LOCAL PERCEPTION AND PROXIMATE ANALYSIS OF SOME EDIBLE FOREST PLANTS AROUND UNIVERSITY OF AGRICULTURE WILDLIFE PARK, BENUE STATE, NIGERIA.

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ABSTRACT

Local perception and proximate analysis of some edible forest plants around the University of Agriculture Makurdi Wildlife Park were investigated. The selected plants were Anona senegalensis, Cissus populnea, Tacca leontopetaloides and Vitex doniana. The Focus Group Discussion (FGD) technique was employed to obtain information from local residents in four bordering communities around the park. Results obtained from FGDs showed that the villagers used these wild plants mainly for food and medicine. Proximate analysis of the selected plants showed varying composition of micronutrients. moisture content was highest in Vitex doniana (45.2 ± 0.1) and lowest in Tacca leontopetaloides (7.9 ± 3.4). Annona senegalensis had the highest protein and fat content (8.78 ± 0.02 and 24.17 ± 0.33) which were both considerably low in Tacca leontopetaloides (0.3 ± 0 and 0.1 ± 0) and Cissus populnea (0.3 ± 0 and 0.13 ± 0.07), fibre and ash content were highest in Cissus populnea (29.37 ± 0.41 and 12.97 ± 0.34) and least in Tacca leontopetaloides (3.07 ± 0 and 1.08± 0) and Tacca leontopetaloides had higher carbohydrate value (84.22± 0.03). The results showed that the selected edible wild plants were rich in essential nutrients and could serve as good sources of dietary supplements for growth and body maintenance. Further research is recommended especially in the propagation and domestication of the species to ensure sustained availability of the plants.

Key words: Local Perception, Proximate Analysis, Edible Forest Plants, Focused Group Discussions.

INTRODUCTION

Edible wild plants as noted by Lockett *et al* (2000) and Ali- Shtayeh *et al* (2008) are important sources of dietary nutrients in food and contribute to the proper growth and functioning of the body. Based on studies by FAO, about 1 billion people especially in developing countries depend

on edible wild plants in their diets (Bharucha and Pretty, 2006). Traditionally, some of these plants are not only edible but also have high medicinal properties as noted by Pardo-de-Santayana *et al* (2007). Ethnobotanical surveys show that wild plants play a major role in the sustenance of life (Bhogaonkar *et al,* 2012) especially in the rural areas as the rural dwellers depend on wild plants basically for edible and medicinal uses (Chen and Qui, 2011). Various parts of these plants (leaves, roots, stem, bark,) have been discovered to have medicinal properties when used individually or mixed in a concoction. The medicinal and nutritional uses of these plants have been attributed to the phytochemical composition and nutritional content of the plants respectively (Potchoo *et al,* 2008). Despite the oblivious use of these plants, inadequate knowledge hinders intensive use and wider acceptance by some of the people. The research aims at evaluating the local perception and nutritional composition of selected edible wild plants in order to provide information on their status in the area of study.

METHODOLOGY

The study was carried out in four villages around the University of Agriculture Makurdi Wildlife Park. The university has a total land mass of 8000 hectares within which the Forestry Wildlife Park occupies 25 hectares. Four out of seven villages were randomly selected to investigate the local perception of the residents on the selected forest plants. The villages chosen were Tse-Yav, Tse-Ankyegh, Tse-Anyam and Tse-Tyodugh. These communities are all Tiv speaking communities from Benue State located around the boundaries of the university. The field survey involved the identification and collection of edible plant species needed for laboratory analysis and conduct of Focus Group Discussions (FGDs) to understand the rural dwellers' perception of the sampled plants. The four selected plant species (*Anona senegalensis, Cissus populnea, Tacca leontopetaloides* and *Vitex doniana*) collected from the University Wildlife Park.

Laboratory Analysis

The laboratory analysis was conducted for proximate analysis. This was carried out at the College of Food Science and Technology Food Chemistry Laboratory at the University of Agriculture Makurdi. The procedure for plant sample preparation and analysis by Onwuka (2005) was followed for all plant samples. *Anona senegalensis* and *Vitex doniana* fruits were washed, carefully cut open, and then the seeds removed to access the edible part of each fruit.

Cissus populnea was washed and peeled to remove the outer skin before been cut into strands and used for the experiment.

Tacca leontopetaloides had to be processed into powder as that is the form in which it is edible. The tubers were thoroughly washed then it skin was carefully peeled off (as it's believed to be poisonous) after which the whole tuber was grated into a bowl of water and thoroughly rinsed to remove any lingering bitterness. The water was later decanted and the residue dried into powder. This powder was then used for the experiment.

The parameters tested were; moisture content, ash content, crude fibre content, fat content, crude Protein and Carbohydrate (by difference).

RESULTS

In Table 1, all the sampled plant species were accepted as edible plants in each village. The edibility of each plant as compared among villages using one way analysis of variance showed no significant difference (F=0.36, P=0.783)

All the plants except *Vitex doniana* were used for medicinal purposes among the sampled villages (Fig.1). Similarly, all the plants were accepted as edible plants among the local people. When the results of both medicinal and edible uses were compared among the villages using one way ANOVA,

there was no significant difference (F=0.468, P=0.720). Only *Cissus populnea* was accepted for its spiritual use as well as its use for construction purposes in rural areas. Wood from *Vitex doniana* is been used for timber.

In comparing medicinal uses of sampled plant species among the villages, *Anona senegalensis* was shown to have the highest level of acceptance (Fig. 2) as it was accepted by all four sampled villages. However, the other plants were not so useful medicinally as they were not accepted by the 15 respondents in the sampled village.

The results of proximate analysis showed a varying composition of nutrients. The moisture, ash, fibre, protein, fat and carbohydrate contents were differently represented in each plant species sampled as shown in Table 2. In comparing the results of proximate analysis of each plant species sampled, there was a significant difference ($P < 0.0001$) in almost all the plant samples except in the protein comparison between *Tacca leontopetaloides* and *Cissus populnea* which showed there was no significant difference at the 95% confidence interval ($P > 0.005$).

Table 1: Perception of local people around the University Wildlife Park on edibility of selected plants.

Sampled Villages	***Anona senegalensis* (Ahur)**	***Tacca leontopetaloides* (Gbache)**	***Cissus populnea* (Ager)**	***Vitex doniana* (Hulugh)**
Tse- Yav	15	15	11	09
Tse- Ankyegh	13	11	11	13
Tse- Anyam	15	15	15	15
Tse- Tyodugh	10	10	10	10

(F = 0.36 Probability ratio= 0.78)

Table 2: Nutrient Composition of the sampled plant species

Species	Moisture	Ash	Fibre	Protein	Fat	Carbohydrate
Anona senegalensis	14.57±0.63	10.83±0.37	15.87±0.73	8.78±0.02	24.17±0.33	25.82±0.48
Tacca leontopetaloides	7.9±3.4	1.08±0	3.07±0	0.3±0[a]	0.1±0[a]	84.22±0.03
Cissus populnea	35.1±0.1	12.97±0.34	29.37±0.41	0.3±0[b]	0.13±0.07[b]	22.11±0.01
Vitex doniana	45.2±0.1	5.19±0.11	9.49±0.28	2.65±0.23	0.51±0.01[b]	36.96±0.44

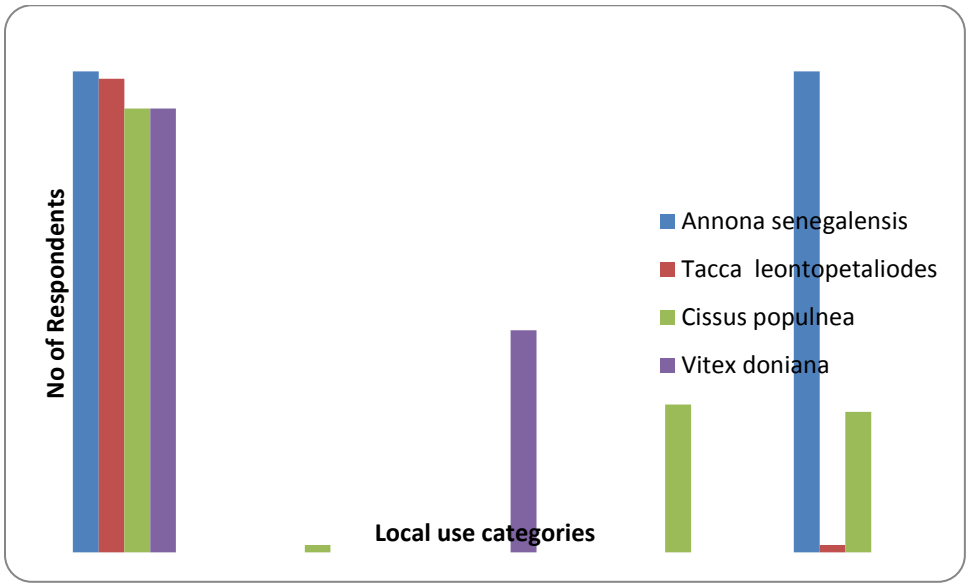

Fig.1: Other uses of selected plant species.

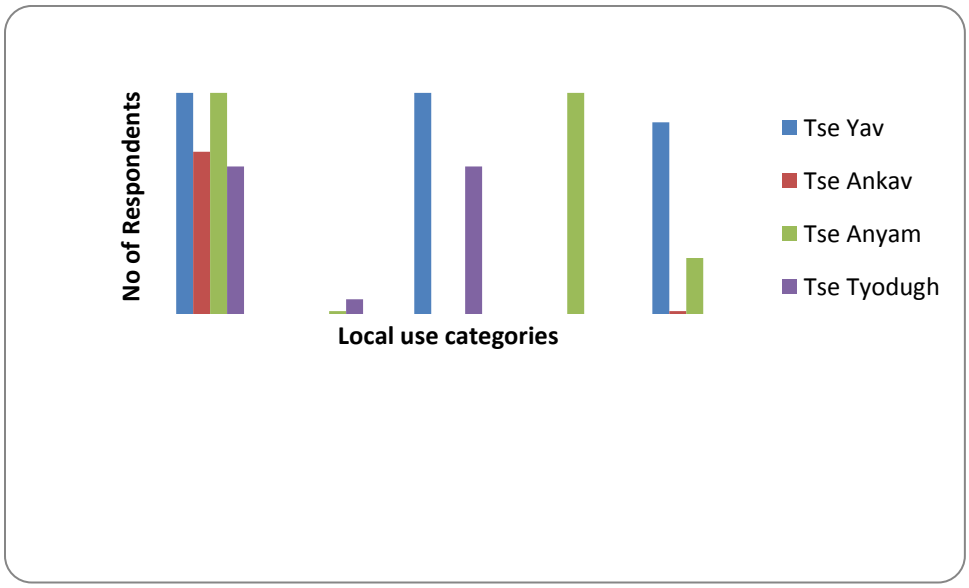

Fig.2: Medicinal uses among sampled villages

DISCUSSION

All the sampled plants (*Annona senegalensis, Tacca leontopetaloides, Cissus populnea and Vitex doniana*) have a certain percentage of dietary compositions or micronutrients as revealed by the study. These micronutrients include crude protein, crude fibre, fat (lipid), carbohydrate, ash and moisture which all have different functions in the human body. Each micronutrient has a specific quantity required by the body. An excess according to Gebel, (2011); Soladoye and Chukwuma, (2012) may turn around to cause harm to the body. The percentage moisture composition was shown to be highest in *Vitex doniana* (45.2%) followed by *Cissus populnea* (35.1%). The high moisture content of *Vitex doniana* can be a challenge in storage especially sun drying during the rainy seasons. According to Yisa *et al* (2012), high moisture content increases perishability as the fruits are more susceptible to microbial infections Based on findings by Ajenifujah-Solebo and Aina (2005), *Tacca leontopetaloides* would be easier to store as compared to the other four sampled plants because it has the lowest moisture content.

According to Onwuka (2005), natural food products should have a general ash content of about 5% while processed food can have ash content ranging over 10%. The author added that *Tacca leontopetaloides* and *Vitex doniana* have acceptable levels of ash content as natural food products. According to A.O.A.C (2005), mineral contents are usually needed in small proportions. This is because high ash content signifies low food quality while low ash content signifies high food quality. *Cissus populnea* had the highest percentage composition of fibre while *Tacca leontopetaloides* had the least percentage composition of fibre. The high percentage composition of fibre in *Cissus populnea* ensures its use in other areas other than its edibility. Also, research has shown

that foods high in crude fibre content are more wholesome compared to foods with less fibre (Gebel, 2011). Thus people who consume more fibre possess a certain level of resistance to some ailments like gastrointestinal diseases (Ajenifujah-Solebo and Aina, 2005) and lower rates of bowel cancer. This is because low fibre results in low body cellulose which gives rise to a host of toxins that result in disease conditions.*Annona senegalensis* had the highest level of protein and fat. This poses a significant contribution to dietary intake in food as protein is the main substance necessary for body buildup while fats are converted to energy in place of carbohydrates (Ramalingam, 2010).

Tacca leontopetaloides had the highest amount of carbohydrate. The result agreed with Ubwa *et al*, (2011) who worked on Chemical Analysis of *Tacca leontopetaliode* peels in which carbohydrate was the highest nutrient found in the plant. Wild edible plants high in carbohydrate are very good because carbohydrates provide energy which helps the body meet up with daily activities (Gebel, 2011). Such plants high in carbohydrate content are more advantageous than those with excess protein because the body does not require too much of protein and fat. .

Research by FAO showed that about one billion people use wild edible plants in their diets (Lockett *et al*, 2008; Bharucha and Pretty, 2006). This supports the high level of acceptance of edibility of the sampled plants (Table2). This also determines to an extent the form in which the plant is eaten. Some of the reasons for the acceptability of wild edible plants according to Lockett *et al*, (2008) and Bharucha and Pretty (2006) are their importance as food sources in both rural and urban areas as they serve as important sources of micronutrients. They also supplement cultivated crops (Teklehaymanot and Giday, 2010) and

promote dietary diversity (Batal, 2006). These reasons might have contributed to the rural peoples' acceptability of the edible wild plants seen in the studied community, although the ways in which the plants are eaten may vary from one place to another and in some cases individual to individual or family to family (Ali-Shtayeh *et al*, 2008). The level of acceptability of the edible plants was high may be due to the ease of preparation. These plants promote improved health and decrease micronutrient deficiencies (Bata, 2006). They also are a cheap source of nutrient for the rural poor (Mahapatra *et al*, 2012) although in some countries, consumption of wild edible food increases with wealth and is influenced by price, individual or cultural preference (Bharucha and Pretty, 2006).

Wild edible plants can be used to benefit man in different ways as reflected in this study.This observation was also noted by Pardo-de-Santayana *et al*, 2007 and Bhogaonka *et al*, 2012. The sampled plants were all accepted for different uses based on the people's knowledge of the plants in each sampled village.

CONCLUSION

This study showed that the edible wild plants are rich sources of dietary supplements as they contain essential nutrients like protein, carbohydrate, fat, mineral, moisture and ash needed by the human body (and animals) for proper growth and maintenance. These nutrients are all available in different proportions and can be used to enrich meals in both urban and rural areas. The study also showed that these edible wild plants are good sources of plant protein which is more preferable to animal protein and are cheaper than the other sources of protein.

Beside edibility of the plants, the community people mentioned other uses such as medicinal uses, spiritual uses, local binders, local dyes, thatching of roofs as

well as wood construction and treatment of infertility.

RECOMMENDATIONS

Efforts should be made to domesticate some of the wild edible plants so that they can be available in season and out of season. This would also help in protecting the plants from extinction. Also, proper information dissemination should be made to the local groups so as to create awareness concerning the rich heritage they possess through community outreach programmes which may help to enlighten them thereby reducing the current rate of destruction on the plants.

Lastly, more information on the phytochemical analysis of the plants with medicinal importance to determine their relevance as raw materials for drug manufacture should be made.

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