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Comparative Study of Proximate and Phytochemical Compositions of *Anthocleista Djalensis* Planch. And *Anthocleista Vogelii* A. Chev. (Longaniaceae) In South Eastern Nigeria

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ABSTRACT

Proximate and phytochemical compositions of *Anthocleista djalensis* Planch. and *Anthocleista vogelii* A. Chev. present in Southeastern Nigeria were determined and compared. Standard methods of analyses were employed. There were presence of alkaloid, flavonoid, saponin, steroid and tannin whereas glycoside was absent in the leaves, stems and roots of the two species. Alkaloid was the highest bioactive agent present in the two plants. High levels of protein, fat and carbohydrates were also found in the parts of *Anthocleista djalensis* and *A. vogelii* with higher concentration of carbohydrates in *A. vogelii*. A close affinity between these plants was revealed, thus, suggesting their usefulness in ethnobotany as foods and drugs.

Keywords: *Anthocleista*, *Anthocleista Djalensis*, *Anthocleista Vogelii*, Plant Drugs.

1. INTRODUCTION

The genus *Anthocleista* Afzel ex R. Br. is a member of the family Longaniaceae. It is composed of five species in Nigeria. These include *Anthocleista djalensis* A. Chev., *A. vogelii* Planch., *A. liebrechtsiana* De Wild and Th. Dur., *A. procera* and *A. schweinfurthii* Gilg (Syn. *Anthocleista oubanguiensis*) Aubrev. and Pellegr. [1].

Among the five species reported in Nigeria by Keay *et al.* [2], only *Anthocleista djalensis* and *A. vogelii* are of wild occurrence in the South Eastern Nigeria. The other three species were few in the West and Lagos areas of Nigeria only. According to these workers, the species in the South Eastern States could among other character, be distinguished, and based on their habitat, spines and flora colours. *Anthocleista djalensis* grows in dry secondary forest zones, white flowered and with few spines with nearly parallel prongs. *Anthocleista vogelii*, on the other hand, is of the swampy forest region, with short orange or fawn-coloured flowers and with much more diverged and numerous prongs of spines.

Quite a number of economical benefits of *Anthocleista djalensis* have been reported. The white timber of *Anthocleista djalensis* is used for plywood, veneers, crates, boxes, fascia-board, formwork and roofing members. The leaves are excellent wrapping materials, as well as fodder for sheep and goat. Ethnobotanically, *Anthocleista djalensis* has been reported to be of immense importance. But no information has yet been given on the ethnobotanical uses of *Anthocleista vogelii*. The reason may be because of the inaccessible ecological zone it habits. The objective of this work, therefore, was to compare the phytochemical and nutritional constituents of the two plants. This may subsequently reveal the ethnobotanical importance of the less exploited species, and predict those of other species in the

other parts of the country. This may also help to establish the taxonomic relationship between the two species.

2. MATERIALS AND METHODS

2.1. Plant Materials

The plant materials used for this work were collected from various wet and dry zones of the botanical garden of Nnamdi Azikiwe University Awka, where both were growing naturally. The specimens were authenticated and the vouchers deposited at the Herbarium of Nnamdi Azikiwe University Awka.

2.2. Preparation of Plant Material

Two hundred and fifty gram (250g) of the seeds, leaves, stems and roots used were oven-dried at 60°C for 24 hours.

2.3. Preliminary Phytochemical Tests

The preliminary phytochemical tests for the presence or absence of alkaloid, saponin, flavonoid, sterols and triterpenes, tannins, glycoside and starch were carried out following standard methods of Beckett and Stenlake [3]. The symbol (+) denoted present while (-) represented absent of the phytochemicals.

2.4. Quantitative Phytochemical Tests

The quantitative phytochemical tests were conducted using a standard method [4].

2.5. Proximate Analyses

Proximate analyses of the test samples were conducted following the standard methods of Ene-Obong and Carnovale [5].

3. RESULTS

The results of the phytochemical and proximate study of *Anthocleista djalonenensis* and *A. vogelii* were shown in Tables 1-3. There were presence of alkaloid, flavonoid, saponin,

steroid and tannin in the leaves, stems and roots of the two species; whereas glycoside was absent (Table 1). Highest level of alkaloid was detected in the leaves of *Anthocleista djalonenensis* ($6.80 \pm 0.3\%$) (Table 2). High level of saponin was found in the leaves ($6.40 \pm 1.1\%$) and stems ($5.40 \pm 0.2\%$) of *A. vogelii* (Table 3). Higher level of fat was present in the parts of *Anthocleista djalonenensis* whereas highest level of carbohydrate was found in the leaves ($54.79 \pm 0.3\%$), stems ($47.55 \pm 1.1\%$) and roots ($43.80 \pm 1.2\%$) of *Anthocleista vogelii* (Table 3).

Table 1: Qualitative phytochemical constituents of *Anthocleista djalonenensis* and *A. vogelii*

Constituents	<i>Anthocleista djalonenensis</i>			<i>Anthocleista vogelii</i>		
	Leaves	Stems	Roots	Leaves	Stems	Roots
Alkaloid	+	+	+	+	+	+
Flavonoid	+	+	+	+	+	+
Glycoside	-	-	-	-	-	-
Saponin	+	+	+	+	+	+
Steroid	+	+	+	+	+	+
Tannin	+	+	+	+	+	+

The signs indicated the presence (+) or the absence (-) of phytochemical.

Table 2: Quantitative phytochemical constituents of *Anthocleista djalonenensis* and *A. vogelii* (%)

Constituents	<i>Anthocleista djalonenensis</i>			<i>Anthocleista vogelii</i>		
	Leaves	Stems	Roots	Leaves	Stems	Roots
Alkaloid	6.80 ± 0.3	3.40 ± 0.3	2.00 ± 0.1	3.40 ± 0.1	0.60 ± 0.01	1.40 ± 0.2
Flavonoid	3.10 ± 0.2	2.0 ± 0.1	1.10 ± 0.01	1.90 ± 0.2	1.10 ± 0.1	0.40 ± 0.01
Saponin	2.10 ± 0.2	2.00 ± 0.1	1.90 ± 0.1	6.40 ± 1.1	5.40 ± 0.2	1.90 ± 0.12
Steroid	0.91 ± 0.3	1.11 ± 0.2	2.11 ± 0.4	0.62 ± 0.1	0.71 ± 0.2	0.88 ± 0.12
Tannin	1.20 ± 0.1	1.10 ± 0.1	1.00 ± 0.01	0.80 ± 0.1	0.85 ± 0.2	0.62 ± 0.1

Data are mean \pm Standard deviation of triplicate determinations.

Table 3: Proximate composition of *Anthocleista djalonenensis* and *A. vogelii* (%).

Constituents	<i>Anthocleista djalonenensis</i>			<i>Anthocleista vogelii</i>		
	Leaves	Stems	Roots	Leaves	Stems	Roots
Protein	2.10 ± 0.2	2.50 ± 0.11	1.98 ± 0.1	0.55 ± 0.1	0.09 ± 0.01	1.27 ± 0.1
Fat	15.50 ± 0.7	4.50 ± 0.2	9.50 ± 0.3	4.50 ± 0.1	2.00 ± 0.1	1.50 ± 0.11
Ash	1.00 ± 0.01	0.60 ± 0.03	3.00 ± 0.2	4.20 ± 0.1	0.81 ± 0.01	1.60 ± 0.2
Crude fibre	2.00 ± 0.1	4.00 ± 0.2	3.00 ± 0.1	2.00 ± 0.1	3.00 ± 0.1	4.00 ± 0.3
Carbohydrate	1.20 ± 0.3	14.00 ± 0.7	23.52 ± 0.3	54.79 ± 0.3	47.55 ± 1.1	43.80 ± 1.2
Moisture	80.20 ± 1.2	78.40 ± 1.1	62.00 ± 2.1	36.00 ± 2.1	49.60 ± 0.7	51.80 ± 0.9
Acid insoluble ash	0.60 ± 0.1	2.00 ± 0.2	1.20 ± 0.1	0.60 ± 0.01	1.00 ± 0.1	2.20 ± 0.2
Water insoluble ash	0.20 ± 0.01	1.20 ± 0.1	1.80 ± 0.12	3.00 ± 0.2	2.40 ± 0.1	3.20 ± 0.1

Values are mean \pm Standard deviation of triplicate determinations.

4. DISCUSSION

The result showed that there were considerable high level of bioactive agents as well as nutrient values in the various parts of *Anthocleista djalonensis* and *A. vogelii* of Southeastern Nigeria. High level of alkaloid ($6.80 \pm 0.3\%$) in the leaves of *A. djalonensis* in addition to flavonoid, saponin and tannin in all the parts, could be the reason for traditional usefulness of *A. djalonensis* as drug. The bark is useful in treatment of painful menstruation, gonorrhoea, ulcer, cut, sores, wounds and stomach problems [6]. The root of the plant in local gin has been reported useful in the treatment of sexually transmitted diseases and fever, while the leaves are poison antidote, antimalarial, anti-viral and includes fertility in humans. These could be as a result of high alkaloid ($6.80 \pm 0.3\%$) content of the leaves in addition to high level of flavonoid, saponin and tannin in the parts of the plant, presumably due to the anti-protozoal [7]; antibiotic and antiviral [8,9] activities of saponin as well as antiulcer action of saponin and tannin [10,11]. Besides, high level of alkaloid, flavonoid and saponin were also found in parts of *A. vogelii* with highest concentration of saponin in the leaves ($6.40 \pm 1.1\%$) and stems ($5.40 \pm 0.2\%$). This suggested that it could also be used in traditional medicine in the same way as *A. djalonensis*. In addition, the whole parts of *Anthocleista* spp have been reported to be used as good luck charm in Nigeria [12]. Although, there was absence of glycosides in all the parts of the plants examined, long term use of high doses of parts of these plants may be fatal, as a result of high alkaloid content. The toxic effect of the use in large doses of *A. djalonensis* in traditional medicine has been observed [13].

In addition, considering the level of protein in the leaves ($2.10 \pm 0.2\%$) and stems ($2.50 \pm 0.11\%$), fat ($15.50 \pm 0.7\%$) and crude fibre contents of *A. djalonensis*; coupled with high carbohydrate, crude fibre contents of *A. vogelii*, their usefulness as food is suggested.

5. CONCLUSION AND RECOMMENDATION

Findings of this study proposed a close affinity between these two species. Dearth of information on the traditional usefulness of *A. vogelii* implied that it is still untapped. There were compositions of phytochemicals which have bioactive actions in these plants, revealing their potential usefulness as drugs; and this need to be fully utilized. In addition, they were rich in nutrient contents. Thus, utilization of both *Anthocleista djalonensis* and *A. vogelii* in ethnomedicine as drugs and food is recommended. However, the latter may not be good for diabetic patients due to high carbohydrate content; which suggests an in vivo investigation of these species.

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