

Phytochemical and Proximate Analysis of Black Turtle Beans (*Phaseolus vulgaris*)

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Abstract: Phytochemical and proximate analysis of *Phaseolus vulgaris* was carried out to determine its medicinal and nutritional value. phytochemical screening revealed the presence of alkaloid, saponins, tannin, steroids, resins, carbohydrate, protein and absence of flavonoid. These classes of compounds were known to possess therapeutic properties. Proximate composition has shown that *Phaseolus* contains 10.56± 0.10 moisture, 24.00±0.01, crude protein 14.00 ± 0.01, fat 3.50 ± 0.02, Fibre 4.90± 0.01, ash and 53.60 ±0.01 carbohydrates. This result indicated that *Phaseolus vulgaris* is a high medicinal and nutritional plant.

Key words: Phytochemical • Proximate • *Phaseolus vulgaris* and Black Turtle Beans

INTRODUCTION

It is a well known fact that under developed nations all over the world does not produce enough food and/or food of right nutritive values to meet daily need [1]. The dearth in food supply especially of protein is so enormous that the developing nations have to depend on cereals, grains, starch, roots and tubers for energy and protein. Legumes refer to the seeds of leguminosae including peas, beans and pulses, “it is considered as poor man meat” due to their high protein content and low cost compared to meat and meat products. Black turtle beans commonly known as Akidi in the Eastern Nigeria belong to the family *Fabaceae* is a herbaceous annual plant grown worldwide for its edible fruit, either the dry seed or the unripe fruit both of which are referred to as beans. Their leaves are occasionally used as fodder. Along with other species of beans genus (*Phaseolus*), it is classified botanically into the legume family, most of whose members acquire nitrogen through an association with rhizobia, a species of nitrogen fixing bacteria [2].

Nutritional Quality: In Nigeria, beans are grown and widely eaten in Southern, Mid-western and Eastern part of Nigeria. Leguminous plant families are noted to be rich in protein, yet very low in fat, more than any other known vegetable seed, making it a great inclusion in healthy diets, as well as weight loss legume. They are highly sought after because they tend to have a unique subtle

sweetness and flavor. They are also more tender and smooth in texture after cooking and reported to be of high nutritional content [3]. They contain soluble and insoluble dietary fibres that make them give a great sense of satiety, this is a desirable effect for weight loss. High dietary fiber also means that the bulk effect needed for good bowel function.

MATERIALS AND METHODS

Sampling and Sample Preparation: The seed of *Phaseolus vulgaris* were bought from Ogbaru Main market Onitsha, ground to fine powder and keep in air tight container for Proximate and Phytochemical Screening. Proximate Analysis was done by methods outlined by AOAC, 1980 [4] while Phytochemical by (Harborne, 1999) [5]

RESULTS AND DISCUSSION

The results of Proximate and Phytochemical are shown in Table 1 and 2.

Phytochemical Screening of the sample as presented in the table showed the presence of the following secondary metabolites: saponin, tannin, proteins, carbohydrate, steroids, resins, alkaloids, but absence of flavonoid. Alkaloids which was presence in this work are used as antimycotics and also in the treatment of stomach pains [6]. Saponin has being found to be anticarcinogenic, chloesterol decreasing and antiinflammatory substances.

Table 1: Result of Phytochemical Screening of Black Turtle Beans (*Phaseolus vulgaris*)

S/N	Phytochemicals	Results
1	Alkaloids	+
2	Saponin	+++
3	Tannin	++
4	Flavonoids	-
5	Steroids	++
6	Resins	++
7	Carbohydrate	+++
8	Protein	++

Key: - Absent, +- slightly present, ++-moderately present, +++-Highly present.

Table 2: Result of Proximate Composition of Black Turtle Beans (*Phaseolus vulgaris*)

S/N	Parameters	Percentage yield
1	Moisture%	10.56 ±0.10
2	Crude protein%	24.00± 0.01
3	Fat%	14.00±0.01
4	Fibre %	3.50±0.02
5	Ash%	4.90± 0.01
5	Carbohydrate%	53.60±0.01

Tannin extract are ant-inflammatory, control gastritis and irritating bowel disorders, they also contribute to antimicrobial power, which heals wounds and stop bleeding [7]. There was presence of steroids revealing the importance of the plant in pharmacy due to their relationship with sex hormones [8]. Resins are valued for their chemical properties and associated uses such as the product of varnishes, adhesive and food glazing agents.

Carbohydrate and protein in the plant indicated the high nutritional value of the seed. Presence of Carbohydrate revealed that the plant was a good source of energy while Protein indicated that it can help in physical and mental growth and development [9].

From the result obtained from the proximate analysis of the seed of *Phaseolus vulgaris*, The ash content showed that they contained some quality of mineral element which are essential in our diet [10]. The high moisture content suggested that they should be dried properly before storage so as to avoid the invasion of micro-organisms which can lead to their spoilage [11]. The percentage of the crude fiber suggested that the consumption could help to maintain movement of food through the gut to provide energy and ensure break down of the food. It also showed that the samples contained some mineral elements which are essential for animal nutrition [12]. The crude fat or lipid provides very good source of energy and aids in transport of fat soluble vitamins, insulates and protects internal

tissues and contributes to important cells processes [13, 14]. The protein content of the sample showed that the seed is highly proteinous and could be incorporated in the diet of both old and young including pregnant and nursing mothers and the high carbohydrate value indicated that the seed contained reasonable amount of energy and will give high amount of energy when consumed.

CONCLUSION AND RECOMMENDATION

From the result of this study, It has been revealed that *phaseolus vulgaris* have both nutritional and medicinal value due to the presence of secondary metabolites which has therapeutic properties, It is therefore recommended to be consumed by both young and adult especially the nursing mothers. The Government should encourage the planting of this wonderful plant as it could also be used for soil restoration to check erosion.

REFERENCES

- Olaofe, O. and C.O. Sanni, 1998. Mineral content of agricultural products. Food Chem., 30: 73-77.
- Gentry, H.S., 1969. "Origin of the common bean, *Phaseolus vulgaris*". Economic botany (New York: New York Botanical Garden Press), 23(1): 55-69.
- Aremu, M.O., Y.E. Olayioye and P.P. Ikkoh, 2009. Effect of processing on the nutritional quality of variety of seed flours J. Chem., Soc. Nig., 34(2): 140-149.
- A.O.A.C Association of Analytical Chemist Official Method of analysis (2006). Washington DC, pp: 650-670.
- Harborne, J.B., 1998. Phytochemical method: A guild to modern techniques of plant analysis, 3rd Edition, Chapman and Hall, An imprint of Thompson Science, 2-6 boundary row, London, UK, pp: 1-290.
- Akpauka, M.U., 2009. Essential of Natural Products Chemistry Mason Publishers, Inc. Enugu Nigeria, pp: 34-65.
- Gills, L.S., 1992. Ethanomedical Lises of plants in Nigeria, Unviersity of Benin Press, Benin, Nigeria, pp: 276.
- Burkil, H.M., 1984. The useful plants of West Tropical Africa Vol. I. families A.D Royal Botanical Garden, pp: 401-415.
- Onwukeme, V.I., P.M. Nwankwo and E.C. Obiuchendu, 2010. Proximate Analysis and

- Antinutritive content of *Vigna Unguiculate*, *Anachem Journal*, 4(2): 761-764.
10. Onwuka, G.I., 2005. Food analysis and Instrumentation; Theory and Practice. Napthalic Prints, Surulele, Lagos, Nigeria, pp: 219-230.
 11. Kirchmann, G. and J. Kirchmann, 1996. Nutritional Almanac, Mc Graw Hill, London, pp: 115-116.
 12. Ajiwe, V.I.E., U.V. Ugbona, H.O. Nnabuenyi and A.C. Ajiwe, 2008. Proximate Analysis, Extraction, Characterization and Possible Application of oil from *Milletia aboensis* fruit., *Anachem J.*, 2(2): 363-367.
 13. Jones, M.M., D.O. Johnson and J.T. Nethville, 1985. Chemistry and society. 5th ed., Saunder College Publishers U.S.A, pp: 521-577.
 14. Pamela, C.C., A.H. Richard and R.F. Denise, 2005. Lippincott's Illustrated Reviews Biochemistry 3rd ed., Lippincott William and Wikins, Philadelphia, pp: 335-388.