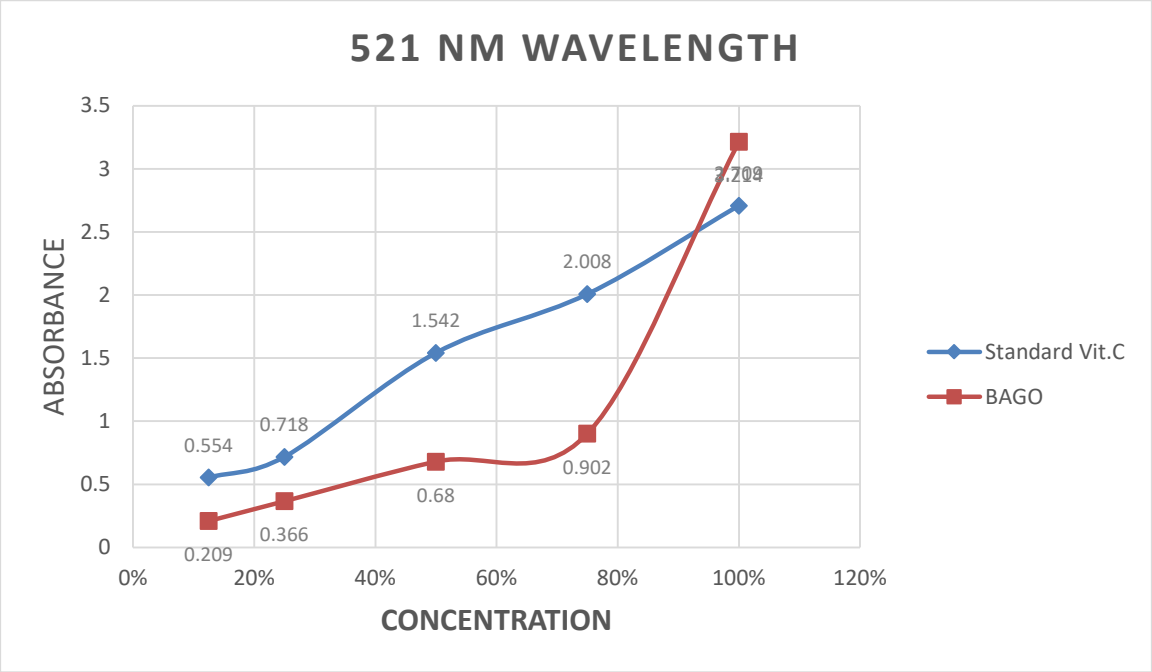


Figure 9. Graph of Vitamin C

From the graph, it showed that the curved of matured and young bago leaf sample is far to the curved of ascorbic acid which shows that bago leaf sample has presence of vitamin c.

Conclusion

Based on findings and results of this study, the researcher found out the following.

1. The matured and young Bago leaf extract has boiling point 0f 109^{0}C, dark green in color, pleasant in odor, pH of 5.6 which means weakly acidic, immiscible in hexane, miscible in water and ethanol which means the sample is polar and has density of 0.97g/mL which means less dense than water.

2. The matured and young Bago leaf extract has nutritional content which ash, carbohydrates, fats, moisture and protein which good to be preserved as food.

3. The Bago leaf extract contain alkaloid, phenolic compound,saponin and tannin which make it useful in the field of medicine.

Recommendations

From the results and conclusion of the study, the following recommendations are presented:

1. Further study be conducted about this plant and test triterpenes, beta carotene and lycopene.

2. Conduct another study using dried of young and matured leaf of Bago plant.

3. Other parameters and methods be conducted to detect nutritional and nutraceutical content of sample and include in objectives of the study the percent yield.

Acknowledgement

The authors would like to thank the College of Science, University of Eastern Philippines for the support.

References:

A.BOOKS/JOURNAL

Arums Wulandari, Supriyanto, Edi Guhardjia, M.A Rifia, Y.Fakuara, N.Sakarno.1997.Effect of a thermal-shock on fruiting-body induction of *Scleroderma* sinnamariense associated with *Gnetum gnemom* seedlings.International Conference on Mycorrhizae

Brown,W.H.1954.UsefulplantsofthePhilippines.Rep.Philip.Dep. Agric.Nat.Res.Tech.Bull.10 vol.2 .Bur. Printing, Manila, Phils.

Coronel, R.E.1983.Promising fruits of the Philippines. College of agriculture, University of the Philippines at Los Banos, College, Laguna, phil.pp.475-476.

Francisco, S.F. and P.J.Wester.1930.Analysis and food value of some unsual Phil.Fruits. Philip. J.Sci.43 (4):655-633.

Mori, M., *et al*. (2008). Relationship between lifestyle-related Diseases with the Intake of Indonesian Fruit Melinjo Rich in Phytoestrogens. Niigita, Japan. The 4th

International Niigita Symposium on Diet and Health Integrative Function of Diet in Anti-aging and Cancer Prevention.

Hisada, H., *et al*. (2005). Antibacterial and Antioxidative Constituent of Melinjo Seeds and Their Application to Foods.Japan. Science Links Japan.

Karina Milagros R. Cui, Ma. Lourdes C. Alvarez, Franklin E. Cortez, Abel Alejandro U. Flores Jr., Blenah O. Perez, Felisa L. . Judy M. Somoray and Manuel Cecille G. Vicencio., "Analysis of Nutrient & Nutraceutical content of mushroom species." International Journal Chemistry Volume 4 (2): pp.135-139. 2015

Pancho, J.1983.kalikasan: The Philippine Journal of Biology Supplement No.1, New Mercury Printing Press.Pp.51-53.

Kapur et al, "Spectrophotometric Analysis of Total Ascorbic acid Content in Various Fruits and Vegetables,"2012

Dagadkhair AC,et al 2016, Journal of Nutrition and Food Science. "Effect of storage on physicochemical Properties of Spiced Fish Sauce http://dx.doi.org/10.4172/2155.900,10000520.

Sanico F.L, Samoray Ma.Judy M., Alvarez Ma.Lourdes C., et al., "Analysis of Nutrient and Nutraceutical Content of Mushroom Species."International Journal Chemistry , Vol 4(2):pp.135-139.2015

Guevarra, Beatrice B. A guidebook to plant Screening Photochemical and Biological). University of Santo Tomas, Manila: Publishing House Inc.

Dr.karina Milagros Cui-Lim, Technical Chemistry Laboratory manual for procedure determination of moisture and total solids,pages 3 – 4

Dr.Merle N. Tonog, Principles of Environment Chemistry. Properties of acids and Neutralization. Page 48 and 52

B. Unpublished thesis

Valera Sem A.(2014) "Nutritional Content of Dioscorea hispida Dennst (korot)" found in lavezres, Northern Samar., 2015

Porcadilla Bennix G., Phytochemical Screening of Cynodon Dactylon (L) Per (Bermuda Grass) leaf extract.,2015

Beraldez,H.F.(2009)"Phytochemical Screening of Tamarindus indica Linn.(Sampaloc)"Unpublished Undergraduae Thesis. College of Science, University of Eastern Philippines, University Town, Northern Samar.

C. Internet Sources

http://en.m.wikipedia.org/wiki/Antimicrobial Wikipedia, the free encyclopedia

http://WWW.cognitive.com/mode/2235.accessed 2017.

https://en.wikipedia.org/wiki/Food_moisture_analysis.

Accessed: March 2017

http://umm.edu/health/medical/altmed/supplement/vitamin-c-ascorbic-acid. Accessed: February 2017

https://en.wikipedia.org/wiki/Anthraquinone.accessed:Jan.2017

D. Other Sources

Erdb.denr.gov.ph/files/publications/rise/r_v13n2.pdf by RT Cadiz-2001.

Phytochemistry 62(4):601-6 March 2003 with DOI:1016/SOO31-9.March 2003

The sixth International Conference on Natural Products for Health and Beauty., At Pullman Raja Orchid Hotel,khonkhan,Thailand., Volume:ISBN:9786162235665.January 2016.

Cockerell et.al,(2000)Food analysis. Retrieved Jan.2017 from https://en.wikipedia.org/wiki/food.moisture analysis/crude fiber analysis

Horwitz et al, (2001) Food analysis. Retrieved January 2017 from https://books.google.com.ph/books/about/food-analysis/ash content/crude fat content.html? id=DUL7 jEGcUC, Rider-esc=y.