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Proximate Composition and Mineral Analysis of *Brysocarpus Coccineus* Grass

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ABSTRACT

The proximate and some mineral compositions of *Brysocarpus Coccineus* in Nigeria were investigated. The grass was found contain 7.56 ± 0.06% moisture, 15.30 ± 0.22% Ash, 7.30 ± 0.26% crude lipid, 4.62 ± 0.11% crude fibre, 3.35 ± 0.22% crude protein, and 61.220 ± 0.90% was determined using standard methods. The mineral content showed 0.06 ± 0.02mg/100g calcium and 0.16 ± 0.08mg/100g magnesium using EDTA titration and 9.28 ± 0.26mg/100g sodium using flame photometer. The results indicated that *Brysocarpus Cocccineus* is not rich in crude protein, but found to be rich in carbohydrate and total ash content. The higher amount of total ash suggests a high value mineral composition comprising calcium, sodium and magnesium as the main elements. The present study inferred that *Brysocarpus Coccineus* would not serve as source of protein but a good source of energy.

Keywords: *Brysocarpus Coccineus*, Grass, Mineral analysis, Proximate

INTRODUCTION

Plant have been the source of medicinal agent since earliest times, and today have continued to play a dominant role in the primary health care of about 80% of the world population. In Nigeria, more than 70% of the estimated 140 million People are rural dwellers, who depend entirely on indigenous herbal medicines as a source of alternative health care (Farnsworth, 2000). *Byrsocarpus coccineus schum and thonn (family connaraceae)* are among such plants that have been known and used in traditional medicine in several parts of West Africa (Adeola, 2001). But on the other way round, the plant (*Byrsocarpus coccineus*) has not been fully utilized as source of nutrient to both the plant and animals. *Byrsocarpus coccineus* is a climbing shrub with prominent and numerous lenticules,pinnate leaves, 6-9 pairs of leaflets that are larger near rounded apex. It has small white or pinkish scented flowers and grows usually between January to March. *Byrsocarpus coccineus* is popularly known in Ghana by the "*Twi"*. In northern Nigeria, it is referred by the Hausas as "*Tsamiyar kasa* or *Kimbar maharba*." The Fulani peoples call it "*Wangarabubi* or *Yangara-bubihi*." While the Bassange people call it "*Kogi*." In the southern part of Nigeria the Yoruba people call it "*Oke Abolo*" or "*Mybo-Apepea*". Kilba people in Adamawa state call it "*Mblakiki*." (Dalziel, 2001). Throughout popular knowledge, *Byrsocarpus coccineus (Tsamiyar kasa)* is used in the traditional medicine in Togo to alleviate various diseases including Dysmenorrheal, swellings, muscular and rheumatic pains, sore, wounds, hemorrhage, hypertension, primary and secondary sterility abscess and anemia(Dalziel, 2001). *Byrsocarpus coccineus* (*Tsamiyar Kasa*) have various pharmacological activities such as analgesic activities, anti-Diarrhea activities, antipyretic activities, anti-inflammatory activities, antixiotic/sedative activities, and antidiabetic activity (Akindele and Adeyemi, 2006).

The use of herbal medicine may be considered to be safe, some natural products are known to be toxic at high doses and others may have potential adverse effects after prolonged use. Many data concerning the safety of herbal medicine has been reported and frequently these reports are related to hepatotoxicity and nephrotoxicity (Akindele and Adeyemi, 2006). During the last decades, the use of medicinal plants in therapeutics has increased substantially (Lee *et al.*, 2012) due to the increasing interests for natural substances. Among medicinal plants used in traditional medicine, some have antioxidant property and are used rightly or wrongly to prevent premature aging. Antioxidants have been reported to prevent oxidative damage caused by reactive oxygen species (ROS) which readily attack and induce damage to various biological compounds, including proteins, lipids, sugars and DNA (Lee *et al*., 2012). These oxidative damage are considered as crucial etiological factor (Refers to many factors coming together to cause an illness) implicated in the initial phase of several chronic diseases, such as diabetes mellitus, pulmonary diseases, cancer,

neurodegenerative diseases and also in the ageing process (Roussel, 2009). Less efforts have been put as to knowing the exact quantity of nutrients and elements that might be present in this grass, and that was why attention was drawn as to determine the nutritional and some elemental composition of *Byrsocarpus coccineus* so that awareness can be created as to whether it can be used as source of some important nutrients that might not be available in some feeds used to feed the animals.

A research has been carried out by Abidemi *et al.,* (2014) on ameliorative effect of hydroethanolic leaf extract of *Bysorcarpus coccineus* in alcohol and sucrose-induced hypertension in rats. Results obtained in the study showed that the extract of *Byrsocarpus coccineus* at various dose administered reduced the systolic, diastolic and arterial blood pressure elevated by ethanol and sucrose. Also, the extract reversed the reduction in catalase (CAT), reduction glutathione (GSH), glutathione peroxide (GPx) and superoxide dismutase (SOD) induced by ethanol and sucrose.

An investigation into the preliminary phytochemical and antimicrobial screening of the leaves of *Byrsocarpus coccineus* was carried out by Augustine *et al.,* (2006). The results of the microbial screening showed that the ethyl acetate fraction at 200mg/mL produced zones of inhibition ranging from 22.5 to 35mm against the test organism while the minimum inhibitory concentration of the fraction were 1.75mg/mL, 1.75mg/ml, 0.88mg/mL and 0.44mg/mL against *Escherichia coli, Salmonella typhi, Candida albicans* and *Staphylococcus aureus* respectively. Results of the phytochemical screening revealed the presence of flavonoids, tannins on both fractions while saponin was present only in the n-butanol fraction. The crude ethanolic extract (EE), the ethyl acetate soluble fraction (EA) and N-butanol soluble fraction (N-BT) were subjected to preliminary phytochemical screening using standard procedures (Silva *et al.,* 1998).

MATERIALS AND METHODS

Sampling and sample treatment

The fresh sample of *Byrsocarpus coccineus* (Fig. 1) was collected from Basansan, a district area of Kware Local Government of Sokoto State, Nigeria. The sample was identified and authenticated in Botany unit of Usmanu Danfodiyo University, Sokoto and deposited in the Herbarium of the Department under reference Number (UDUH/ANS/0181). The sample was further washed and shade dried at room temperature. The dried sample was pulverized to powder using pestle and mortar for effectiveness and then kept in clean polyethylene bags for further analysis.

Fig. 1: *Brysocarpus Coccineus* Grass

Nutritional Analysis

Standard methods of AOAC (1990) were used for the proximate analysis. The moisture content was determined by weighing two grammes (2g) of dried *Pennisetum pedicellatum* Trin. grass in a crucible and dried in an oven (Gallenkamp, UK) at 105ºC for 24 hr. The dried sample was then cooled in a dessicator for 30 min and weighed.

The ash content was determined by the incineration of 2g of dried sample in a muffle furnace at 55ºC for 2hr. Crude lipid (CL) was extracted from 2g dried sample with n-hexane for 8 hr using Soxhlet extraction method. The nitrogen (N) content was estimated by micro-kjeldahl method and crude protein (CP) content calculated using (%N x 6.25). Crude Fiber (CF) content was determined by treating 2g dried sample with 1.25% (w/v) H_2SO_4 and 1.25% (v/v) NaOH. The available carbohydrate (CHO) was calculated by difference. Calorific value (CV) was determined as reported by Hassan *et al*. (2011) using equation (1);

$$CV(Kcal/100g) = (CHO \times 4) + (CL \times 9) + (CP \times 4) - 100 \quad (1)$$

Mineral Analysis

Mineral analysis was carried out on the sample. Calcium and magnesium were determined using EDTA titration and Sodium was determined using flame photometry (Jambunathan, 2000).

Statistical analysis

Data obtained were subjected to one way analysis of variance (ANOVA) using SAS (1999), Means were compared using Duncan (1955) option of same software.

RESULT AND DISCUSSION

Table 1 present the result of the result of the proximate analysis of the sample from which it can be observed that the sample was found to contain the moisture of 7.56 ± 0.06 mg/100gDW. This value is higher than what was obtained for Pennisetum pedicellatum (3.03 ± 0.50 mg/100gDW) (Suleiman *et al.,* 2018). The value is also higher than what was reported for *Sorghum vulgare* leaf (4.95 ± 0.35%). However the value is lower than the moisture content of 12% reported for the grain by Axtel *et al.*,(1988). Thus the leaf will be less susceptible to microbial attack and enzyme activities which could lead to spoilage and as such can be stored as hay.

The analysis of the crude protein reveals that the *Brysocarpus coccineus* contain low amount of crude protein 3.35mg/100g. The value obtained in this analysis is lower than the amount of crude proteins (14.4 ± 0.9%) obtained for *Sorghum vulgare* leaf as reported by Axtell *et al*., 1988. The value is also lower than what was obtained for Guinea corn grains (10.4% and 15.0%) as reported by Oguntona and Akinyele, 1995. This shows that the grass cannot provide the essential protein needed by the animals and as such an alternative source of protein must be provided when the grass is to be given to the animals as source of balanced diet.

Table 1: Proximate Composition of *Brysocarpus Coccineus* (mg/100gDW) dry weight

Parameters	***Brysocarpus coccineus* (mg/100gDW)**
Moisture	7.56 ± 0.06
Ash	15.30 ± 0.27
Crude Lipid	7.30 ± 0.26
Crude Fiber	4.62 ± 0.11
Crude Protein	3.35 ± 0.22
Carbohydrate	61.88 ± 0.90
Calorific Value (Kcal/100gDW)	327 ± 0.22

The values are mean ± standard deviation of the three replicate

The result from the analysis shows that *Brysocarpus coccineus* grass contain 4.62 ± 0.11g/100mgDW of crude fiber which is a bit lower than the value (5.02 ± 1.31%) found in *Sorghum vulgare* leaves (Axtell *et al*., 1988) but it is highly than what was obtained for guinea corn leaves (2.0%) (Adegoke, 1994).

The concentration of the ash was found to be (15.30 ± 0.27mg/100gDW) in the sample. The ash content is higher compared to the (8.72 ± 0.47%) of the Guinea corn leaf as reported by Adegoke, 1994. And also the concentration is higher than those reported for the guinea corn grains (1.6%) (Adegoke, 1994). The high ash concentration suggested that the grass contain appreciable amount of inorganic elements and as such can be used as source of some essential elements in the animal feed.

Table 2: Mineral composition (mg/100g) of Short-pod *(Byrsocarpus coccineus).*

Mineral elements	**Composition mg/100g**
Sodium	9.28 ± 0.26
Magnesium	0.16 ± 0.08
Calcium	0.06 ± 0.02

Value are expressed, as mean ± standard deviation of three replicate.

Mineral composition

Table 2 present the result of the result of the proximate analysis of the sample. From the analysis, the *Byrsocarpus coccineus* leaves was found to contain 9.28mg/100g of sodium. These value were higher than their respective values reported in rice (0.05%), maize (0.53%), and millet (0.01%) (Kouakou *et al.,* 2008). The sodium content found in Byrsocarpus coccineus appeared to be lower than the sodium content in Sorghum vulgare leaf (30.33 ± 9.44%). Hence the leaf is better source of calcium than grain (8.20mg/100g) (Doherty and Rooney, 1999).

The magnesium content of *Brysocarpus coccineus* (0.16 ± 0.08mg/100gDW) analysed appear to be low when compared with content found in *Sorghum vulgare* leaves (4.0mg/100gDW) as reported by Axtell *et al*. (1988).

The result indicated that the calcium content in *Byrsocarpus coccineus* (0.06 ± 0.02mg/100g) was found to be significantly lower than that of *Sorghum vulgare* leaves (0.21mg/100mg/100gDW) as reported by Axtell *et al*. (1988).

CONCLUSION

The results of the study indicated that *Brysocarpus coccineus* grass contained appreciable amount of carbohydrate, and so can be used as a source of energy for the animals. The study also revealed that *Brysocarpus coccineus* grass contained appreciable amount of sodium but not for calcium and magnesium but it is necessary to apply strategic harvesting procedure in order to enhance the nutritive value of Pennisetum pedicellatum grass to support livestock production.

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