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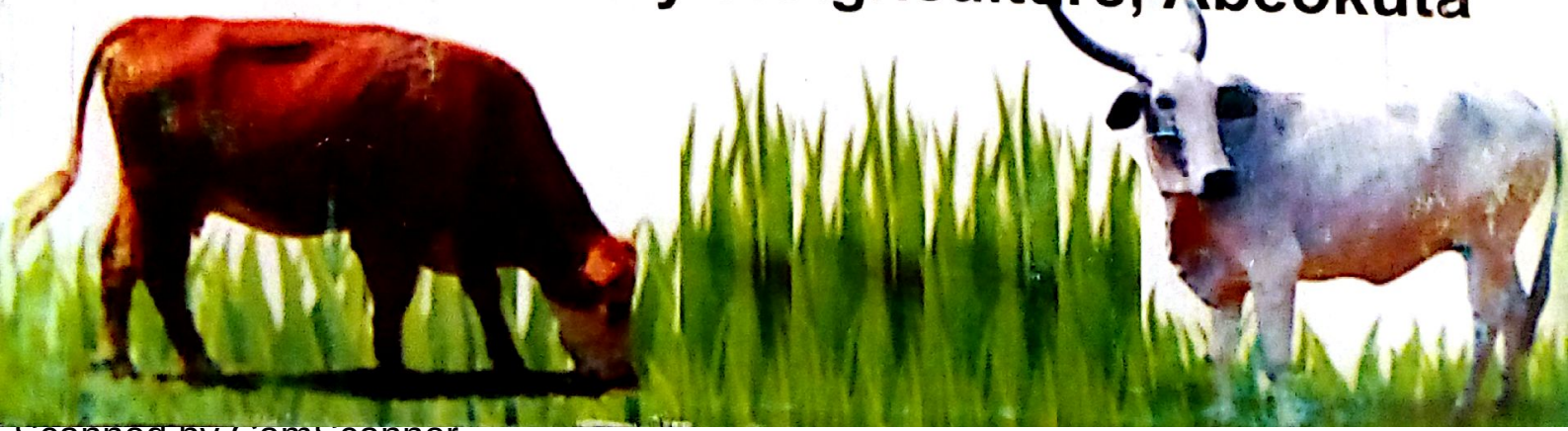

CHEMICAL COMPOSITION OF THREE SPECIES OF UNWILTED AND WILTED BROWSE LEAVES IN THE NORTHERN GUINEA SAVANNA OF NIGERIA

*[1]Ibrahim, U.B., [2]Amodu, J.T., [3]Tanko, R.J., [1]Abdu, S.B., [1]Adamu, H.Y., [4]Bala, A.G., [1]Bello, S.S., [1]Sadiq, M.S and [5]Ishiaku, Y.M.

[1]*Department of Animal Science, Federal University Kashere, Gombe State, Nigeria.*
[2]*National Animal Production Research Institute, Ahmadu Bello University, Shika.*
[3]*Department of Animal Science, Ahmadu Bello University, Zaria, Nigeria.*
[4]*Division of Agricultural Colleges, College of Agriculture and Animal Science, Ahmadu Bello University Kaduna State, Nigeria.*
*Corresponding author: ibrahimumar7700@gmail.com; +2347039378263

ABSTRACT
A study was conducted to evaluate the chemical composition of unwilted and wilted *Adenodolichos paniculatus, Ficus thonningii and Gmelina arborea* browse leaves. The experiment was laid out in a Complete Randomized Design with 2×3 factorial arrangement, with three replications. Results indicated a crude protein values (11.25%) for both wilted and unwilted *A. paniculatus*, (13.38%) for wilted *F. thonninigii* and(9.75%) for its unwilted form and lastly, (11.38%) for wilted *G. arborea* while its unwilted form was (13.75%). The fiber and the acid detergent fiber together with the neutral detergent fiber for *G. arborea* were all lower than that reported by several other scientists. *It was hence, concluded that* from the three species of browse leaves, wilted *Gmelina arborea* have shown more great potential in nutrients and it's availability throughout the year makes it an alternative sole feed of ruminant livestock.

Keywords: Browse, chemical composition, unwilted, wilted irrigation, species.

INTRODUCTION

Browse plants are available all year round because of their drought resistance, persistence, vigorous growth, re-growth and palatability. Browse plants are also found all year round in contrast to grasses which rapidly deteriorate with maturity increasing fiber and decreasing protein (Agishi, 1984). Browse plants have higher nutritive value than grasses and they provide vitamins and, frequently, mineral elements, which are mostly lacking in grassland pastures.

Gmelina arborea is of the family *Verbenanceae*. It is a fast growing deciduous tree reaching up to 40 m in height and 140 cm in diameter, but some could be smaller (Jensen, 1995). Previous records have shown that the leaves contained as much as 10.01-38.4% crude protein and 3.10-30.46% crude fiber (Osakwe and Udeogu, 2007). *Ficus thonningii* is an evergreen tree of about 6-21 m, with a rounded to spreading dense crown. *F. thonningii*, also known as fig tree is a multipurpose tree that can be found almost everywhere in the northern part of Nigeria. Fig tree is a palatable fodder plant with a wide distribution in the savannah zone of the humid tropics. Agishi (1985) attested to the high nutritive value of its leaves to ruminant livestock. *Adenodolichos paniculatus* is a perennial woody multi-purpose shrub or sub shrub legume. It reaches a height of 1.5 to 4.5 m (Burkill, 1985). *A. paniculatus* leaves are used as fodder for ruminants and for edible caterpillars. The objective of this study therefore, was to evaluate the chemical composition of unwilted and wilted *Adenodolichos paniculatus, Ficus thonningii and Gmelina arborea* browse leaves fodder for ruminants.

MATERIALS AND METHODS

Leaves of the three browse plants were sourced around the National Animal Production Research Institute (NAPRI), Shika-Nigeria. Samples of *Adenodolichus paniculatus, Ficus thonningii and Gmelina arborea* leaves were collected fresh as unwilted leaves while the wilted leaves after wilting for 24 hours under air condition. The samples of the leaves were analysed for chemical composition using the method described by A.O.A.C (2000) at NAPRI, Shika. Acid detergent fibre (ADF) and Neutral Detergent fibre (NDF) were determined according to Van Soest *et al.*, 1991.

RESULTS AND DISCUSSION

Table 1 shows the chemical composition of three wilted and unwilted browse leaves. The crude protein values of this trial (11.25%) for wilted and unwilted *A. paniculatus*, (13.38%) for wilted *F. thonningii* and (9.75%) for its unwilted form and lastly, (11.38%) for wilted *G. arborea* while its unwilted form was (13.75%). These values were lower than that reported by many scientists. Several crude protein values have been reported in the literature of *Gmelina arborea* leaves. Babayemi *et al.* (2003) reported a crude protein value of 26.7% while Taiwo *et al.* (2009) reported 20.39% for *Gmelina arborea* leaves. Abu (2014) reported CP value of 13.29 and Ash of 8.77 in *Ficus thonningii*. Bayer (1990) had 15% CP and 18% DM in the leaf of *Adenodolichus paniculatus*. Taiwo *et al.* (2009) and Ahamefule *et al.* (2006) reported 15.00% and 3.10% for crude fibre respectively. The fiber and the acid detergent fiber together with the neutral detergent fiber for *G. arborea* were all lower than that reported by several other scientists. Osakwe and Udeogu (2007) reported crude fibre content of 34.46%, 44.69%. Taiwo *et al.* (2009) obtained 42.79% Acid Detergent Fibre (ADF), 64.11% Neutral Detergent Fibre (NDF) and 88.68% Dry Matter (DM). Adeleye and Fasae (2008) reported DM and NDF values of *Gmelina* leaves as 91.60% and 55.76% respectively. Abu (2014) had crude fiber, NDF and ADF contents of 20.79%, 38.05% and 37.95% in *Ficus thonningii*. Also, Adamu (2011), Okapor (2012) reported DM values of 93.71% and 96.76% in the leaves of *G. arborea*. Variability in the nutrient content of browses has been attributed to within species differences, plant parts, season, harvesting regime, location, soil type and age (Norton, 1994). The increased NDF is a good indicator of fiber contents in browse leaves which will result in higher digestible energy and forage intakes. The CP content and NDF in this study exceed the minimum protein requirements for ruminant recommended by ARC (1985).

CONCLUSION

From the three species of browse leaves, wilted *Gmelina arborea* has shown more great potential in nutrients (high NDF of 50.04% and CP of 11.38) for feeding of ruminant livestock.

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Table 1: Chemical composition of three wilted and unwilted browse leaves.

Parameters (%)	*A. paniculatus*		*F. thonningii*		*G. arborea*	
	Wilted	Unwilted	Wilted	Unwilted	Wilted	Unwilted
Dry matters	66.59	33.68	51.19	32.35	53.26	58.51
Crude protein	11.25	11.25	13.38	9.75	11.38	13.75
Crude fibre	20.14	18.77	20.86	21.04	21.84	22.22
Ether extract	1.30	1.20	4.50	5.20	3.60	3.50
Ash	4.67	2.73	8.85	11.54	5.31	5.77
Acid detergent fibre	28.88	29.15	26.11	17.95	32.17	30.04
Neutral detergent fibre	50.00	48.36	47.27	42.36	50.04	48.00
Nitrogen free extract	62.64	66.05	52.41	52.47	58.07	54.76