PROXIMATE, NUTRIENTS AND PHYTOCHEMICAL CONTENT OF *Edat* (*Sacoggls gabonensis)* Bark meal

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ABSTRACT

The proximate, vitamins, minerals, amino acids and phytochemical compositions of Edat (S. gabonensis) bark meal was analysed. This paper is aimed at highlighting the medicinal, nutritive and phytochemical potentials of S. gabonensis bark meal. The tree bark was washed, air dried and milled and then subjected to analyses. Milled S gabonensis bark meal on air dried basis contained 3.19% crude protein, 2.66% ash, 2.31% ether extract, 22.52% crude fibre, 94.63% dry matter, NDF (71.10%), ADF (54.05%) and ADL (21.90%). It also contained vitamins (mg/100 g) A (26.45), C (3.11), B1 (0.128), B2 (0.047), B_3(1.28), B_5 (0.64), B_6 (0.47), biotin (0.25), folacin (µg/100 g 13.79), choline (0.43) and B_{12} (µg/100 0.024), with minerals like calcium (0.267%), potassium (0.745%), phosphorous (0.369%), sodium (0.216%), sulphur (0.2478%), chlorine (0.3129%), magnesium (0.278%), iron (118.69mg/kg), copper (13.24mg/kg), zinc (55.78 mg/kg), manganese (28.92 mg/kg), molybdenum (0.051 mg/kg), cobalt (0.026mg/kg) and selenium (0.0021 mg/kg). It also contained amino acids like leusine (1.24 %), lysine (1.78 %), methionine (1.13%) and threonine (2.35%). The phytochemicals included phenolic (0.267%), saponin (0.354%), tannin (0.0029%), oxalate (0.153%), phytate (0.218%), flavonoid (0.035%), steroid (0.0026%), alkaloid (0.324%), terpenoids (0.0018%), cyanogenic glycosides (0.197%). S. gabonensis bark meal contains vital nutrients and phytochemicals which can be of great value as additive in livestock health and nutrition.

Keywords: *Saccoglotis gabonensis,* bark meal, proximate composition, vitamins and minerals, amino acids, phytochemicals

INTRODUCTION

Recently, nutritionist concerns of the livestock industry are directed towards analysing the effects of plant sources rich in natural bioactive compounds that can be useful in livestock feed thereby impacting on the quality of the products (Arroyo *et al*., 2019). A wide range of several herbs have been in use in traditional medicine, in different form of spices, herbs and their essential oils, and can equally be used in animal nutrition. A wide variety of herb extracts with their oils and bioactive constituents, such as cinnamaldehyde and eugenol, gotten from Cinnamon spice which is obtained from the inner bark of Cinnamomum verum are said to be useful in poultry nutrition as dietary supplements with variety of uses, including antibacterial activity against many pathogens and acceleration of the growth of good bacteria, such as lactic acid bacteria and bifidobacterial, in the poultry intestine (Adarsh *et al* 2020; Bedier 2020). One of the many plant's nature has blessed Africa with is *Edat* (*S. gabonensis). S. gabonensis* is an evergreen tree that belongs to the family *Humiriaceae* and commonly known as 'bitter back tree' commonly found in the tropical rain forest of West Africa in Cameroon, Gaboon and also in Nigeria particularly in the Southern part of Nigeria in Akwa Ibom, Bayelsa, Cross River, Rivers, Delta, Edo, Abia and Imo states (Maduka 2004). In Akwa Ibom, It is called '*edat* or *mkpa eto* and commonly used to enrich fresh palm wine before consumption, while Itarman *et al*. (2022) reported that in Igbo it is locally referred to as *nche*/*ntala/okpi-uta* and *atala* in Yoruba . It is commonly found on river banks, lagoons forest and savannah edges and the tree dominate the coastal rainforest.

This study therefore aimed at determining the proximate, minerals, vitamins, amino acids and phytochemical composition of *Edat* (*S. gabonensis)* bark meal as a potential additive in farm animal's diets.

MATERIALS AND METHODS

Freshly harvested *S. gabonensis bark* was purchased from Ikot Mbang market in Ibiono Ibom L.G.A., Akwa Ibom State. The sample was scrapped, washed, air dried and milled. The bark meal samples were subjected to proximate, vitamin and mineral analysis according to the procedure of AOAC (2012). Phytochemical analysis of the bark meal was also determined according to AOAC (2012).

RESULTS AND DISCUSSION

Results of the proximate analysis carried out on *Sgabonensis* is presented in Table 1. It shows that *S gabonensis* bark meal contained 3.17% protein crude, 2.68% ash, 2.30 % ether extract, 22.49% crude fibre, 94.61% dry matter, 75.98% NDF, 53.91% ADF and 21.87% mean values respectively.

Table 1: Proximate composition of Edad (*Saccoglotis gabonensis*) bark meal

Parameters	Composition (%±SD)
Dry matter	94.61 ±0.013
Crude protein	3.17±0.0354
Ash	2.68 ± 0.02
Ether extract	2.30 ± 0.0212
Crude fibre	22.49 ±0.019
Neutral detergent fibre	75.98 ± 0.015
Acid detergent fibre	53.91± 0.038
Acid detergent lignin	21.87 ± 0.005

S.D. = Standard deviation.

The vitamin composition of *S ganonensis* bark meal is presented in table 2 below. The result reveals that *S ganonensis* bark meal contains various vitamins and the values are in agreement with the report of Maduka (2004) which confirms the vitamins potentials of *S gabonensis.*

Table 2; Vitamin composition of *S ganonensis* bark meal

Vitamins	Composition (%± SD)
Vitamin A (mg/100 g)	268.42 ± 0.04
Vitamin C (mg/100 g)	3.04 ± 0.14
Vitamin B1 (mg/100 g)	0.1285 ± 0.0005
Vitamin B2 (mg/100 g)	0.0475 ± 0.0005
Vitamin B3 (mg/100 g)	1.89 ± 0.04
Vitamin B5 (mg/100 g)	0.625 ± 0.024
Vitamin B6 (mg/100 g)	0.48 ± 0.014
Biotin (mg/100 g)	0.24 ± 0.014
Folacin (µg/100 g)	13.775 ± 0.0025
Choline (mg/100 g)	0.445 ± 0.0035
Vitamin B12 (µg/100 g)	0.0245 ± 0.0005

S.D. = Standard deviation.

The mineral component of *S ganonensis* bark meal is presented in Table 3. It was shown that *S ganonensis* bark meal contains vital minerals confirming Maduka (2004) earlier report that *S gabonensis* is embedded with primary oxidant like copper, zinc, manganese, iron, sodium, magnesium etc which are useful in a lot of biological processes like combating electrolyte imbalance, lipid peroxidation, acid base balance, osmotic balance because of its antioxidative properties. For instance, the large quantity of chloride and fluoride in *S.gabonensis* bark justifies the report that when extract from the bark is used in palm wine, it helps in addressing high blood pressure and issues with teeth. (Maduka, 2004)

Table 3: Mineral component of *S ganonensis* bark meal

Minerals	Composition (%±SD)
Calcium (%)	0.269 ± 0.0028
Potassium (%)	0.7435 ± 0.0025
Phosphorus (%)	0.368 ± 0.001
Sodium (%)	0.2185 ± 0.0016
Sulphur (%)	0.248±0.0004
Chloride (%)	0.3127 ± 0.0004
Magnesium (%)	0.2795 ± 0.001
Iron(mg/kg)	118.885 ± 0.139
Copper(mg/kg)	13.215 ± 0.005
Zinc(mg/kg)	55.9 ± 0.087
Manganese(mg/kg)	28.92 ± 0.022
Molybdenum(mg/kg)	0.053 ± 0.004
Cobalt(mg/kg)	0.028 ± 0.004
Selenium(mg/kg)	0.0205 ± 0.0007

SD. = Standard deviation.

The amino acids composition of *S. ganonensis* bark meal is as presented in Table 4. The results showed the values for four amino acids in *S ganonensis* bark meal.

Table 4: Amino acid composition of *S ganonensis* bark meal

Amino Acids	Composition (%±SD)
Leucine (%)	1.23± 0.014
Lysine (%)	1.795 ± 0.0067
Methionine (%)	1.125 ± 0.0025
Threonine (%)	2.365 ± 0.0035

S.D. = Standard deviation.

The phytochemical composition of *Saccoglotis ganonensis* bark meal is as presented in table 5. The results reveals that *S ganonensis* bark meal contains phytochemicals. In the views of Namratha and Sahithi (2015) the bark, root and leaves extract (methanolic extract) possesses antiviral and antimicrobial activities, this can also be seen in the rich phytochemical content of *S gabonensis* bark meal in this report. Various research that has been carried on medicinal plants has proven that plants are embedded with different types of phytochemicals. According to Edo *et al*, (2022) the presence of these phytochemicals gives plants their medicinal ability while Hammed *et al.* (2022) in their views stated that most of these plants have the ability of increasing blood level, has anti-inflammatory and anti-diabetic properties. Phytochemical such as terpenes, alkaloids, tannins, terpenes and flavonoids forms the major constituents of these plants. These phytochemicals are distinguished in their functions, for instance, the hydroxyl group in phenols provides them with their ability to stabilize unpaired electrons in radicals thus, they are useful in treating ailments associated with free radicals (Onyibe *et al*., 2021) while alkaloids cytotoxicity confers them with the ability of being useful in managing cancerous cells. Some of these plants have the ability to restore inflamed tissues due to the presence of flavonoids (Shoppo *et.al*., 2022).

Table 5: Phytochemical composition of *Saccoglotis ganonensis* bark meal

Phytochemicals	Composition (%±SD)
Phenolic(%)	0.2695 ± 0.0016
Saponin(%)	0.355 ± 0.00063
Tannin(%)	0.0028 ± 0.0002
Oxalate(%)	0.1525 ± 0.0005
Phytate(%)	0.217 ± 0.00063
Flavonoid(%)	0.0033 ± 0.0004
,Steroid(%)	0.0028 ± 0.0004
Alkaloid(%)	0.3265 ±0.0016
Terpenoid(%)	0.0017 ± 0.0001
Cyanogenic Glycoside(%)	0.195 ± 0.0013

SD = Standard deviation.

CONCLUSION

S. gabonensis bark meal contains a lot of nutrients and phytochemicals which can be of great value in animal nutrition. From the background of its rich potential, *S. gabonensis* can be considered as one of such alternative minerals, vitamins, essential amino acids and botanical additives in animal health and nutrition.

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