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*E-mail: jrfwe2019@gmail.com; jfewr@yahoo.com*
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# PHYTOCHEMICAL SCREENING OF SELECTED BROWSE SPECIES IN FEDERAL COLLEGE WILDLIFE MAANAGEMENT NEW BUSSA, NIGER STATE

**Omotugba S. K., Kehinde A. S., Ampitan T. A. and Amusa T. O.**

Federal College of Wildlife Management, PMB 268, New- Bussa, Niger State, Nigeria
Corresponding Author: *omokay6@yahoo.com*; +2348031957092

***ABSTRACT***

***The qualitative and quantitative analysis of phytochemical nutrients (saponins, flavonoids, phtobatanin, chakones and glycosides) in ten different plants species, Burkea africana, Sterculia setigera, Nauclea latifolia, Khaya senegalensis, Entanda africana, Parkia biglobosa, Terminalia microptera, Bridelia ferugina, Boswellia dalzeli and Vitex doniana were investigated were assessed. The phytochemical test was conducted on the ethanol extracts of leaves and bark of the plants investigated. The plant materials, Parkia biglobosa, Terminalia microptera, and Khaya senegalensis were found to contain all the active components assessed. Highest (83.20%) percentage of dry matter occurred in Terminalia microptera and the least (52.19% ) in Nunclae latifolia. The highest parentage of Saponin occurred in Pakia biglobosa (85 ±0.332mg/g) while the least was recorded in Boswellia dalzelli (58.54 ±0.752mg/g). Highest parentage of flavonoids occurred in Terminalia microptera (52 ±0.842 mg/g) and the lowest value (24.64 ±0.47 mg/g) in Sterculia setigera. Generally, low value of total phenol with the highest value found in Khaya Senegalensis (3.45 ±0.032mg/g) and least value in Terminalia microptera (0.435±0.007mg/g) this can be attributed to microclimate, genetic formation or immature parts of the plant sampled. The study provided awareness on the potential value of the plants and ecological importance of the studied area.***

**Key words:** Active constituents, wild plants, qualitative and quantitative, medicinal values

## INTRODUCTION

There is increasing demand in the Western World for the use of specific herbal materials in preference to synthetic pharmaceuticals (FAO, 1995). For this to be optimally actualised forest as habitat of biodiversity has major roles to play. Medicinal plants are those valuable plants that have healing properties, which have been proven to be useful as drugs (Adeyoju, 1993). These plants are used extensively in Africa traditional health care delivery system, and in other countries, such as China and India (Rawseley, 1992). Reports have shown that therapeutics such as contraceptives steroid and muscle relaxants for anaesthesia and abdominal surgery are made from wild yam composite (Lancef, 1995).

According to Gbile and Adesina (2000), the need to study medicinal plants are of paramount importance because it will promote safe utilisation, provide information on the plants and assist in preservation. The loss of these plants will affect commerce, since wild plants is a good revenue earner for a large percentage of rural women (Akinsoji, 2003). Dossou *et al* (2019) observed the significance of plants genetic resources as veritable source of pharmaceutical, this fact can be attributed to the therapeutic nature of the plants. Most rural people use plant extracts for curing ailment without considering the side effects in body organs such as liver, kidney, heart etc. This study attempts to evaluate and document chemical constituents of some wild plants in the forest of Federal College of Wildlife New – Bussa, Niger State, Nigeria.

## MATERIALS AND METHODS

### Study Area

The study area was at Federal College of Wildlife Management, situated between Kainji Dam and New Bussa town about two kilometres from Awuru road with a total area of about 2.56 km$^2$. The College is between latitude 4$^o$ 3’ and 10$^o$ N and Longitude 4$^o$ 33’E and 9$^o$49’N in the Nigeria Guinea Savannah zone. The annual rainfall varies

between 1005 – 1222 ml. The wet season normally last between 6 – 8 months. The vegetation belt has been described as wooden savanna which consists of three Districts sub types which comprises of *Anogeisus leocarpus, Ptericarpus erinaceus* woodland to the North West, *Burkea africana, Acacia spp, Detarium macrocarpum, Combretum species*, and mixture of wood dominating the southern boundary (Keay, 1989; Onyeanusi and Abafara, 2006).

**Sample Collection and Preparation**

Ten (10) different plants species of *Burkea africana, Sterculia setigera, Nauclea latifolia, Khaya senegalensis, Entanda africana, Parkia biglobosa, Terminalia microptera, Bridelia ferugina, Boswellia dalzeli* and *Vitex doniana* used in indigenous therapy based on preliminary investigation carried out in local herb markets and users were freshly collected at different locations. The parts of the plants investigated (leaves and bark) as shown in Table 1 below were harvested, dried under shade for two weeks and then pulverized.

**Table 1: Common and Botanical Names and Family Classification of Plants used for the Study**

| S/N | Botanical Name | Plants part used | Family |
|---|---|---|---|
| 1. | *Burkea africana* | Leave and bark only | Cesalpiniodeae |
| 2. | *Sterculia setigera* | Bark | Sterculiaceae |
| 3. | *Nauclea latifolia* | Leaves | Caesalpiniodae |
| 4. | *Khaya senegalensis* | Bark | Meliaceae |
| 5. | *Entanda Africana* | Bark and root | Mimosoidae |
| 6. | *Parkia biglobosa* | bark | Fabaceae |
| 7. | *Terminalia microptera* | Bark | Combretacea |
| 8. | *Bridelia ferugina* | Bark | Euphorbiaceae |
| 9. | *Boswellia dalzeli* | Bark | Burseraceae |
| 10. | *Vitex doniana* | Leaves | Verbenaceae |

**Dry Matter Determination**

The prepared plant powder samples were oven drying at 70$^{o}$C until a constant weight was obtained for each sample in triplicates.

**Plant Extraction**

A 50 g sample of the pulverized plant parts was soaked at room temperature in 250 cm$^3$ of ethanol (40$^{o}$C - 60$^{o}$C). Each of the extraction mixtures was left for 48 hours in a tight fitting bottle. The extracts were then filtered under gravity and concentrated.

**Phytochemical Screening**

The extracts were investigated for the presence of tannins, saponins, flavonoid, phenol, phlobatanins, chalcones and glycosides respectively using standard procedures as adopted by Odebiyi and Sofowora (1978).

**Quantitative Analysis**

**Flavonoid Determination**

Boham and Kocipal (1974) method was adopted. Ten 10 g of each plant prepared powder was extracted in triplicates with 100 ml of 80% aqueous methanol at room temperature. The whole solution was filtered through whatman filter paper no 42 (125 m). The filtrate was later subjected to evaporation into dryness to obtain constant weight.

**Saponin Determination**

Obadoni and Ochuko, (2001) method was adopted. Twenty (20) g of the prepared powdered plant samples taken from each plant investigated were put into different conical flasks and 100 ml of 20% aqueous ethanol were added in triplicates. The samples were heated over a hot water bath for 4 hours with continuous stirring at about 55$^{o}$C. The mixture was allowed to cool and thereafter filtered. The residue was filtered for the second time with another 200 mL of 20% ethanol. The combined extracts were reduced to 40ml over water bath at about 90$^{o}$C. The concentrate was transferred into 250 ml separating funnel and 20 ml of diethyl ether was added and shaken vigorously. The aqueous layer was discarded. The purification process was repeated. 60 ml of n - butanol was added. The combined n - butanol extracts were washed twice with 10 ml of 5% aqueous sodium chloride. The remaining solution was heated in a water bath. After evaporation, the

samples were dried in the oven to constant weight and the Saponin content was calculated

**Total Phenol Determination**

Total phenol content was determined according to McDonald's method using Folin-ciocalteau reagent (Gallic acid as a standard) (McDonald *et al*, 2001).

**RESULTS**

Table 2 shows that the plants had different levels of dry matter in (%). The highest dry matter 83.20% was obtained in *Terminalia microptera*, while the least 52.19% was recorded for *Nuclea latifolia*. However, the variation among the plants was much with an average value of (52.19 ±31.01%).

**Table 2: Percentage Dried Matter Contents of Plant Samples**

| S/No. | Plant species collected | Dry Matter content of Samples (%) |
|---|---|---|
| 1. | *Burkea Africana* | 61.67 |
| 2. | *Sterculia setigera* | 60.87 |
| 3. | *Nauclea latifolia* | 52.19 |
| 4. | *Etanda Africana* | 68.22 |
| 5. | *Khaya senegalensis* | 70.72 |
| 6. | *Termmalia microptera* | 83.20 |
| 7. | *Parkia biglobosa* | 70.00 |
| 8 | *Bridellia ferugina* | 77.32 |
| 9. | *Boswellia dalzelli* | 76.90 |
| 10. | *Vitex doniana* | 71.71 |

In Table 3 above, the lowest of saponin was recorded in *Boswellia dalzelli* (58.54 ±0.752 mg/g) and the highest value (85 ±0.332 mg/g) found in *Parkia biglobosa.* Flavonoid lowest and highest values (24.64 ±0.47 mg/g and 52 ±0.842 mg/g) were recorded in *Sterculia setigera* and *Terminalia microptera* plants respectively, while 0.43 ±0.007 and 3.45 ±0.032 g/L were recorded for the total phenol as lowest and highest contents in *Terminalia microptera* and *Khaya senegalensis* respectively.

**Table 3: Quantitative Analysis of Phytochemical present in the screened plant extracts from the investigated plants**

| S/N | Plants Samples | Saponin Content (mg/g) | Flavonoids Content (mg/g) | Total Phenol Content (mg/g) | Part used |
|---|---|---|---|---|---|
| 1. | *Burkea africana* | - | 29.75 ± 0.36 | 2.14 ± 0.041 | leaves |
| 2. | *Sterculia setigera* | 60.05 ± 0.622 | 24.64 ± 0.47 | 0.56 ± 0.007 | bark |
| 3. | *Khaya senegalensis* | 70 ± 0.511 | 45 ± 0.654 | 3.45 ± 0.032 | bark |
| 4. | *Parkia biglobosa* | 85 ± 0.332 | 50 ± 0.721 | 2.32 ± 0.051 | bark |
| 5. | *Etanda africana* | - | 52 ± 0.842 | - | bark |
| 6. | *Parkia biglobosa* | 61 ± 0.342 | 36.72 ± 0.46 | 3.35 ± 0.042 | bark |
| 7. | *Terminalia microptera* | 58.54 ± 0.752 | 47 ± 0.832 | 2.25 ± 0.009 | bark |
| 8. | *Bridullia ferugina* | 64. 05 ± 0.032 | 43.21 ± 0.112 | 3.18 ± 0.211 | bark |
| 9. | *Boswellia dalzelli* | 59.03 ± 0.341 | 26.41 ± 0.321 | 0.544 ± 0.512 | bark |
| 10. | *Vitex doniana* | - | - | 2.34 ± 0.008 | leaves |

Table 4 below shown that, *Khaya Senegalensis* contained all the medicinally active constituents examined. *Parkia biglobosa* and *Terminalia microptera* had six out of seven active ingredients considered, which makes it to be plants of medicinal interest. The phytochemicals in *Khaya Senegalensis*, justified the pesticides and medicinal potential of the plant. Tannin was present in *Nuclear latifolia*, *Khaya Senegalensis*, *Etanda africana*, *Parkia biglobosa and Terminalia microptera* but it was not detected in other plants investigated.

**Table 4: Phytochemical Present in the Screened Plant Extracts from Different Plants Used.**

| S/No. | Name of plant sample | Part used | Tannins | Saponins | Flavonoids | Phenol | Phlobotanin | Chalcones | Glycosides |
|---|---|---|---|---|---|---|---|---|---|
| 1. | *Burkea africana* | leave | - | - | + | + | + | + | + |
| 2. | *Sterculia setigera* | Bark | - | + | + | + | - | + | + |
| 3. | *Nauclea latifolia* | Leave | + | - | - | - | + | - | + |
| 4. | *Khaya senegalenas* | Bark | + | + | + | + | + | + | + |
| 5. | *Etanda africana* | Bark | + | - | + | - | + | + | - |
| 6. | *Parkia biglobosa* | bark | + | + | + | + | + | + | - |
| 7. | *Termmalia microptera* | bark | + | + | + | + | + | + | - |
| 8 | *Bridellia ferugina* | bark | - | + | + | + | + | + | - |
| 9. | *Boswellia dalzelli* | Bark | - | + | + | - | + | + | - |
| 10. | *Vitex doniana* | Leave | + | - | - | + | - | - | + |

**Key**: Positive (+ve) indicated presence of components tested for. Negative (–ve) indicated absence of component tested for.

## DISCUSSION

Glycoside was detected in almost half of the browse forages examined as indicated in Table 3 above. The presence of Glycosides in plant extracts have been reported by Funtua *et al*, (2003). Chindo *et al*, (2002) reports that cardiac glycosides have the ability to stimulate heart muscles and usually used in the treatment of congestive heart failure. The ethanol extracts revealed the presence of saponins. Saponins are effective in the treatment of syphilis, rheumatism and certain skin diseases, and for the treatment of abscesses and other swellings, ulcers and septic wounds (Chindo *et al*, 2002).

Proper identification of medicinal plants is of paramount important in the development of traditional medicine. Accessibility to the phytochemical screened plants by the scientists must be enhanced as indiscriminate consumption of these plants has adverse effect on the lungs and kidney (Sijuade, 2009). The quantitative estimation of the chemical constituents in the studied plants showed that *Terminalia microptera* contained the highest content of flavonoids compared to other plant samples with lesser amount of total phenol contents, though the variation in the amount is significant at P>0.005. *Khaya Senegalensis* had the highest total phenol contents (3.45± 0.032g/L) while the highest saponins contents was found in *Parkia biglobosa* (85± 0.332mg/g) and the lowest contents in *Boswellia dalzelli* (58.54± 0.752mg/g). Tannins, phelonics, saponins, alkaloids and flavonoids possess antibacterial and anti-viral activity while tannins and flavoids are reported to be responsible for antidiarrheal activity (Enzo, 2007). This work revealed the diuretic property of the plants which could be adduced to the presence of tannins as earlier reported by researchers (Awoyinka et al, 2007). Thus possible utilization of these plants as a diuretic agent is important.

## CONCLUSION

Ethanol extracts of the studied plants contained tannins, saponins, flavonoids, phenol, phlobotanis, chalcon, and glycosides which are well pronounced in *Khaya Senegalensis* and *Parkia biglobosa* while tannins, phenol, and glycosides are well pronounced in the extracts from *Vitex doniana*. *Chalcones*, *phobotanins* and *tannins* are dominantly present in the extracts from *Nuclear latifolia* species. The browse species studied in the study area should be conserve as they contained potential source of useful medicinal values.

## RECOMMENDATION

Effort towards further research into characterization and isolation of the active ingredient of various phytochemical screened is crucial and so recommended.

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